Initial Environmental Examination

Project Number: 48218-003
July 2017

Prepared by the Department of Local Infrastructure Development and Agricultural Roads, and the Ministry of Federal Affairs and Local Development for the Asian Development Bank.

Environmental Assessment Report

Initial Environmental Examination for Nepal
Project Number: 48218-003 NEP
July 2017

Nepal: Rural Connectivity Improvement Project (387.82 kms)

Prepared by Department of Local Infrastructure and Agricultural Roads, Ministry of Federal Affairs and Local Development for the Asian Development Bank (ADB).

ABBREVIATIONS

AADT	Average Annual Daily Traffic
AC	Asphalt Concrete
CBS	Central Bureau of Statistics
ADB	Asian Development Bank
ADS	Agricultural Development Strategy
BoQ	Bill of Quantities
CBS	Central Bureau of Statistics
CDM	Clean Development Mechanism
CDR	Central District Region
CF	Community Forest
CFC	Chlorofluorocarbon
CFUG	Community Forest User Group
CITES	Convention on International Trade in Endangered Species
CO	Carbon Monoxide
CRU	Climate Research Unit
CSC	Construction Supervision Consultant
DBST	Double Bituminous Surface Treatment
DDC	District Development Committee
DFO	District Forest Office
DG	Diesel Generating
DHM	Department of Hydrology and Metrology
DHO	District Health Office
DNPWC	Department of National Parks and Wildlife Conservation
DOF	Department of Forest
DoHM	Department of Hydrology and Meteorology
DoLIDAR	Department of Local Infrastructure Development and Agricultural Roads
DOS	Department of Statistics
DTMP	District Transport Master Plan
EA	Executing Agency
EDR	Easter District Region
EIA	Environmental Impact Assessment
EMG	Environmental Management Guidelines
EMoP	Environmental Monitoring Plan
EMP	Environmental Management Plan
EPA	Environment Protection Act
EPR	Environment Protection Rules
ES	Environmental Specialist
FGD	Focus Group Discussion
FIDIC	Federation Internationale des Ingenieurs Conseils
GDP	Gross Domestic Product
GHG	Green House Gas
GoN	Government of Nepal
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
GSM	Global System for Mobile Communication
IA	Implementing Agency
IEE	Initial Environmental Examination
IUCN	International Union for Conservation of Nature
ILO	International Labor Organization
LRMP	Land Resources Management Project
LPG	Liquefied Petroleum Gas

MCT	Main Central Trust
MFT	Main Frontal Thrust
MoFALD	Ministry of Federal Affairs and Local Development
MoPE	Ministry of Population and Environment
MWDR	Mid-Western Disrict Region
NAAQS	Nepal Ambient Air Quality Standard
NEP	Nepal
NGO	Non-Governmental Organization
NOx	Nitrogen Oxide
NRN	Nepal Road Network
NRS	Nepal Road Standard
ODS	Ozone Depleting Substance
PCU	Project Coordination Unit
PHCC	Primary Health Care Center
PIP	Priority Investment Plan
PIU	Project Implementation Unit
PMGSY	Pradhan Mantri Gram Sadak Yojana
PPE	Personal Protective Equipment
RCIP	Road Connectivity Improvement Project
REA	Rapid Environmental Assessment
RoW	Right of Way
RRRSDP	Rural Reconstruction and Rehabilitation Sector Development Program
SEMP	Specific Environmental Management Plan
SRES	Special Report on Emission Scenario
SRN	Strategic Road Network
SPS	Safeguard Policy Statement
TA	Technical Assistance
TMO	Transport Management Office
TOR	Terms of Reference
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
VDC	Village Development Committee
WDR	Western District Region

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WEIGHTS AND MEASURES

dBA	decibels A
KWH	Kilowatt-Hour
K VA	Kilo-Volt- Ampere
ppb	Parts Per Billion
ppm	Parts Per Million

CURRENCY EQUIVALENTS (AS OF 20 JUNE 2017)

Currency Unit- Nepalese Rupee (NRs)

$1=NRs 103.32

Notes: The Nepalese calendar year (B.S) runs from mid-April to mid-April. Unless otherwise stated, year ranges written in the form 2015/016 denote a single calendar year.

The fiscal year (FY) of the Government ends on 15 July. FY before a calendar Year denotes the year in which the fiscal year ends (For example, FY 2015 begins on 16 July 2014 and ends on 15 July 2015).

Acts and Regulations are cited under the name of the ministry from which they originate. The official version of Acts and Regulations is published in the Nepal Gazette (in Nepali). Some Acts and Regulations are published by other Government agencies in English (Unofficial translations).

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EXECUTIVE SUMMARY

1. Nepal is a landlocked country in which road transport is overwhelmingly responsible for the transportation of cargo and passengers in the absence of rail, sea or inland waterways. The length of its road network has tripled in the past 10 years, with most of the increase taking place in the rural road network.

2. With the strategic network at nearly 11,000 km (and another 3,000km under construction or planned) and the rural network considered to be approximately 60,000 km in size, the road density is around 48km per 100 square kilometres. Funding for the road sector has tripled in nominal terms over the past 5 years alone and is estimated to be approximately NPR 56 billion for 2011-12. The allocation of this funding is *ad hoc* rather than planned, however, with funding spread over a large number of small projects and expenditure concentrated at the end of the financial year, reducing efficiency and effectiveness. Responsibility for the roads and the traffic on them is shared by several ministries, departments and local bodies whose capacity remains weak, while outsourcing of services other than road works remains very limited.

3. Approximately half the strategic network and less than 5% of the rural road network is paved (totalling approximately 8,000 km of paved roads or 11% of the road network), with most of the network consisting of fair weather roads[4] that, combined with a lack of bridges, make many areas poorly accessible during the rainy season. There is very little planned maintenance, reducing the effective life of the road network and further limiting accessibility. The increased use of equipment in districts undermines the benefits of the traditional labour-based approach, while the involvement of user committees[5] without proper technical assistance results in substandard roads being built that quickly deteriorate and become impassable (half the local road network is currently considered to be impassable). The local road construction industry is able to carry out most road works, but faces problems keeping qualified staff and obtaining a steady flow of contracts as most rural road works tend to be carried out through user committees and strategic road works are often contracted out to international companies.

4. The project will will improve and maintain 27 rural roads with a total length of about 388 kms. These rural roads will be improved to all-weather standards with safety features, climate proofed, and to be maintained by the contractors for 3 years after project completion and defect liability period. In general, the project roads will retain its single lane 3.75 m configuration but will be upgraded to paved condition with 0.75m earthen shoulder on each side, adequate drainage system, and landslide and erosion controls. The project also has a Capacity development component for DoLIDAR to build project management, contract administration, road asset management, road safety, safeguards and detailed design preparation skills.

5. The sub-project roads have been divided into four clusters namely; Central East Districts Cluster (Kathmandu, Bhaktapur, Sindhuli, Dolakha, Kavre, Sindupalchowk), Central West Districts Cluster (Parbat and Chitwan) Eastern Districts Cluster (Sunsari, Morang, Jhapa, Panchthar, Ilam, Dhankutta), and Western Districts Cluster (Rolpa and Rukum). These clusters were also the basis in packaging the civil works contracts.

Environmental Screening and Categorization

6. The project roads were screened and categorized using Rapid Environmental Assessment (REA) and categorized as “B” and therefore this initial environmental examination report was prepared. An initial categorization during the project identification was accomplished and confirmed during fact-finding. Discussions with the Department of National Parks and Wildlife Conservation (DNPWC) officially confirmed all 27 project roads did not encroached to any protected area including buffer zones by overlaying geo-referenced road alignments against official protected areas map. A transect survey of all

roads further confirmed the significance of potential impacts and risks particularly the absence of natural habitats of protected and endangered species further confirming the environmental “B” categorization.

7. The transect surveys of all roads were accomplished using an environment checklists first developed in the IND: (Loan37066-012) India Rural Roads Sector Project or Pradhan Mantri Gram Sadak Yojana (PMGSY) in the 2003 and has been sustained to date under the current sovereign loan 40423-053 IND: Rural Connectivity Investment Program III. This environment checklist was also effectively used in Sri Lanka under the Integrated Road Investment Program (L47273-001). Reconnaissance survey and initial consultations determined the nature of the scope of the IEE and extent of consultations to be carried out along the road alignment. It helped to identify data gaps, decide valued environment components, key stakeholders and key informants who can further substantiate the collected information.

8. The Government of Nepal has categorized each individual road as “B” and IEE reports have been prepared by DoLIDAR and submitted and approved by the Ministrsy of Federal Affairs and Local Development (MoFALD). These IEE reports have been prepared according to the Environmental Protection Act, 2057 and Environmental Protection Rules, 2057 of the Government of Nepal and approved Terms of References.

Status of Legal Compliance

9. DoLIDAR has fully complied wth the environmental assessesment requirement with the approval of the IEE reports. Although no land acquistions will be undertaken under the project and instead voluntary land donations was adopted, this complied with the Land Acquisition and Compensation Act’s consultation and documentation procedures and ADB relevant policies. The DoLIDAR is now in the process of securing forest clearances on 20 of the 27 roads that required tree cutting inside forest lands. Forested sections of the project roads will not be turned-over to the contractors for clearing unless prior clearances are secured by DoLIDAR. During construction stage, the Contractors with support from the Construction Supervision Consultant and the PCU will secure required environmental consents, clearances, and permits to include but not limited to: permission for construction material quarrying; consent to operate hot mix plant, crushers, batching plants; consent for disposal of sewage from labour camps; and vehicle pollution under control certificates.

Key Environmental Baseline

10. The projects roads are distributed in the western, central, and south eastern regions of the country with varied climatic conditions mainly due to altitudinal variation. Rainfall in the project roads comes in the form of summer monsoon rain and winter rains. the season can be defined as: monsoon (June to September), post - monsoon (October to November), winter (December to February), and pre - monsoon (March to May).

11. The topography of the project districts is also varied, Kathmandu, Bhaktapur, Sindhuli, Dhankuta, Parbat, Rolpa are located in plain and partly hills; Dolakkha, Sindupalchok, Chitwan, Ilam, Rukum in the high mountain; along steep slope of the Mahabrata Range are Kavrepalanchok, morang; while in the Terai are Sunsari, Morang, Jhapa districts.

12. Project districts are drained by a number of minor rivers, irrigation canals, and streams. The geology and soil underying the project districts varies from the Quartzite, Schist, Gneiss, Silicate and Phyllite found in Bhaktapur, Chitwan, Parbat, and Rolpa; alluvial and co-alluvial in Kathmandu, Dolakha, Kabhrepalanchok, Sindhupalchok , Sunsari, Jhapa, Panchthar, Ilam, Dhankutta, and Parbat.

13. The project roads have been divided into four clusters namely; Central East Districts Cluster (Kathmandu, Bhaktapur, Sindhuli, Dolakha, Kavre, Sindupalchowk), Central West Districts Cluster (Parbat and Chitwan) Eastern Districts Cluster (Sunsari, Morang, Jhapa, Panchthar, Ilam, Dhankutta), and Western Districts Cluster (Rolpa and Rukum). Out of 16 project districts, 4 districts are located in terai region, 10 in hilly region and 2 in mountain region respectively.

14. The entire country falls in a high earthquake intensity belt: almost the whole of Nepal falls in high intensity scale of MMI IX and X for the generally accepted recurrence period. The seismic zoning map of Nepal, which depicts the primary (shaking hazard), divides the country into three zones elongated in northwest-southeast direction; the middle part of the country is slightly higher than the northern and the southern parts. As per the seismic zone classification of Nepal, project districts lie in mild to most active i.e.; Zone II-V.

15. Of the 27 project roads, 18 are vulnerable to climate change variability and extremes as these are already exposed to flooding, erosion, and landslide risks.

16. Land use pattern of project districts is described briefly in the table below. Of the total project districts area, 43% are forested, 37% are agricultural lands, 9% are shrubland, and 7% are barren. Of the 27 roads, 22 roads crossed community and national forest and 1 on private forest all requiring forest clearances for tree cutting with a total of 83.2 kilometers. All trees affected are not listed under protected status and the corridor of construction is not know to be habitats of protected or endangered species based on the transect survey and consultation with the local communities and wildlife officials. The road side plantation is mixed type and natural regeneration is seen. A total of 5,142 trees have been enumerated within the corridor-of-construction. Predominant species in the project district are Sal, Uttis, Bakaino, Salla, Chilaune, Paiyu etc. Majority of trees are of girth size are between 120-180 cm.

17. According to the latest census of 2011, the project districts population is 7.548 million distributed in 1.713 million households , with an average size of 4.5. The male to female ratio is 98 per 100 and the average project district population density is 644 per square kilometer.

18. All project districts have pre-primary, primary, lower secondary, and higher secondary level educational institutions. The literacy rate above 5 years old is 70.79% with the male population having higher rate at 79.27% compared to the female population with 63.12%. All the VDCs of project area have facility of sub-health post and districts with at least 1 hospital.

19. There are no archeological or historical monuments along the project roads. However, there are a number of religious structures and other community property resources (CPR) including sensitive receptors like schools and health centers. There are 50 schools, 20 temples, 3 health posts, 2 waiting places/sheds, 2 police posts, and 2 community buildings along the project roads in total.

20. The large industries that are operating in the project districts include agro-based and distilleries, pipe and steel, textile, tobacco and, soap and detergent; whereas small industries are cereal processing mills, stones, and bricks. There are small and cottage industries like rice and flour mill, weaving industry located in various settlements of project districts.

21. There are no metallic minerals extraction reported in the project districts. However, perennial and seasonal rivers provide ample supply of sand, boulders, and stones for construction purposes and are even exported to neighboring districts and Indian cities close to the border, especially from Terai districts.

22. Road is the dominant mode of transportation in the project area. Majority of the project households have electricity connections and dependent on firewood for cooking food. Use of LPG and bio-gas are gradually increasing especially in the urban areas.

Impact Assessment and Mitigation Measures

23. Potential adverse impacts due to the proposed project implementation are temporary disruption of public utilities and existing services as electrical poles/line, telephone poles/line, water supply pipelines, existing bus bays, existing cross-drainage structures including canal crossings. A total of estimated 5150 trees will be required to be cleared from community forests along the road alignment of 27 project roads. Water pollution could result from waste disposal and spoil deposits if not properly managed. The road construction will provoke accident risks if the road safety and safe diversion is not managed for smooth flow of traffic. Air pollution due to dust particles and vehicle emissions, pollution of water, poor sanitation, road and work site accidents, social conflicts and other pressures on the local communities are the possible impacts during construction. During the operation stage, soil erosion and scouring of embanked slopes/siltation on farm land due to monsoon rain could occur. Cross-drains may cause erosion of adjacent agricultural fields if not maintained properly.

24. Rehabilitation, extension and construction of adequate drainage and cross-drainage structures are provisioned in the design to avoid alteration of surface water hydrology by maintaining flow and course of stream and irrigation crossings. The mitigation measures such as bio-engineering (seed sowing) for stabilization of embanked slopes and restoration of visual environment, road safety and occupational safety and hazards mitigation will be included in the technical detailed design. Mitigation measures for health and sanitation, pollution control and social and economic impacts are recommended and will be implemented during the project implementation. Strict rules and regulation in the labor and work camp is being provisioned so that any engagement in alcoholic and other bad habits are restricted.

25. Adequate traffic signs and markings, delineators, proper passing bays at bus stops/bus bays, proper junction layout, appropriate entry and exit at access roads and approach to petrol pumps to minimize traffic conflict have been cautiously provisioned in the design for safety of vehicular traffic during operation stage.

26. Most of the mitigation measures are built-in to the project design and cost estimate. However, some of the mitigation costs not included in the project design and construction contract are estimated separately for inclusion in the Civil Works contract. Such costs include the costs for vegetation and plantation of trees, and reinstatement of public utilities/services etc. and cost for monitoring of air, water and noise during construction and operation stage.

27. Environmental management plan (EMP) in the IEE report has identified key issues likely to arise from project implementation, and has proposed mitigation measures, including responsibility. A separate Social Assessment and Resettlement Studies Report have also been prepared by the Social Development and the Resettlement Specialist, respectively under the project prepatory facility. However, the correlated issues such as safety of community and construction crews, safe passages for public, protection of common physical, cultural, religious, historical, archaeological and public utilities/facilities reinstatement are covered under the mitigation plan. Environmental monitoring is an essential component in the implementation of IEE recommendation. The Environmental Monitoring Plan (EMoP) has been prepared to monitor the implementation performance of the EMP.

28. A Grievance Redressal Committee (GRC) will be established at two-levels, one at the District or PIU level and another at PCU level. The GRC will provide an opportunity to

affected person to have their grievances redressed. Depending on the nature and significance of the grievances or complaints, the GRM will comprise procedures to address grievances at the project site or PIU level, PCU level. Most serious complaints which cannot be addressed at the PIU level will be forwarded to the PCU. The PCU level will comprise members from the DOLIDAR, CSC, contractor, local community, and local forestry authority.

Public Consultations

29. Public consultations were organized at two levels namely, (i) district headquarters, and (ii) project level. During consultation, local beneficiaries, affected people and stakeholders expressed various ideas and opinions. Following issues and concerns were raised commonly by local stakeholders and addressed in the project:

- Land acquisition and compensation issues,
- Possibility of displacement of persons and resettlement of the displaced persons,
- Community involvement in the project activities, and
- Support programs/ training needs to the community.

30. The project received immense support from local people, as they perceive that this project will improve the overall connectivity and bring various economic opportunities to the people of the project area.

Conclusion and Recommendations

31. The findings IEE ndicated that impacts are mostly similar and subprojects are unlikely to cause any adverse environmental impacts. While some of the impacts are negative, there are many bearing benefits to the area. Most of the impacts are likely to occur during construction stage, are temporary in nature, and can be mitigated with minor to negligible residual impacts.

32. All 27 roads included under RCIP were selected based on ecological and climate change consideration defined under PAM. Accordingly, none of the roads passes through protected areas or encroaches precious ecology (sensitive or protected areas) or any historical or archeologically protected areas. As per selection guidelines, none of the selected road passes through reserved forests either. Few trees cutting though may be involved.

33. The impacts identified are mostly related to alignment selection, land clearing, borrowing earth, and cutting of trees, shifting of utilities and community structures, establishment of construction camp or material storage areas, transportation of material and operation of hot mix plant. All identified impacts are either eliminated or minimized through design consideration and suitable mitigative measures.

34. Environmental Management plan covering all stages of road construction (design, construction and operation) is prepared with defined responsibility for its implementation. Environmental Monitoring plan is also prepared to ensure effective implementation of EMPs.

35. DOLIDAR has defined institutional setup including specified responsibility for environmental management. Existing capacity of the Department of Local Infrastructure Development and Agricultural Roads (DOLIDAR) and Project Implementation Units (PIUs) for implementing environmental safeguard issues need substantial strengthening. Trained and experienced in-house officials should carry out more training in future periodically.

36. The IEE also indicate that rural road construction works does not warrant further EIA study for subsequent rural road construction works.

Key Recommendations

37. Any major changes or any major additional work other than the proposed project activities will require preparation of another environmental assessment. This additional assessment will have to be submitted to DOLIDAR, Concerned Government authorities and ADB for concurrence before civil works commence.

38. The implementation of prescribed mitigation measures will minimize/avoid the adverse impacts. Moreover, the impacts shall be monitored continually by implementing and updating the Environmental Management plan and Environmental Monitoring Plan. These IEE is prepared based on ECoPs and feasibility stage. Subproject specific EMP shall be improved as per the final provisions made under DPRs. The updated EMP if there is any change shall also be sent to ADB for information.

39. As of August 15, 2017 all roadwise IEE reports have been approved by the MoFALD in compliance with the requirements of Environment Protection Act 1996 and Environment Protection Rules, 1997 (with amendments). All forest clearance applications have been filed with the jurisdictional Distric Forest Offices by the PIUs with assistance from the PCU. No tree cutting shall be allowed until the forest clearance is secured. The contractors however, can start land clearing on stretches outside forestlands. Boundaries of the forestlands shall be clearly marked on the ground through the installation of metal or galvanized iron sign boards in consultation with the forest department.

40. DoLIDAR shall ensure that EMP and EMoP is included in Bill of Quantity (BoQ) and forms part of bid document and civil works contract. The contractor will specify the quantity and budget for various activities like rehabilitation of borrow earth pits, first aid and Sanitation facilities at construction camp and temporary office/material storage place. The same shall be revised if necessary during project implementation or if there is any change in the project design. Any such change shall be reported to ADB as well.

I. INTRODUCTION

A. Project Background

1. Nepal is a landlocked country in which road transport is overwhelmingly responsible for the transportation of cargo and passengers in the absence of rail, sea or inland waterways. The length of its road network has tripled in the past 10 years, with most of the increase taking place in the rural road network.

2. With the strategic network at nearly 11,000 kms with another 3,000km under construction or planned, and the rural network of about 60,000 kms translates to a road density of around 48kms per 100 square kilometres[1]. Approximately half of the strategic network and less than 5% of the rural road network is paved, with a total of approximately 8,000km or 11% of the road network[2], with most of the network consisting of fair weather roads[3]. However, this network is hampered by the lack of bridges and inaccessible during the rainy season.

3. There is very little planned maintenance, reducing the effective life of the road network and further limiting accessibility. The increased use of equipment in districts undermines the benefits of the traditional labour-based approach, while the involvement of user committees[4] without proper technical assistance results in substandard roads being built that quickly deteriorate and become impassable. About half of the local road network is currently considered to be impassable. The local road construction industry is able to carry out most road works, but faces problems keeping qualified staff and obtaining a steady flow of contracts as most rural road works tend to be carried out through user committees and strategic road works are often contracted out to international companies.

B. Rural Connectivity Improvement Project (RCIP)

4. The agriculture sector's contributions of 65-70% of employment and 35% of gross domestic product (GDP) are vital, especially to Neplaese who live and find sustenance in rural areas where poverty is widespread. The Agriculture Development Strategy (ADS) of Government of Nepal recognizes access as one of the major constraints to the development of commercial agriculture value chains. Transport in many high-potential production areas is limited to basic tracks or undeveloped roads, resulting in high transportation costs and losses of product quality and quantity. Only 17% of the rural population on Nepal has access to all-weather roads, compared with 60% in India and 37% in Bangladesh. The ADS recognizes the urgent need for rural road access into productive agricultural areas and provides a target for the upgrading or construction of 50 km of rural roads per district during the first five-year of the strategy period 2015-2020. Quality and coverage of transport infrastructure greatly impact on agricultural and rural communities' access to social and economic services, assistance during emergency events, and access to markets for agricultural inputs and outputs. Improving road connectivity throughout Nepal is a key consideration for ensuring that economic growth reaches rural areas. However, many local

[1] This is much higher than official World Development Indicators and is even high compared to other mountainous countries such as Bhutan (20km/100km^2) and Pakistan (32km/100km^2), reflecting the enormous expansion of the road network in Nepal in the past decade. It is important to note that many of these roads were not properly engineered and often unmaintainable.

[2] This is much lower than the official World Development Indicators which appear to only take into account the strategic network. It is also very low compared to neighbouring countries such as India (50%) and Bhutan (62%), reflecting Nepal's past focus on opening up new roads rather than upgrading existing roads.

[3] Fair weather roads are generally not useable during rains or even during the entire rainy season due to a poor road surface or as a result of a lack of proper cross drainage.

[4] A "User Committee" refers to a committee formed by a group of persons directly benefitting from the formation, implementation, management, repair or maintenance of a particular construction work, which comprises those persons selected by them from among themselves applying a particular procedure (*Local Body Financial Administration Regulations* 1999).

road linkages only offer seasonal access, isolating a large portion of the population during the rainy season. Proposed Rural Connectivity Improvement Project (RCIP) focuses on improving rural roads to all-weather standards, serving the agriculture sector and the rural population and to ensure roads are maintained in a sustainable manner.

Table 1: List of RCIP Roads

S. No.	District Name	Name of Road Sub- Project	Total Length (Km)	Actual Length for RCIP	Cost (NRs.)	Proposed Standard
1	Panchthar	Phidim-Nagin - Sidin - Prangbung - Falot Road **(Phidim - Ludintar Sector)**	34.56	23.56	634,459,464.01	Blacktop
2		Samdin - Chokmangu - Nawamidada - Faktep Ghurbisepanchami Road **(Samdin - Nawamidada Sector)**	14.85	14.85	424,656,375.65	Blacktop
	Total Km		**49.41**		-	
3	Ilam	Nepaltar - Shantidada - Gagrebhangyang - Mangalbare - Dhuseni - Gajurmukhi - Ebhang - Chaturemoad Aadipur - Larumwa - Gharti Dobhan - Chapeti - Beldagi Damak Road **(Ebhang - Chaturemoad Sector)**	13.28	13.28	379,499,182.74	Blacktop
4		Mangalbare - Pungfung - Ektappa Sikari Bhanjyang- Phakphok - Ra.ma.bi. Khambang Chowk - Thingepur - Aamchok - Jungetar - Phuyatappa - Rabi road (Suru bindu khanda)	9.51	9.51	251,824,508.84	Blacktop
	Total Km		**22.79**		-	
5	Jhapa	Padajungi (Lakhanpur)-Guhawari-Laladhbandra-Jharka-Baluwathan-Chapramari-Khajurgachhi	10.003	10.00	182,493,555.49	Blacktop
6		Charpane-Chaitubari-Matigada-Sadhukuti-Khodamara-Rajgadh	15.484	15.48	246,595,996.26	Blacktop
7		Amaldagi - Samayaghad -Baswari - Solmari road	11.509	11.51	181,854,111.88	Blacktop
8		Kharsangwari-Jalthal-Mangalware-Baundoka-Adhikari Chowk Sadak	6.520	6.52	84,154,448.07	Blacktop
	Total Km		**43.516**		-	
9	Morang	Khorshane - Kerawari -Singhadevi Road	26.427	13.62	468,826,879.79	Blacktop
10		Laxmimarga - Dangihat - Banaul- Babiyabirta - Amahi Road	30.496	**28.14**	553,213,010.18	Blacktop

S. No.	District Name	Name of Road Sub- Project	Total Length (Km)	Actual Length for RCIP	Cost (NRs.)	Proposed Standard
	Total Km		**56.923**		-	
11	Sunsari	Inaruwa - Satterjhoda - Chhitaha - Purbakushaha - Biratnagar Road	22.687	12.79	220,335,947.95	Blacktop
12		Jhumka - Shinghiya - Ramdhuni - Prakashpur - Madhuwan - Shukrabare - Paschimkushaha - Laukahi - Boarder Road	30.94	**18.76**	328,220,987.06	Blacktop
	Total Km		**53.627**		-	
13	Dhankuta	Mudheshanischare - Dadagaun - Chanuwa Road	22.34	10.34	344,017,914.76	Blacktop
	Total Km		**22.34**		-	
14	Dolakha	Nayapul - Pawati - Dadakharka Road	18.88	12.08	366,632,053.83	Blacktop
	Total Km		**18.88**		-	
15	Sindhuli	Tallo - Ranibas - Harshadi - Tadi - Dhanshari	12.776	12.78	254,809,015.70	Blacktop
16		Dhudhuli - Lakhima - Ratmata Kartha - Thakur Damar - Arunathakur	13.011	13.01	**325,919,729**	Blacktop
	Total Km		**25.787**		-	
17	Chitwan	Phisling - Tolang - Baspur - Oralang - Mayatar - Tarse - Upradanggadi - Shaktikhor bazar Road	47.987	38.49	1,047,496,729.1	Blacktop
	Total Km		**47.987**		-	
18	Sindhupalchok	Barhabise - Maneswara - Ghumthang - Listi - Bhairabkunda	12.378	12.38	353,228,918.2	Blacktop
	Total Km		**12.378**		-	
19	Kavrepalanchok	Dolalghat - Phalate - Kolati -Dhadkharka-Pokharichauri - Gurase Road	29.629	18.63	475,741,461.12	Blacktop
	Total Km		**29.629**		-	
20	Kathmandu	Badbhanjyang - Sanomasino - Thulomasino -	6.403	6.40	188,475,422.08	Blacktop

S. No.	District Name	Name of Road Sub- Project	Total Length (Km)	Actual Length for RCIP	Cost (NRs.)	Proposed Standard
		Satghumti Road				
	Total Km		**6.403**		-	
21	Bhaktapur	From Bansbari- Bageswori Purano Health Post to VDC Building	4.461	4.46	**147,948,388**	Blacktop
	Total km		**4.461**		-	
22	Parbat	Lunkhu- Mudikuwa Road	19.703	13.00	358,159,145.61	Blacktop
23		Armadi- Banau Road	12.802	12.80	382,863,799.15	Blacktop
	Total km		**32.505**		-	
24	Rukum	Solawang Raule Baluwa Naigadpul Jamaabagar Simalchaur Hukaam Ranmamaikot Road's (Naigadpul-Jamabagar Sector)	19.627	11.63	399,168,901.42	Blacktop
25		Sital Pokhari- Jhulkhet-Chunwang Road	18.42	18.42	590,923,895.57	Blacktop
	Total km		**38.047**		-	
26	Rolpa	Mijhing-Ruinibang-Badachaur-Gumchal-Harjang-Syuri-Gaam Road	23.697	13.70	354,375,178.12	Blacktop
27		Mijhing-Dhulewodaar-Namjaa-Sirp-Pang Road	5.996	6.00	131,983,971.35	Blacktop
	Total Length (km)		**29.693**			
	Grand Total		**494.4**	**382.120**	**9,677,878,990**	

C. Project Objectives

5. The Project aims to improve transport efficiency of the rural road network, which will contribute to expansion of economic opportunities and poverty reduction. This will be realized by: (i) improving the district road network, (ii) facilitating safe and appropriate road usage, (iii) increasing efficiency of transport services and (iv) enhancing DOLIDAR capacity for road asset development and management. Project immediate outcomes will be improved accessibility to social services and markets, increased fuel efficiency, reduced travel time, accidents, vehicle emissions and better employment opportunities outside agriculture, both through improved access to economic centers and increased industrial activities in the project districts.

6. To achieve the above objectives, the project roads will be improved to single/intermediate lane with earthen/gravel shoulders with largely in consistent to Nepal Road Standard (NRS) 2070 and other relevant and DoLIDAR guidelines. Widening and improvement components will include: (i) improvement in pavement conditions and road geometry (ii) reconstruction/widening and provision of additional cross drainage structures, (iii) provision of service roads, lined drains in built-up sections, junction improvement, protection works, bus bays/lay byes and installation of adequate road safety measures etc.

D. Initial Environmental Examination (IEE) Objectives

7. The project environmental screening and categorization using suitable rapid environmental assessment checklist indicated the environmental category 'B' classification in accordance with ADB's Safeguard Policy Statement (SPS), 2009. An initial categorization during the project identification was accomplished and confirmed during fact-finding. Discussions with the Department of National Parks and Wildlife Conservation (DNPWC) officially confirmed all 27 project roads did not encroached to any protected area including buffer zones by overlaying geo-referenced road alignments against official protected areas map. A transect survey of all roads further confirmed the significance of potential impacts and risks particularly the absence of natural habitats of protected and endangered species further confirming the environmental "B" categorization. This initial environmental examination (IEE) identifies the environmental issues to be considered at project planning and design stage. The IEE report covers the general environmental profile of the study area and includes an overview of the potential environmental impacts and their magnitude on physical, ecological, economic, and social and cultural resources within the project's influence area during design, construction, and operation stages. An Environmental Management Plan (EMP) is also proposed as part of this report which includes mitigation measures for significant environmental impacts during implementation of the project, environmental monitoring program, and the responsible entities for mitigation and monitoring. IEE has four basic objectives; (i) identify the environmental issues that should be taken into account due to project interventions (ii) determine the magnitude of potential environmental concerns and to ensure that environmental considerations are given adequate weight at planning/design stage (iii) identify need for further environmental studies or Environmental Impact Assessment (EIA) and (iv) suggest enhancement measures, if any.

8. The Government of Nepal has categorized each individual road as "B" and IEE reports have been prepared by DoLIDAR and submitted and approved by the Ministrsy of Federal Affairs and Local Development (MoFALD). These IEE reports has been prepared according to the Environmental Protection Act, 2057 and Environmental Protection Rules, 2057 of the Government of Nepal and approved Terms of Reference.

E. Extent of IEE

9. IEE extent has been decided considering all likely Impacts and risks analyzed in the context of the project's area of influence. It encompasses: (i) the primary project site(s) and related facilities (ii) associated facilities whose viability and existence depend exclusively on

the project (iii) areas and communities potentially affected by cumulative impacts from further planned development of any existing project or condition, and other project-related developments that are realistically defined at the time of assessment; and (iv) areas and communities potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location. The core zone of impact is taken as proposed corridor-of-construction. In contrast with the road right-of-way (RoW) which is usually covers the area between 10-meter on both sides of the road centerline, the corridor-of-construction can be confined based on availability of land to 3.75m single/intermediate lane with 0.75 m earthen shoulders. The assessment also considers the areas and activities related to associate facilities i.e. quarry operation, borrow areas, construction camp, transportation/haulage routes etc. The study area is considered up to 5 km on either side of road alignment for larger analysis of landuse and other environmental features like protected areas and wildlife habitat. Assessment is carried out for all components of environment covering terrestrial and aquatic ecology, soil, water, noise and socio economic aspects.

F. Study Approach and Methodology

10. This IEE report has been prepared on the basis of feasibility report, field investigations and stakeholder consultations to meet the requirements for environmental assessment process and documentation as per ADB's Safeguard Policy Statement (SPS), 2009. IEE commenced with the review of legal requirements for the project. In next step, technical details were collected compiled by feasibility consultant. This was followed by a discussion with the implementing agency to reconfirm the technical details. Further steps followed for IEE has been concisely described in following paragraphs.

G. Reconnaissance Survey and Initial Consultations

11. This step involves the conduct of transect surveys of all roads using an environment checklists first developed in the IND: (Loan37066-012) India Rural Roads Sector Project or Pradhan Mantri Gram Sadak Yojana (PMGSY) in the 2003 and has been sustained to date under the current sovereign loan 40423-053 IND: Rural Connectivity Investment Program III. This environment checklist was also effectively used in Sri Lanka under the Integrated Road Investment Program (L47273-001). Samples of the environmental are provided in Appendix I. Reconnaissance survey and initial consultations determined the nature of the environmental survey and extent of consultations to be carried out along the road alignment. It helped to identify data gaps, decide valued environment components, key stakeholders and key informants who can further substantiate the collected information.

1. Primary Data Collection

12. The environmental checklist required the compilation of key environmental features i.e. terrain, landuse, waterways/water bodies, road side vegetation, sensitive receptors, common property resources, utilities, drainage, flooding/water logging, industries, accident prone areas etc. within the area of interest/core zone. Similarly, tree survey was also carried out. Baseline monitoring was conducted at the locations for which data was not available in environmental assessment report conducted by detailed design team.

2. Secondary Data Collection

13. Secondary sources included detail design report, published government reports, environmental impact assessments conducted in the similar region, government websites, recognized institutions and relevant government departments (forest, irrigation, statistics, Department of Hydrology and Meteorology (DoHM) etc. Pertinent information including consultations and public hearing from the IEE reports approved by MoFALD were integrated in this report.

3. Public Consultations

14. Meaningful consultations were organized with the government agencies, local people/beneficiary population to know the level of project acceptability, understand their concerns, apprehensions, and overall opinion. Information were gathered about existing baseline environmental condition viz. ambient levels and its effects on health, water resources, flora and fauna, socio-economic standing of local people, impact due to loss of land other assets and common property resources, accident risk during construction and operation stage, perceived benefits and losses, etc. Information thus gathered was used to integrate it in project design and formulate mitigation measures and environmental management plan.

4. Other Tools, Additional Surveys and Studies

15. Climate risk screening identified flood, erosion, and landslide as major risks which may adversely impact the road components like, pavement, embankment and cross drainage structures during design life. To minimize these risks it is essential to incorporate various measures in design. Details of structures, history of floods, water logging/low lying areas, road stretches and bridge liable to submergence along the project road, erosion, and landlisde prone areas were collected during field visit and the same was corroborated with information available with design team.

1. Assessment of Potential Impacts

16. The assessment of the type, nature, direct, indirect, cumulative or induced impacts and their significance to the physical, biological, and socio-economic components of the environment has been done to ascertain whether the project is environmentally sustainable or not. Nature of impacts has been classified as significant, insignificant, short-term, long-term, reversible, irreversible etc. After identification of nature and extent of impacts, mitigation measures have been suggested.

2. Preparation of the Environment Management Plan

17. A general Environment Management plan has been formulated with an aim to avoid, reduce, mitigate, or compensate for adverse environmental impacts/risks and propose enhancement measures. This includes (i) mitigation of potentially adverse impacts (ii) monitoring of impacts and mitigation measures during project implementation and operation (iii) institutional capacity building and training (iii) compliance to statutory requirements (iv) integration of EMP with Project planning, design, construction and operation. Road-specific EMPs will be prepared by the construction supervision consultant (CSC) in coordination with the Project Coordination Unit (PCU).

H. Structure of IEE Report

18. The IEE has been prepared based on the requirements of the Environment Protection Act (EPA), 1996 and Environment Protection Rules (EPR), 1997 of the Government of Nepal (GoN), and the ADB Safeguard Policy Statement (SPS), 2009. The content covers following eight chapters, including this introduction chapter:

Chapter – 1: Introduction
Chapter – 2: Policy, Legal and Administrative Framework
Chapter – 3: Description of Project
Chapter – 4: Description of Environment
Chapter – 5: Anticipated Impacts and Mitigation Measures
Chapter – 6: Public Consultation and Information Disclosure
Chapter - 7: Environmental Management Plan
Chapter – 8: Grievance Redress Mechanism
Chapter – 9: Conclusion and Recommendation

II. DESCRIPTION OF THE PROJECT

A. Project Background

19. In Nepal, the agriculture sector contributes 65–70% of employment and 35% of gross domestic product. Poverty however remains widespread in rural areas. The Government of Nepal (the Government) signed the Agricultural Development Strategy (ADS) in 2015 recognizing that the agriculture sector was performing below its potential in providing food and fiber, materials for processing and manufacturing, and employment and income. The Government recognized that dramatic changes in strategy were needed if the sector was to perform to its potential and raise the sector's long term annual growth rate from 3% to government's goal of 5%. The ADS underscores access as one of the major constraints to the development of commercial agriculture value chains. Transport in many high-potential production areas is limited to basic tracks or undeveloped roads, resulting in high transport costs and losses of quality and quantity. Only 17% of the rural population in Nepal has access to all-weather roads, compared with 60% in India and 37% in Bangladesh. The project will focus on improving rural roads to all-weather standards, serving the productive agricultural areas and the rural population at sixteen poor districts[5]and ensuring roads are maintained in a sustainable manner.

20. The impact of the project will be improved connectivity between rural communities, productive agricultural areas and socioeconomic centers in Nepal, aligned with the government's Fourteenth Plan (FY2017-2019).[6] The outcome will be increased transport efficiency on project roads.

21. The project will deliver two outputs: (i) improved road conditions between the selected rural communities, productive agricultural areas and socioeconomic centers, and (ii) enhanced capacity of road agency. The two outputs will be achieved through two components:

(i) *Road improvement component.* This component will improve, and maintain about 388 km of rural roads. The rural roads will be improved to all-weather standards with safety features and climate proofed,[7] and be maintained for 3 years.[8] (ii) Capacity development component. This component will build the capacity of DOLIDAR in project management, contract administration, road asset management, road safety, safeguards and detailed design preparation. Consulting services will be engaged to assist with development of the DoLIDAR's capacity.

B. Location of the Project

22. The 27 sub-project roads under RCIP are located in 16 districts of Nepal namely: Kathmandu, Bhaktapur, Dolakha, Sindhuli, Kabhrepalanchok, Sindhupalchok, Chitwan, Sunsari, Morang, Jhapa, Panchthar, Ilam, Dhankutta, Parbat, Rolpa and Rukum.

23. The Federal Democratic Republic of Nepal is a country situated in South Asia between India and China. Administratively Nepal is divided into Provinces, Districts, Village development committees, Metropolitan areas and Municipalities. As of 20 September 2015 Nepal is divided into 7 provinces. They are defined by schedule 4 of the new constitution, by grouping together the existing districts.

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[5]Panchthar, Ilam, Jhapa, Morang, Sunsary, Dhankuta, Sindhuli, Kavre, Sindhupalchowk, Dolakha, Bhaktapur, Kathmandu, Chitwon, Parbat, Rolpa and Rukum.
[6]Government of Nepal, National Planning Commission. 2016. *The Fourteenth Plan (FY2017–2019)*. Kathmandu.
[7]Structural and non-engineering measures to cope with the predicted increase in intensity and variability in rainfall and temperature and resulting occurrence climatic induced disasters that includes floods, landslides and debris flows
[8]Performance-based maintenance (PBM) will be undertaken for 3 years after construction.

24. The sub-project roads have been divided into four clusters namely; Central East Districts Cluster (Kathmandu, Bhaktapur, Sindhuli, Dolakha, Kavre, Sindupalchowk), Central West Districts Cluster (Parbat and Chitwan) Eastern Districts Cluster (Sunsari, Morang, Jhapa, Panchthar, Ilam, Dhankutta), and Western Districts Cluster (Rolpa and Rukum). These clusters were also the basis in packaging the civil works contracts.

Table 2: Administrative and Ecological Belt of RCIP Districts

Development Region	Ecological Belt			Total
	Mountain	Hill	Terai	
Eastern		Dhankutta, Panchthar, Ilam	Sunsari, Morang, Jhapa	6
Central	Sindhupalchok, Dolakha	Kathmandu, Bhaktapur, Sindhuli, Kabhrepalanchok	Chitwan	7
Western		Parbat		1
Mid-western		Rolpa, Rukum		2
Total	**2**	**10**	**4**	**16**

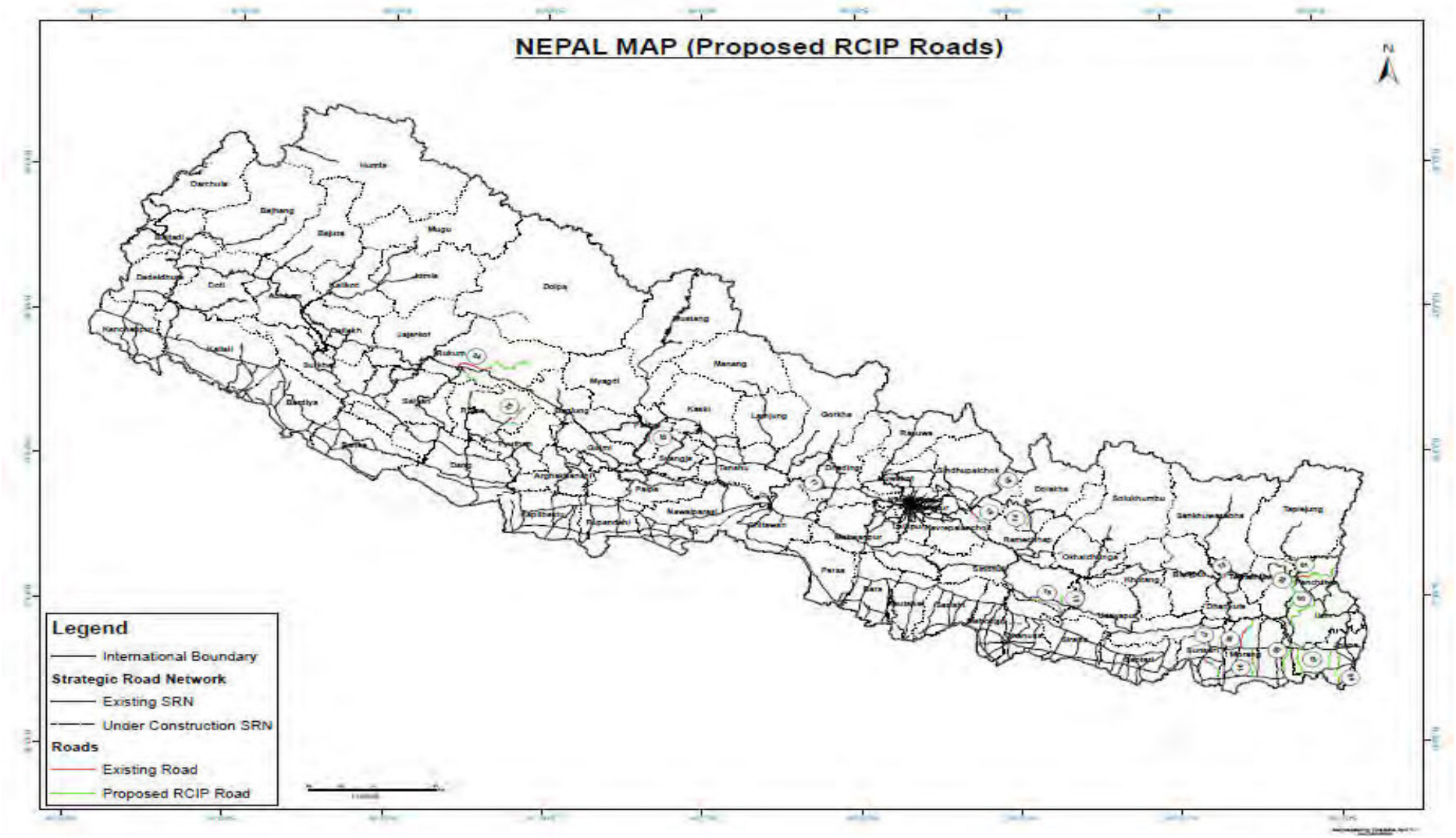


Figure 1: Location Map of Project Roads

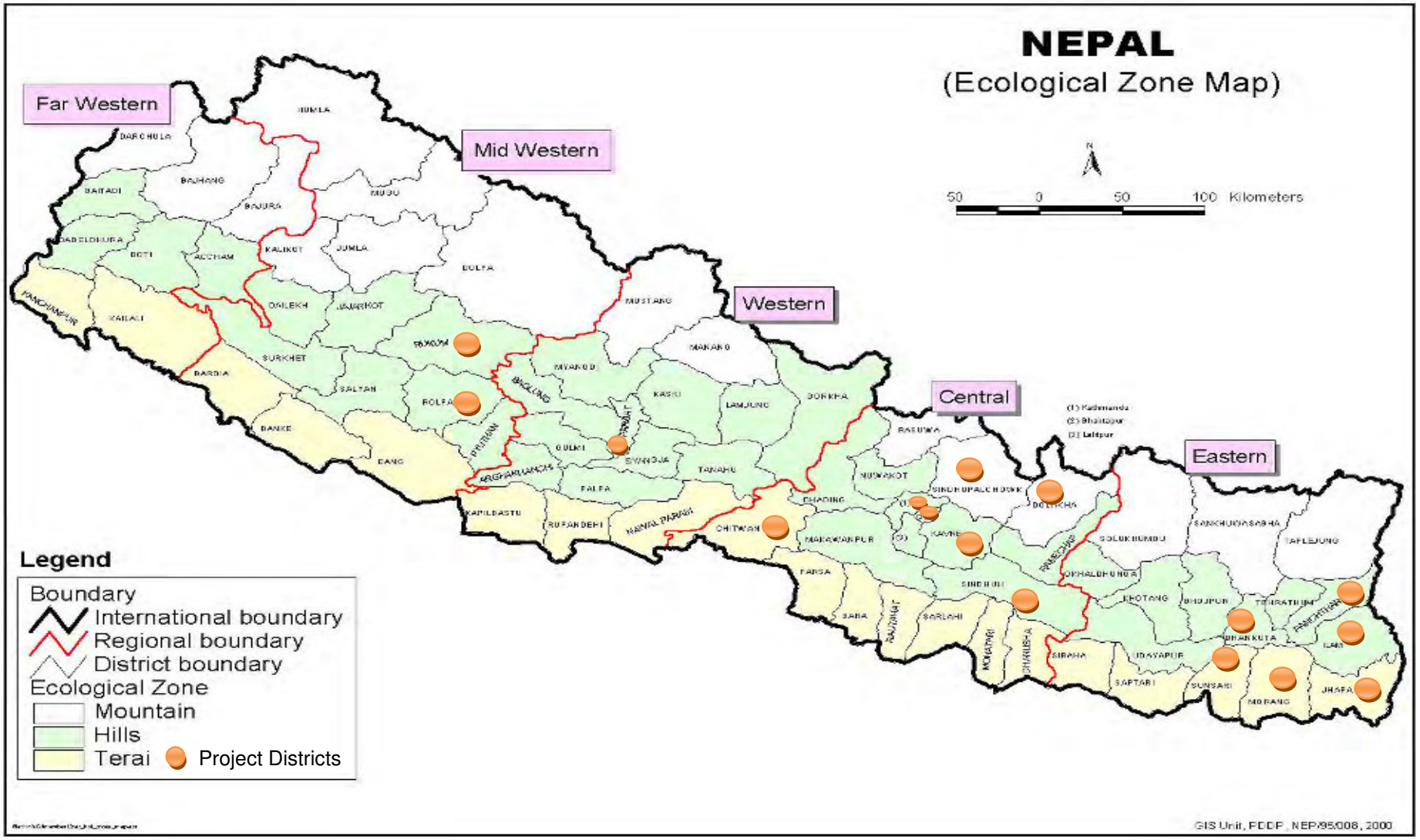


Figure 2: Project Roads and Ecological Zones of Nepal

C. Project Category

25. The Asian Development Bank's-Roads and Highways-Rapid Environmental Assessment (REA) Checklist **(Appendix A)** along with the Project/Site Description were prepared. This is a road upgrading project from 2 lanes to 4 lanes. This upgrading is to meet single lane Nepalese design standard within the existing right-of-way (RoW) and categorized by ADB as Environment Category B since some adverse issues of lesser degree are involved with it for environmental assessment and therefore, an IEE is prepared.

D. Characteristics of Existing Roads

26. Existing roads under RCIP have varying width and road conditions. ROW is generally 20 m in most cases with reduced width in settlements varying from 3 to 4 m. Major part is 1-lane with or without earthen shoulder. Riding condition is mostly poor to fair. Roadside drains are present in some urban stretches but mostly choked and non-functional. Overtopping of roads is not observed in general but water-logging is very common in built-up areas. Waterways are being crossed in most of the hilly roads. Major bridges are present only on 5 roads.

27. Most of the roads have inadequate road safety provisions. Horizontal and vertical profiles are incoherent to applicable code provisions. Horizontal curve is mostly insufficient in built-up areas. Vertical curves are deficient to severely deficient throughout the stretches of all sub-projects. Abutting land use is mainly agricultural along majority of roads. Others are dominated by forest, fallow/barren land. Inhabited portion varies from 5-15% of the total alignment along most of the roads.

E. Improvement/Strengthening Proposal

28. Existing road's characteristics and proposal for improvement has been summarized in Table 2 below.

Table 3: RCIP Road's Salient Features and Improvement Proposals

<table>
<tr><th>Road</th><th>Existing Road's Salient Features</th><th>Improvement Proposal</th></tr>
<tr><td>Panchthar District</td><td></td><td></td></tr>
<tr><td>Phidim-Nagin - Sidin - Prangbung - Falot Road (Phidim - Ludintar Sector)</td><td>Length=34.56 km
Location: Starts from Adalat chowk of Phidim Municipality in Panchthar district and terminates at Muwa khola, Ludintar of Prangbung VDC in Panchthar
district.
Habitations are Tritiya, Pipalbote, Dairy bazaar, Akashebhangyang, Bansbote, Ogemba
ROW: 20m
Configuration: Single lane (35 km)

Terrain and Land use: Mainly hilly with few stretches rolling/hilly. Land use mainly agricultural.
Stream/drainage at 0+820,2+055, 2+125, Ch 3+275, Ch 4+227, Ch 6+875, Ch 7+196, Ch 20+658, Ch 22+539, Ch 22+678, Ch 22+622, Ch 23+941, Ch 24+924, Ch 29+247 and Ch 31+860.</td><td>- Project Road Length : 23.56 Km
- Configuration: single lane of 3.75m with earthen shoulder of 0.75m on either side
- Cross Drainage Structures:
<table><tr><th>Type of Work</th><th>Quantity</th></tr><tr><td>Pipe culvert</td><td>89</td></tr><tr><td>Box Culvert</td><td>4 no.</td></tr><tr><td>Concrete Causeway</td><td>8 no.</td></tr></table></td></tr>
<tr><td>Samdin - Chokmangu - Nawamidada - Faktep Ghurbisepanchami Road (Samdin - Nawamidada Sector)</td><td>Length – 14.85 km
Location – Starts from Samdin of Phidim Municipality in Panchthar district and terminates at Nawami Dada Bazaar of Nawami Dada VDC in Panchthar district.
- The road alignment passes through various settlements such as Jorkula, Maidane, Dumrebote, Simaltar, Kanyatar, Sepyani and Chuniya dada.
- The road alignment passes through Phidim Municipality & Nawamidada VDC.
- The road alignment is existing earthen track of about 3.5 m width,
- The alignment passes through forests, and cultivated land, crossing streams (Khola/Kholsi) at several locations.
- RoW – 20 m, Roadway width is 5.25 m.</td><td>- Project Road Length : 14.85 Km
- Configuration: Road width of 5.25 m, single lane of 3.75m with earthen shoulder of 0.75m on either side
- Drainage Structures:
<table><tr><td>Drainage</td><td>Drain</td><td>15767</td><td>Rm</td></tr><tr><td></td><td>Pipe culvert</td><td>20</td><td>Nos</td></tr><tr><td></td><td>Concrete causeway</td><td>14</td><td>Nos</td></tr></table></td></tr>
<tr><td>Ilam District</td><td></td><td></td></tr>
</table>

Road	Existing Road's Salient Features	Improvement Proposal
Nepaltar - Shantidada - Gagrebhanjyang -Mangalbare - Ebhang - Chaturemode Aadipur - Larumwa - Chapeti - Beldagi Damak Road **(Ebhang - Chaturemode Sector)**	- Length – 13.28 km - Location – Starts from Ibhang of Ibhang VDC in Ilam district and terminates at Chature of Ibhang VDC in Ilam district. - The road alignment passes through various settlements such as Ibhang, Pauwa Gaun, Gurung Gaun, Samatar. - The road alignment passes through Ibhang VDC only. - The road alignment is existing earthen track of about 3.5 m width, - The alignment passes through Agricultural land, forest and Shrub land with some scattered barren land, crossing streams (Khola/Kholsi) at several locations. - Significant streams that cross the road section include Tama Khola at chainage 3+858 and Maija Khola. - Various minor streams and Kholsi crosses the road alignment at chainage of 3+855, 4+236, 4+482, 4+553, 4+657 and 5+ 143. - RoW – 20 m.	- Project Road Length : 13.28 Km - Configuration: Road width of 5.25 m, single lane of 3.75m with earthen shoulder of 0.75m on either side - Cross Drainage Structures: Pipe culvert – 25; Box culvert – 10; Causeway - 12

<table>
<tr><th>Road</th><th>Existing Road's Salient Features</th><th>Improvement Proposal</th></tr>
<tr><td>Mangalbare - Pungfung - Ektappa Sikari Bhanjyang- Phakphok - Ra.ma.bi. Khambang Chowk - Thingepur - Aamchok - Jungetar - Phuyatappa - Rabi road (Suru bindu khanda) Road</td><td>- The road is 9.51 km
- The designed RoW of the road is 10 m from the center line of the road.
- It starts at New Bus Park, Mangalbare of Mangalbare VDC and ends at Ra.Ma.Bi. Kolbote of Phakphok VDC of Illam District at an altitude of 250 to 3960 masl.
- It passes along some rural settlements such as Mangalbare, Punphung, Hangmasuli, Sikari Bhanjyang , Kolbote and hills.
- The project road does not cross any major river.
- The current land use in the project site is forestland (8%), cultivated land (78%), settlement (12%) and other (2%).</td><td>- Project Road Length – 9.51 km
- Configuration: Road width of 5.25 m, single lane of 3.75m with earthen shoulder of 0.75m on either side
- Bypass: Nil
- Cross Drainage Structures:<table><tr><th>Type of Work</th><th>Quantity</th></tr><tr><td>Bridge</td><td>1</td></tr><tr><td>Pipe culvert</td><td>33</td></tr><tr><td>Box Culvert</td><td>3</td></tr><tr><td>Concrete Causeway</td><td>7</td></tr></table></td></tr>
<tr><td>Jhapa District</td><td></td><td></td></tr>
<tr><td>Padajungi (Lakhanpur)-Guhawari-Laladhbandra-Jharka-Baluwathan-Chapramari-Khajurgachhi Road</td><td>- The road is 10.00 km
- The designed RoW of the road is 10 m from the center line of the road.
- It starts at Padajungi Chowk (East-West Highway) of Lakhanpur VDC and ends at Tallo Jharkaha of Lakhanpur VDC of Jhapa District at an altitude of 130 to 1040 masl.
- It passes along some rural settlements such as Padajungi- Gohawari-Laldhwandra-Jharkaha.
- The project road does not cross any major river.
- Most of the lands have been used for cultivation, which is followed by settlement.</td><td>- Project Road Length: 10.00 Km
- Configuration: Road width of 5.25 m, single lane of 3.75m with earthen shoulder of 0.75m on either side
- Bypass: Nil
- Cross Drainage Structures: 9 pipe culverts</td></tr>
</table>

<table>
<tr><th>Road</th><th>Existing Road's Salient Features</th><th>Improvement Proposal</th></tr>
<tr>
<td>Charpane-Chaitubari-Matigada-Sadhukuti-Khodamara-Rajgadh</td>
<td>
- The road is 15.484 km
- The designed RoW of the road is 10 m from the center line of the road.
- It starts at Charpane Chowk (East-West Highway) of Birtamod Municipality (Charpane VDC) and ends at Rajgadh Chowk of Rajgadh VDC at an altitude of 122 to 85 masl.
- It passes along some rural settlements such as Charpane chowk, Chaitubari, Matigada, Baradasi, Ghodamara and Rajgadh Bazzar.
- The project road does not cross any major river.
- The current land use in the project road is agricultural land, small market area, forest and settlements alongside the road
</td>
<td>
- Project Road Length: 15.48 Km
- Configuration: 6.75 m (3.75 m carriage way and 1.5 m shoulder on either side).
- Bypass: Nil
- Cross Drainage Structures:
<table>
<tr><th>Type of Work</th><th>Quaity</th><th>Unit</th></tr>
<tr><td>Side Drain</td><td>1500</td><td>Rm</td></tr>
<tr><td>Pipe culvert</td><td>7</td><td>Nos</td></tr>
<tr><td>Slab culvert</td><td>1</td><td>Nos</td></tr>
</table>
</td>
</tr>
<tr>
<td>Amaldagi - Samayaghad -Baswari - Solmari Road</td>
<td>
- The road is 11.509 km
- The designed RoW of the road is 10 m from the center line of the road.
- It starts at Amaldangi of Topgacchi VDC and ends at Solmari of Topgacchi VDC of Jhapa District at an altitude of 137 to 98 masl.
- It passes along some rural settlements such as Mangalbare, Punphung, Hangmasuli, Sikari Bhanjyang , Kolbote and hills.
- The project road does not cross any major river.
- The current land use in the project site is cultivated land, settlement and others.
</td>
<td>
- Project Road Length: 11.56 Km
- Configuration: 1 lane of 6.75 m (3.75 m carriage way and 1.5 m shoulder on either side)
- Bypass: Nil
- Drainage Structures:
<table>
<tr><th>Type of Work</th><th>Quantity</th><th>Unit</th></tr>
<tr><td>Side Drain</td><td>1100</td><td>Rm</td></tr>
<tr><td>Pipe culvert</td><td>5</td><td>Nos</td></tr>
</table>
</td>
</tr>
</table>

<table>
<tr><th>Road</th><th>Existing Road's Salient Features</th><th>Improvement Proposal</th></tr>
<tr><td>Kharsangwari-Jalthal-Mangalware-Baundoka-Adhikari Chowk Sadak Road</td><td>- The road is 6.52 km
- The designed RoW of the road is 10 m from the center line of the road.
- It starts at New Bus Park, Mangalbare of Mangalbare VDC and ends at Ra.Ma.Bi. Kolbote of Phakphok VDC of Illam District at an altitude of 250 to 3960 masl.
- It passes along some rural settlements such as Mangalbare, Punphung, Hangmasuli, Sikari Bhanjyang , Kolbote and hills.
- The project road does not cross any major river.
- The current land use in the project site is forestland (8%), cultivated land (78%), settlement (12%) and other (2%).</td><td>- Project Road Length: 6.52 Km
- Configuration: 1 lane of 6.75 m (3.75 m carriage way and 1.5 m shoulder on either side)
- Bypass: Nil
- Drainage Structures:
<table><tr><th>Type of Work</th><th>Quantity</th><th>Unit</th></tr><tr><td>Side Drain</td><td>1000</td><td>Rm</td></tr><tr><td>Pipe culvert</td><td>5</td><td>Nos</td></tr><tr><td>Box culvert</td><td>1</td><td>Nos</td></tr></table></td></tr>
<tr><td>Morang District</td><td></td><td></td></tr>
<tr><td>Khorshane - Kerawari -Singhadevi Road</td><td>- The road is 26.427 km
- The designed RoW of the road is 10 m from the center line of the road.
- It starts at Kerabari chowk of Kerabari VDC and ends at Basantatar of Singhadevi VDC of Morang District at an altitude of 338 to 1805 masl.
- It passes along some rural settlements such as Mangalbare, Punphung, Hangmasuli, Sikari Bhanjyang , Kolbote and hills.
- The road crosses 4 small springs (almost dry except in rainy season) at Ch. 10+694, 10+821, 11+390, 24+492 and 25+149 (spring water runs at this chainage).
- The land use patterns of formation width are categorized into cultivated land, forest land and built up area.</td><td>- Project Road Length: 13.62 Km
- Configuration: 1 lane of 1 lane of 6.75 m (3.75 m carriage way and 1.5 m shoulder on either side)
- Bypass: Nil
- Cross Drainage Structures:
<table><tr><th>Type of Work</th><th>Quantity</th></tr><tr><td>Pipe culvert</td><td>73</td></tr><tr><td>Slab Culvert</td><td>5</td></tr><tr><td>Concrete Causeway</td><td>20</td></tr></table></td></tr>
</table>

Road	Existing Road's Salient Features	Improvement Proposal
Laxmimarga - Dangihat - Banaul- Babiyabirta - Amahi Road	- The road is 30.496 km - The designed RoW of the road is 10 m from the center line of the road. - The average road width of road from starting point to Ch. 7+090 km and Ch. 12+760 to Ch. 14+110 is 7 meters and rest of the road alignment is 5.4 meters. - It starts at Laxmimarga Chowk of Dagihat VDC (at East-West Highway) and ends at Khayarbani Chowk of Amahi Bariyati VDC (at Nepal-India Border) of Morang District at an altitude of 147 to 67 masl. - It passes along some rural settlements such as Laxmimarga Chowk, Dangihaat Bazzar, Haat Khola, Karsiya Bazzar, Laliya Chowk, Amahi. - The project road does not cross any major river. - The current land use in the project site is cultivated land, settlement and others.	- Project Road Length: 28.14 Km - Configuration: 1 lane of 1 lane of 6.75 m (3.75 m carriage way and 1.5 m shoulder on either side) - Bypass: Nil - Cross Drainage Structures: 88 nos. Pipe culvert
Sunsari District		

<table>
<tr><th>Road</th><th>Existing Road's Salient Features</th><th>Improvement Proposal</th></tr>
<tr>
<td>Inaruwa - Satterjhoda - Chhitaha - Purbakushaha - Biratnagar Road</td>
<td>
- The road is 22.687 km
- The designed RoW of the road is 10 m from the center line of the road.
- It starts at Inaruwa, Inaruwa Municipality and ends at Bridge at Sunsari and Morang Border(near Kanchanbari,Morang) of Sunsari District at an altitude of 86 to 79 masl.
- It passes along some rural settlements such as Inaruwa, Satterjhoda, Chitaha, Purbakusaha.
- Road crosses seven small streams, and in two occasions, passes adjacent to irrigation canal. List of those streams is given below.
<table>
<tr><th>River/Stream/Drainage</th><th>Chainage</th></tr>
<tr><td>Gadan khola</td><td>3+720</td></tr>
<tr><td>Thalaha budi khola</td><td>9+660</td></tr>
<tr><td>Dhonga khola</td><td>10+770</td></tr>
<tr><td>Tangra khola</td><td>18+080</td></tr>
<tr><td>Tangra khola</td><td>18+300</td></tr>
<tr><td>Dhansunna khola</td><td>18+250-18+2760</td></tr>
<tr><td>Keshaliya khola</td><td>22+920</td></tr>
</table>
- The current land use in the project site is cultivation, settlements, small sized orchards, and pond for various purposes.
</td>
<td>
- Project Road Length: 12.79 Km
- Configuration: 1 lane of 5.25 m (3.75 m carriage way and 0.75 m shoulder on either side)
- Bypass: Nil
- Cross Drainage Structures:
<table>
<tr><th>Type of Work</th><th>Quantity</th></tr>
<tr><td>Pipe culvert</td><td>30</td></tr>
<tr><td>Slab Culvert</td><td>6</td></tr>
</table>
</td>
</tr>
</table>

<table>
<tr><th>Road</th><th>Existing Road's Salient Features</th><th>Improvement Proposal</th></tr>
<tr><td>Jhumka - Shinghiya - Ramdhuni - Prakashpur - Madhuwan - Shukrabare - Paschimkushaha - Laukahi - Boarder Road</td><td>
- The road is 30.94 km
- The designed RoW of the road is 10 m from the center line of the road.
- It starts at Jhumka Chowk (at East West Highway) of Bhadgaun Sinuwari VDC and ends at Laukahi Chowk of Laukahi VDC (East West Highway) of Sunsari District at an altitude of 107 to 86 masl.
- It passes along some rural settlements such as Shingiya, Ramdhuni, Prakashpur, Sukrabare, Madhuban, Paschim Kusaha & Laukahi.
- The road crosses six small streams and passes along side Koshi irrigation canal.
<table>
<tr><td>Chainage</td><td>River/Stream/Drainage</td></tr>
<tr><td>2+310</td><td>Singiya khola</td></tr>
<tr><td>3+480</td><td>Sehra khola</td></tr>
<tr><td>5+495</td><td>Pichra khola</td></tr>
<tr><td>6+340</td><td>Amha khola</td></tr>
<tr><td>9+450</td><td>Sunsari khola</td></tr>
<tr><td>9+950</td><td>Prakashpur cannal</td></tr>
</table>
- The current land use in the project site is forest, cultivated land, settlement and others.
</td><td>
- Project Road Length: 18.76 Km
- Configuration: 1 lane of 6.75 m (3.75 m carriage way and 1.5 m shoulder on either side)
- Bypass: Nil
- Cross Drainage Structures:
<table>
<tr><th>Type of Work</th><th>Quantity</th></tr>
<tr><td>Pipe culvert</td><td>22</td></tr>
<tr><td>Slab Culvert</td><td>4</td></tr>
</table>
</td></tr>
<tr><td>Dhankuta District</td><td></td><td></td></tr>
<tr><td>Mudheshanischare - Dadagaun - Chanuwa Road</td><td>
- The road is 22.34 km
- The designed RoW of the road is 10 m from the center line of the road.
- It starts at Mudheshanischare of Dandagaun VDC and ends at Chanuwa of Chanuwa VDC of Dhankuta District at an altitude of 215 to 2140 masl.
- It passes along some rural settlements such as Mudheshanischare, Dandagaun, Chanuwa etc.
- The project road crosses some minor streams.
- The current land use in the project site is comprised of farmland (both irrigated and rainfed), forest and shrub lands, settlement areas and some scattered barren land.
</td><td>
- Project Road Length: 10.34 Km
- Configuration: 1 lane of 5.25 m (3.75 m carriage way and 0.75 m shoulder on either side)
- Bypass: Nil
- Cross Drainage Structures:

Pipe culvert – 63
Slab Culvert – 1
Concrete Causeway – 11
Irrigation Crossing – 2

</td></tr>
</table>

Road	Existing Road's Salient Features	Improvement Proposal
Dolakha District		
Nayapul - Pawati - Dadakharka Road	- The road is 18.88 km - The designed RoW of the road is 10 m from the center line of the road. - It starts at Nayapul (Tamakoshi), Ward no-6, Bhimeshwor Municipality and ends at Pokhari, Ward no-4 of Bhedpu VDC of Dolakha District at an altitude of 1367 to 1275 masl. - It passes along some rural settlements such as Chaurange, Fasku, Saute, Adharikhola, Satdobatepati, Mirge, Sagthakur, Ghang, Bhetpu, Ghang pokhari. - The project road crosses few minor streams. - The road alignment comprises of 25% of forest, 40 % of settlement, and 25 % cultivation land and remaining 10% of barren/bush land.	- Project Road Length: 12.08 Km - Configuration: 1 lane of 5.25 m (3.75 m carriage way and 0.75 m shoulder on either side) - Bypass: Nil - Cross Drainage Structures: ➢ Side drain – 21154.65 m ➢ Pipe culvert – 62 ➢ Slab culvert – 9 ➢ Concrete causeway - 16
Sindhuli District		
Tallo - Ranibas - Harshadi - Tadi - Dhanshari	- The road is 12.776 km - The designed RoW of the road is 10 m from the center line of the road. - It starts at Jhunga, Ward no 9 of Nipane VDC and ends at Bhatahi, Jagadi ward no-8 of Harshahi VDC of Sindhuli District at an altitude of 1250 to 1800 masl. - It passes along some rural settlements such as Jhunga, Thana Khahare, Khuttepani, Panchadhara, Nipane Gaun, Laxmipur, Kalapani gaun, Adhikari Tole, Kalapani, Bastole, Rajabas, Bhatahi , Jagadi. - The project road crosses few minor rivers at Ch. 00+500, 3+290, 3+610, 5+200, 6+750, 9+710, 11+000, 12+280. - The current land use in the project site is forest area followed by cultivation land, and Barren land.	- Project Road Length: 12.78 Km - Configuration: 1 lane of 5.25 m (3.75 m carriage way and 0.75 m shoulder on either side) - Bypass: Nil - Cross Drainage Structures: ➢ Pipe culvert – 17 ➢ Slab culvert - 13 ➢ Concrete causeway – 14 ➢ Gabion causeway - 6

<table>
<tr><th>Road</th><th>Existing Road's Salient Features</th><th>Improvement Proposal</th></tr>
<tr><td>Dhudhuli - Lakhima - Ratmata Kartha - Thakur Damar - Arunathakur</td><td>- The road is 13.011 km
- The designed RoW of the road is 10 m from the center line of the road.
- It starts at Lakhima Dokandanda Ward No. 5 of Dudhauli VDC and and finally reaches to Kalikhola Gaun Ward No 2 of Arun Thakur VDC of Sindhuli district at an altitude of 1250 to 1400 masl.
- It passes along some rural settlements such as Mangalbare, passes through Lakhima Danda, Deurali, Ratmate, Jalkanya, Bamda, Kamitar, Dahar, Dudhbhanjyang, Kamikhola.
- The project road crosses few streams along the road section as Lakhima khola, Katha khola, Jalkani khola, Tekan khola, Chisapani khola, Sisang khola etc.
- The current land use in the project site is forest area, cultivated land, barren land.</td><td>- Project Road Length: 13.01 Km
- Configuration: 1 lane of 5.25 m (3.75 m carriage way and 0.75 m shoulder on either side)
- Bypass: Nil
- Cross Drainage Structures:
➢ Pipe culvert – 28
➢ Slab culvert - 3
➢ Concrete causeway – 9
➢ Gabion causeway – 1
➢ Irrigation crossing - 2</td></tr>
<tr><td>Chitwan District</td><td></td><td></td></tr>
<tr><td>Phisling - Tolang - Baspur - Oralang - Mayatar - Tarse - Upradanggadi - Shaktikhor bazar Road</td><td>- The road is 47.987 km
- The designed RoW of the road is 10 m from the center line of the road. The average road width of the alignment is 3.5 meters. About 3 km road of the alignment is gravelled and rest of the other parts of road is earthen
- It starts at Phisling Bazar, Darechok VDC and ends at Milan Bazar of Shaktikhor VDC of Chitwan District at an altitude of 325 to 335 masl.
- It passes along some rural settlements such as Phisling Bajar, Tokdang village, Majhagaun, Chautaragaun, Tolang village, Baspur village, Dumkinggaun, Mayatar village, Terse village, Upperdanggadi village, Darbetar village, Milanbazar.
- Rhiddhi Khola (22+180), Shikhari Khola (39+520) and Darbetar Khola (40+100) are the rivers which are crossed by the road alignment. Similarly, 12 numbers (13+950, 17+110, 17+290, 19+530, 19+830, 20+140, 20+570, 20+740, 20+850, 32+850, +32+600, 32+100,) of small streams crosses the road alignment.
- The current land use in the project site is settlement areas, cultivation area, forest area, and bush area and grass land.</td><td>- Project Road Length: 38.49 Km
- Configuration: 1 lane of 5.25 m (3.75 m carriage way and 0.75 m shoulder on either side).
- Bypass: Nil
- Cross Drainage Structures:
<table><tr><th>Type of Work</th><th>Quantity</th></tr><tr><td>Pipe culvert</td><td>59</td></tr><tr><td>Slab Culvert</td><td>2</td></tr><tr><td>Concrete Causeway</td><td>2</td></tr></table></td></tr>
<tr><td colspan="2">Sindhupalchok District</td><td></td></tr>
</table>

<table>
<tr><th>Road</th><th>Existing Road's Salient Features</th><th>Improvement Proposal</th></tr>
<tr><td>Barhabise - Maneswara - Ghumthang - Listi - Bhairabkunda</td><td>- The road is 12.378 km
- The designed RoW of the road is 10 m from the center line of the road.
- It starts at Barabise, Ward no 7 of Ramche VDC and ends at Dandagaun ward no 8 of Ghumthang VDC of Sindhupalchok District at an altitude of 757 to 1300 masl.
- It passes along some rural settlements such as Pakhara Gaun, Sawa Besi, Dalbari, Nepal Gaun, Borabari,Dandakhet, Maneshwara, Khipin, Sangbari,Chapleti and Dandagaun , Eklebensi, Nepalgaun,Golmathan, Majuwa, , Dandagaun.
- The project road crosses few minor streams like Andheri khola (1+950), Damar khola (3+500), Ghatte khola (5+300), Govindedovan khola (5+900), Kavre khola (6+500), Bete khola (7+100), Chapleti khola (8+900).
- The current land use in the project corridor is forest area, settlement, cultivation, grass land.</td><td>- Project Road Length: 12.38 Km
- Configuration: 1 lane of 5.25 m (3.75 m carriage way and 0.75 m shoulder on either side).
- Bypass: Nil
- Cross Drainage Structures:
<table><tr><th>Type of Work</th><th>Quantity</th></tr><tr><td>Pipe culvert</td><td>19</td></tr><tr><td>Slab Culvert</td><td>8</td></tr><tr><td>Concrete Causeway</td><td>39</td></tr></table></td></tr>
<tr><td colspan="2">Kabhrepalanchok District</td><td></td></tr>
<tr><td>Dolalghat - Phalate - Kolati -Dhadkharka- Pokharichauri - Gurase Road</td><td>- The road is 29.629 km
- The designed RoW of the road is 10 m from the center line of the road.
- It starts at at Zero Kilo, Bhumlutar VDC and ends at at Chauri Khola of Pokhari Chauri VDC of Kabhrepalanchok District at an altitude of 741 to 800 masl.
- It passes along some rural settlements such as Phalate Village, Kolati Village, Gothapani Village, Sungure Village, Dhadkharka Vanjyang, Majhapani Village and Pokhari Chauri Village.
- Raspat Khola (1+425 km), Jhyape Khola (9+230 km), Sungure Khola (15+650 km) and Charuri Khola are the river which is crossed by the road alignment.
- The land use pattern of the area through which the road passes have been classified into five categories: cultivation land, forest land, grass land, bush and barren land.</td><td>- Project Road Length: 18.63 Km
- Configuration: 1 lane of 5.25 m (3.75 m carriage way and 0.75 m shoulder on either side)
- Bypass: Nil
- Cross Drainage Structures:
<table><tr><th>Type of Work</th><th>Quantity</th></tr><tr><td>Pipe culvert</td><td>32</td></tr><tr><td>Box Culvert</td><td>5</td></tr><tr><td>Concrete Causeway</td><td>2</td></tr></table></td></tr>
<tr><td>Kathmandu District</td><td></td><td></td></tr>
</table>

<table>
<tr><th>Road</th><th>Existing Road's Salient Features</th><th>Improvement Proposal</th></tr>
<tr><td>Badbhanjyang - Sanomasino - Thulomasino - Satghumti Road</td><td>- The road is 6.40 km
- The designed RoW of the road is 10 m from the center line of the road.
- It starts at Badbhanjyang Chowk located in Badbhanjyang VDC (now Chandragiri municipality) of Kathmandu district and ends at Lapse of Naubise VDC, Dhading district at an altitude of 1520 to 1451 masl.
- It passes along some rural settlements such as Badbhanjyang, Deurali Dada, Gotha Dada, Milan Chaur, Kafal Chaur, Kattike Dada, Soldhunga, Sano Masino and Lapse.
- The project road crosses Sikte Khola and Khani Khola..
- The current land use in the project site is forest land, cultivated land, built-up, barren land and shrubs.</td><td>- Project Road Length: 6.40 Km
- Configuration: 1 lane of 5.25 m (3.75 m carriage way and 0.75 m shoulder on either side)
- Bypass: Nil
- Cross Drainage Structures:
<table><tr><th>Type of Work</th><th>Quantity</th></tr><tr><td>Pipe culvert</td><td>28</td></tr><tr><td>Slab Culvert</td><td>4</td></tr><tr><td>Concrete Causeway</td><td>1</td></tr></table></td></tr>
<tr><td>Bhaktapur District</td><td></td><td></td></tr>
<tr><td>Bansbari- Bageswori Purano Health Post to VDC Building</td><td>- The road is 4.461 km
- The designed RoW of the road is 10 m from the center line of the road.
- It starts at Bansbari Chowk, Sudal VDC and end at Way to VDC Building, Bageswori VDC of Bhaktapur District at an altitude of 1365 to 1477 masl.
- It passes along some rural settlements such as Sudal-5, Sudal VDC and Health-post area of Bageswori VDC.
- The road crosses the streams at several locations and these are at 0+546, 0+685, 1+822, 2+240, 2+622, 2+812, 2+974, 3+019, 3+108, 3+264, 3+325, 3+411, 3+551, 3+640, 3+882, 3+972, 4+095, 4+175 and 4+383.
- The current land use within the RoW is agricultural land (77.4%) as dominant land use followed by Settlement (20%), forest and barren land.</td><td>- Project Road Length: 4.46 Km
- Configuration: 1 lane of 5.25 m (3.75 m carriage way and 0.75 m shoulder on either side)
- Bypass: Nil
- Cross Drainage Structures:
<table><tr><th>Type of Work</th><th>Quantity</th></tr><tr><td>Pipe culvert</td><td>16</td></tr><tr><td>Box culvert</td><td>1</td></tr><tr><td>Slab Culvert</td><td>2</td></tr><tr><td>Concrete Causeway</td><td>2</td></tr><tr><td>Irrigation crossing</td><td>2</td></tr></table></td></tr>
<tr><td>Parbat District</td><td></td><td></td></tr>
</table>

<table>
<tr><th>Road</th><th>Existing Road's Salient Features</th><th>Improvement Proposal</th></tr>
<tr><td>Lunkhu- Mudikuwa Road</td><td>- The road is 19.703 km
- The designed RoW of the road is 10 m from the center line of the road.
- It starts at Lunkhu of Lunkhu Deurali VDC and ends at Mudikuwa of Mudikuwa VDC of Parbat District at an altitude of 775 to 1575 masl.
- It passes along some rural settlements such as Lunkhu, Duktang, Kurgha, Phalewas, Dharapani, and Mudkuwa.
- The road crosses the streams at several locations at Ch. 0+269, 0+684, 0+879, 1+033, 1+750, 7+500, 7+553, 8+146, 8+681, 9+200, 10+000, 10+946, 11+230, 12+230, 15+565, and 16+220.
- The current land use in the project site is forestland (52.12%), cultivated land (39.41%), barren land (0.65%), settlement (5.21%) and shrubs (2.61%).</td><td>- Project Road Length: 13.00 Km
- Configuration: 1 lane of 5.25 m (3.75 m carriage way and 0.75 m shoulder on either side)
- Bypass: Nil
- Cross Drainage Structures:
<table><tr><th>Type of Work</th><th>Quantity</th></tr><tr><td>Bridge</td><td>1</td></tr><tr><td>Pipe culvert</td><td>33</td></tr><tr><td>Slab Culvert</td><td>2</td></tr><tr><td>Concrete Causeway</td><td>9</td></tr></table></td></tr>
<tr><td>Armadi- Banau Road</td><td>- The road is 12.802 km
- The designed RoW of the road is 10 m from the center line of the road.
- It starts at Armadi of Khurkot VDC (at present this VDC is part of Kusma municipality) and ends at Banou of Banou VDC of Parbat District at an altitude of 1400 to 2100 masl.
- It passes along some rural settlements such as Pang and Banou.
- The project road crosses streams at Ch. 8+650, 8+925 and (9+786.
- The current land use in the project area includes forests (37.5%), agricultural land (25.8%), Kharbari (18.4%), settlement (9.3%), shrub land (7.3%) and remaining other land use type.</td><td>- Project Road Length: 12.80 Km
- Configuration: 1 lane of 5.25 m (3.75 m carriage way and 0.75 m shoulder on either side)
- Bypass: Nil
- Cross Drainage Structures:
<table><tr><th>Type of Work</th><th>Quantity</th></tr><tr><td>Pipe culvert</td><td>29</td></tr><tr><td>Slab Culvert</td><td>4</td></tr><tr><td>Concrete Causeway</td><td>1</td></tr></table></td></tr>
<tr><td>Rolpa District</td><td></td><td></td></tr>
</table>

<table>
<tr><th>Road</th><th>Existing Road's Salient Features</th><th>Improvement Proposal</th></tr>
<tr>
<td>Mijhing-Ruinibang-Badachaur-Gumchal-Harjang-Syuri-Gaam Road</td>
<td>- The road is 23.697 km
- The designed RoW of the road is 10 m from the center line of the road.
- It starts at Runiwan, Mijhing VDC and ends at Lapse, Gaun, Gaam VDC of Rolpa District at an altitude of 1082 to 1273 masl.
- It passes along some rural settlements such as Ruinibang, Ratmate Gaun/ Sewar Gaun, Gumchaal Gaun, Syuri Gaun.
- The project road crosses two major river of the area i.e. Lungri and Bojang.
- The current land use within the RoW is forestland (55%), cultivated land (12%), built-up (11%), barren land (18%) and 4% other areas.</td>
<td>- Project Road Length: 13.70 Km
- Configuration: 1 lane of 5.25 m (3.75 m carriage way and 0.75 m shoulder on either side)
- Bypass: Nil
- Cross Drainage Structures:
<table>
<tr><th>Type of Work</th><th>Quantity</th></tr>
<tr><td>Pipe culvert</td><td>73</td></tr>
<tr><td>Slab Culvert</td><td>0</td></tr>
<tr><td>Concrete Causeway</td><td>8</td></tr>
</table>
</td>
</tr>
<tr>
<td>Mijhing-Dhulewodaar-Namjaa-Sirp-Pang Road</td>
<td>- The road is 5.996 km
- The designed RoW of the road is 10 m from the center line of the road.
- It starts at Mijhing of Mijhing VDC and ends at Pang of Pang VDC of Rolpa District at an altitude of 1082 to 1273 masl.
- It passes along some rural settlements such as Barjibang, Namja, Malle Patan.
- The project road crosses minor streams at Ch. 0+226, 0+245, 0+260, 2+205, 2+786, 2+824 and 3+112.
- The current land use in the project site is forestland (53.64%), cultivated land (35.64%), barren land (7.94%) and shrubs (2.78%).</td>
<td>- Project Road Length: 6.00 Km
- Configuration: 1 lane of 5.25 m (3.75 m carriage way and 0.75 m shoulder on either side)
- Bypass: Nil
- Cross Drainage Structures:
<table>
<tr><th>Type of Work</th><th>Quantity</th></tr>
<tr><td>Pipe culvert</td><td>10</td></tr>
<tr><td>Slab Culvert</td><td>3</td></tr>
<tr><td>Concrete Causeway</td><td>2</td></tr>
</table>
</td>
</tr>
<tr><td colspan="2">Rukum District</td><td></td></tr>
</table>

<table>
<tr><th>Road</th><th>Existing Road's Salient Features</th><th>Improvement Proposal</th></tr>
<tr><td>Solawang Raule Baluwa Naigadpul Jamaabagar Simalchaur Hukaam Ranmamaikot Road's (Naigadpul-Jamabagar Sector)</td><td>- The road is 19.627 km
- The designed RoW of the road is 10 m from the center line of the road.
- It starts at Baluwa of Kada VDC and ends at Simalchaur, Kol VDC of Rukum District at an altitude of 1154 to 1513 masl.
- It passes along some rural settlements such as Baluwa, Deu Khola, Manam, Jamabagar, Jugena, Jugade, Ghabang Simalchaur.
- Sani Bheri is the major river in the proposed road alignment and other minor streams are at Ch. 2+110, 3+580, 12+130, 12+790, 13+630, 14+00, 14+520, 15+210, 16+910, 17+210, and 17+880.
- The land use along the project alignment mainly comprises of forest (62%), agricultural land (3%), grassland (4%), water body 14% and other 17%.</td><td>- Project Road Length: 11.63 Km
- Configuration: 1 lane of 5.25 m (3.75 m carriage way and 0.75 m shoulder on either side)
- Bypass: Nil
- Cross Drainage Structures:11</td></tr>
<tr><td>Sital Pokhari- Jhulkhet-Chunwang Road</td><td>- The road is 18.42 km long.
- The designed RoW of the road is 10 m from the center line of the road.
- It starts at Shital Pokhari of Musikot Municipality and ends at Galampati of Chaukhabang VDC of Rukum District at an altitude of 250 to 3960 masl.
- It passes along some rural settlements such as Shital Pokhari, Tharadhunga, Jhinja, jhulkhet, Holtara, Chun, Galampati, Gairigaun.
- The main river in the project area is Sankh Khola. Other rivers & kholsi lies in the alignment are Ghorneta Khola (5+860), Tyau Khola (3+900).
- The landuse is dominated by cultivation (53%), forest (35%), grass (10%), others (2%).</td><td>- Project Road Length: 18.42 Km
- Configuration: 1 lane of 5.25 m (3.75 m carriage way and 0.75 m shoulder on either side)
- Bypass: Nil
- Cross Drainage Structures: 62
<table><tr><th>Type of Work</th><th>Quantity</th></tr><tr><td>Bridge</td><td>5</td></tr><tr><td>Pipe culvert</td><td>48</td></tr><tr><td>Concrete Causeway</td><td>19</td></tr></table></td></tr>
</table>

Figure 3: Cross-section of Rural Roads

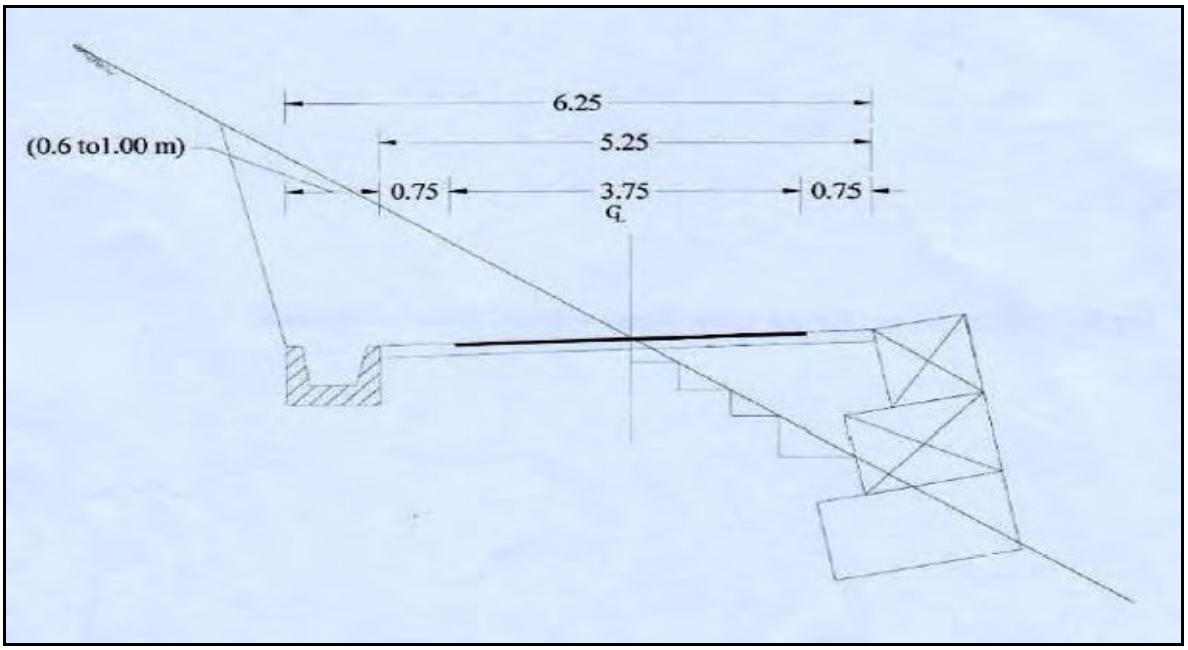


Figure: Single Lane Road with drain in Hill

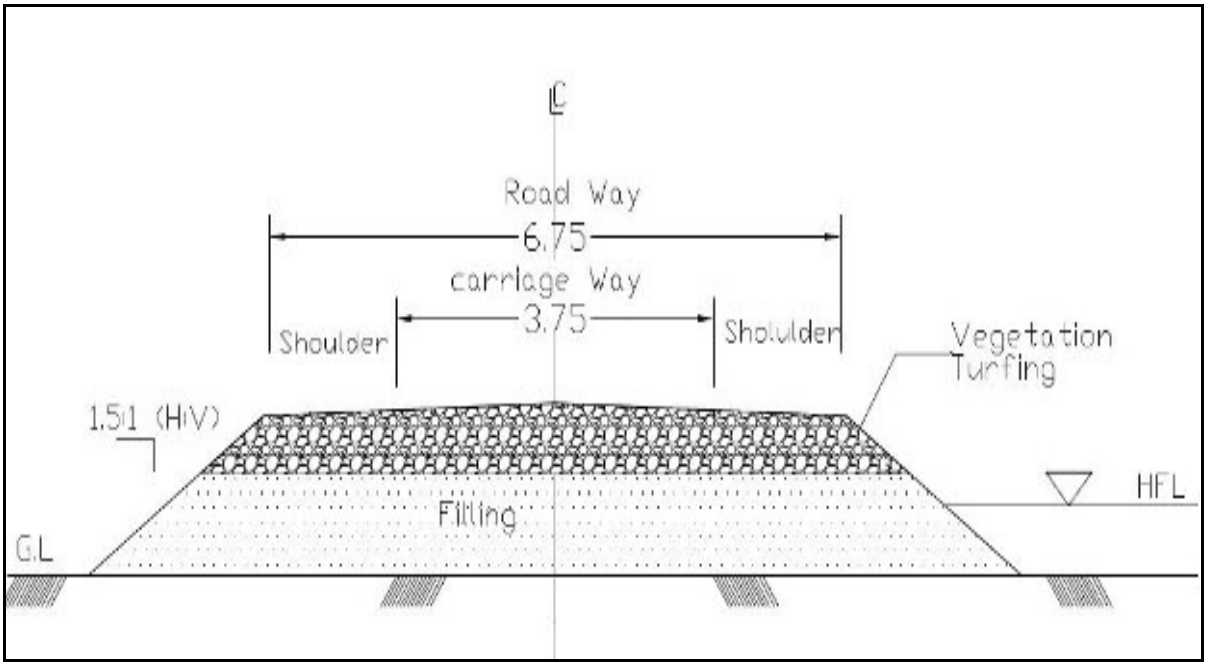


Figure: Single Lane Road in Terai

F. Traffic

29. The present traffic data on each of these rural roads typically varies between 5-10 vehicles per day on most of the rural stretches. The traffic largely comprises motorcycles, tractors, light commercial vehicles, animal drawn carts and bicycles etc.

Table 4:Projected Traffic

S. No.	Name of Road Section	Traffic Volume		Remarks
		PCU	vpd	
1.	Phidim - Nagin - Sidin - Prangbung - Falot Road (Phidim - Ludintar Sector) Road	15	10	District Transport Master Plan (DTMP)
2.	Samdin - Chokmangu - Nawamidada - Faktep Ghurbisepanchami Road (Samdin - Nawamidada Sector) road in Panchthar District	70	45	Economic analysis
3.	Mangalbare - Pungfung - Ektappa Sikari Bhanjyang-Phakphok - Ra.ma.Vi. Khambang Chowk - Thingepur - Aamchok - Jungetar - Phuyatappa - Rabi road (Suru bindu khanda) Road	38	17	as per DTMP
4.	Nepaltar-Shantidada-Gagrebhanjyang-Mangalbare-Dhuseni-Gajurmukhi-Chaturemod Aadipur-Larumwa-Gharti Dobhan-Chapeti-Beldagi Damak Road (Ebhang-Chaturemod Sector)	45	18	
5.	Amaldagi - Samayaghad -Baswari - Solmari Road	240	247	
6.	Charpane - Chaitubari - Matigada - Sadhukuti - Khodamara - Rajgadh Road	266	262	
7.	Kharsangwari-Jalthal-Mangalware-Baundoka-Adhikari Chowk Road	165	180	
8.	Padajungi (Lakhanpur)-Guhawari-Laladhbandra-Jharka-Baluwathan-Chapramari-Khajurgachhi Road	112	85	
9.	Khorshane - Kerabari -Singhadevi Road	410	139	
10.	Laxmimarga - Dangihat - Banaul- Babiyabirta - Amahi Road	501	167	
11.	Inaruwa - Satterjhoda - Chhitaha - Purbakushaha - Biratnagar Road	206		
12.	Jhumka - Shinghiya - Ramdhuni - Prakashpur - Madhuwan - Shukrabare - Paschimkushaha - Laukahi Road	334		
13.	Mudheshanishchare - Dadagaun – Chanuwa Road	87.44	20	
14.	Nayapul - Pawati - Dadakharka Road (Dolakha)	35	19	
15.	Dudhauli-Lakhima-Arunthakur Road	17	8	
16.	Tallo Ranibas - Harshahi - Tandi Dhanshari Road	17	6	
17.	Phisling - Tolang - Bashpur - Oralang - Mayatar - Terse – Upardang Gadi - Shaktikhor Bazaar Road	12	5	
18.	Barhabise - Maneswara - Ghumthang - Listi - Bhairavkunda Road	60	46	
19.	Dolalghat - Phalate - Kolati - Dadakharka - Pokharichauri Road	22	9	
20.	Bansbari-Bageshori Purano Health Post to VDC Building Road	250	170	
21.	Badbhanjyang - Sanomasino - Thulomasino - Satghumti Road	110	80	
22.	Mudikuwa - Lunkhu Road	96	56	
23.	Armadi - Banau Road	32	23	
24.	Sitalpokhari - Jhulkhet - Chunwang Road	25	19	
25.	Solabang - Baluwa Nayegadpul - Jamabagar-Simalchaur-Hukam- Ranmaikot Road	41	42	

26.	Mijhing – Dhuleodar – Namja – Sirpa Road	21	12	
27.	Mijhing-Ruinibang-Badachaur-Gumchal-Harjang-Syuri-Gaam Road	11	11	

G. Construction Material

30. Due to favorable topography and geological conditions, aggregates for the project is available in abundance in most of the project districts with an average lead distance of 20-40 kms. Good earth for embankment is also available within 0-5 km lead distance for all subprojects. Soil for these sub-projects will be transported from nearby upland/foothills located within 15 km from project roads. Sand is also available in plenty in beds of rivers being crossed by the project roads. Total quantity of construction material requirement is approximately 1168140 cu. m earth, 745000 cu.m. stone, 425000 cu. m. soil/gravel, 222400 cu.m. aggregates and 2425700 litre of bitumen[9] Water requirement for construction will be met through combination of ground water and surface water.

H. Cost and Implementation Schedule

31. Project construction period will be about 24 months followed by 3 year performance based maintenance. Concessionaire will be recruited for the construction and maintenance related works. Estimated total project cost is approximately NRs. 968 Crore.

[9] Calculation is based on average taken from sample roads and multiplied with total project road length to get the approximate quantity

III. POLICY AND LEGAL FRAMEWORK

32. This chapter presents a review of the international agreements and commitments, existing institutions and legislations relevant to the project at the National and State level. The environmental assessment process needs to adopt environmental regulations and guidelines of Government of Nepal (GoN) and ADB's safeguard requirements.

A. International Agreements and Commitments

33. Nepal is party to various international agreements/conventions/treaties for conservation of environment at global level. Important agreements and commitments have been briefly described and analyzed vis-a-vis the project development.

34. **Ramsar Convention on Wetlands, 1971:** The Convention on Wetlands, signed in Ramsar, Iran, in 1971, is an inter-governmental treaty, which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The convention entered into force in Nepal on 17 April 1988. Nepal currently has 10 sites designated as Wetlands of International Importance (Ramsar Sites). Out of 10 designated wetlands of International Importance in Nepal, none of them is located in project influence area.

35. **Convention on Protection of the World Cultural and Natural Heritage, 1972:** The United Nations Educational, Scientific and Cultural Organization (UNESCO), which seeks to encourage the identification, protection and preservation of cultural and natural heritage around the world considered to be of outstanding value to humanity has embodied these objectives in an international treaty called the Convention concerning the Protection of the World Cultural and Natural Heritage in 1972. In Nepal, there are 2 cultural and 2 natural mixed sites. None of them is located in project influence area.

36. **Vienna Convention for Protection of the Ozone layer, 1985 and Montreal Protocol on Substances Depleting the Ozone layer, 1987:** The Vienna Convention outlines states responsibilities for protecting human health and the environment against the adverse effects of ozone depletion, and established the framework under which the Montreal Protocol was negotiated. The Montreal Protocol stipulates that the production and consumption of compounds that deplete ozone in the stratosphere chlorofluorocarbons (CFCs), halons, carbon tetrachloride, and methyl chloroform) are to be phased out by 2010. The project does not envisage production and consumption of ODS.

37. **United Nations Framework Convention on Climate Change (UNFCC), 1994:** As per the convention the reduction/limitation requirements of Green House Gases (GHG) apply only to developed countries. The only reporting obligation for developing countries relates to the construction of a GHG inventory (GHG sources and sinks, potential vulnerability to climate change, adaptation measures and other steps being taken to address climate change). Nepal ratified the protocol on September 16, 2005 and became the signatory of the protocol on 14 December, 2005. Nepal is categorized as non annex countries. Hence the country is not obliged to set a reduction target like the Annex I countries and it can only participate in the Clean Development Mechanism (CDM) of the protocol. However Nepal can raise its voice to receive resources for adaptation and mitigation through the Conference of Parties, as individual country or via group of countries.

38. **Convention on Biological Diversity (CBD) 1992:** The Convention on Biological Diversity (CBD) is dedicated to promoting sustainable development and came into force in 1992 Rio Earth Summit. India signed the CBD in 1994. Member Parties have committed themselves to achieve by 2010, a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on earth.

39. **The Convention on International Trade in Endangered Species of Wild Fauna and Flora, (CITES), 1973:** Nepal became party to CITES in 1975. CITES has facilitated international co-operation to regulate international trade in endangered wild flora and fauna with the aim of reducing or eliminating trade in species whose numbers or conditions suggest that further removal from their natural habitat would lead to their extinction. The National Parks and Wildlife Conservation (NPWC) Act, 1973 regulates the trade of species listed in CITES appendices. The Government has designated the Natural History Museum (Tribhuvan University) and the Department of Plant Resources as the scientific authorities for wild fauna and wild flora respectively. Similarly, the Government has designated the Department of National Parks and Wildlife Conservation and the Department of Forest as the management authorities for wild fauna and flora respectively. The Convention urges Parties not to allow trade in specimens of species included in the CITES Appendices I, II and III except in accordance with the provisions of the Convention.

B. ADB Safeguard Policy Statement, 2009

40. The ADB SPS, 2009 aims to avoid, minimise or mitigate harmful environmental and social impacts and help the borrower strengthen their safeguard system. It also provides a platform for participation by affected community in project design and implementation.

41. All roads proposed to be upgraded under the Strategic Road Improvement Project (SRIP) were screened and categorized using Rapid Environmental Assessment (REA). The REA consist of questions relating to: (i) the sensitivity and vulnerability of environmental resources in the sub-project area, and (ii) the potential for the sub-project to cause significant adverse environmental impacts. These roads are then classified into one of the following categories:

- **Category A.** Projects with potential for significant adverse environmental impacts. An Environmental Impact Assessment (EIA) is required to address significant impacts.
- **Category B.** Projects judged to have some adverse environmental impacts, but of lesser degree and/or significance than those for category A projects. An IEE is required to determine whether or not significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.
- **Category C.** Projects unlikely to have adverse environmental impacts. No EIA or IEE is needed although environmental implications are still reviewed.

42. The project road has been classified as Category “B”.

43. All ADB investments are subject to an environmental assessment to address environmental impacts and risks. The environmental assessment starts with screening and categorization; followed by baseline data collection, impact analysis, environmental management planning, information disclosure, consultation and participation, grievance Redressal mechanism development, EMP implementation, and reporting.

C. Country’s Legal Framework and Regulatory Requirements for the Project

44. In Nepal, various legal instruments are in place to ease the integration of environmental aspects in development proposals. The study team has reviewed, but not limited to the following legislative provisions and guidelines of Nepal.

Table 5: Review of Environmental Acts, Regulations and Guidelines

S. No.	Environmental Acts, Regulations and Guidelines	Description of Requirements
1	Environment Protection Act, 2053 BS (1997 AD)	Any development project, before implementation, to pass through environmental assessment, which may be either IEE or an EIA depending upon the location, type and size of the projects.
2	Environment Protection Rule, 2054 BS (1997 (amendment, 2009 AD)	Obliges the proponent to inform the public on the contents of the proposal in order to ensure the participation of stakeholders.
3	Forest Act, 2049 BS (1993 AD)	Sections 68 of the Forest Act, 1993 empowers the government in case of no alternatives, to provide parts of any types of forests for the implementation of a national priority plan with assurance that it does not adversely affect the environment significantly. Section 49 of the Act prohibits reclaiming lands, setting fires, grazing, removing or damaging forest products, felling trees or plants, wildlife hunting and extracting boulders, sand and soil from the national forest without prior approval from DFO.
4	Forest Rules, 2051 BS (1995 AD)	Elaborate legal measures for the conservation of forests and wildlife. Rule 65 of the Forest Regulation stipulates that in case the execution of any project having national priority in any forest area causes any loss or harm to any local individual or community, the proponent of the project itself shall bear the amount of compensation to be paid.
5	National Park and Wildlife Conservation Act, 2029 BS (1973 AD)	Addresses for conservation of ecologically valuable areas and indigenous wildlife. The Act further prohibits wildlife hunting, construction of houses and huts, damage to plants and animals etc. within the park and reserve, without the written permission of the authorized person.
6	The Labor Act, 2048 BS (1992 AD)	Regulates the working environment, Deals with occupational health and safety.
7	Local Self Governance Act, 2055 BS (1999 AD)	Empowers the local bodies for the conservation of soil, forest and other natural resources and implements environmental conservation activities. Sections 28 and 43 of the Act provide the Village Development Committee (VDC) a legal mandate to formulate and implement programs related to the protection of the environment during the formulation and implementation of the district level plan.
8	Land Acquisition Act, 2034 BS (1977 AD) and Land Acquisition Rules, 2026 BS (1969 AD)	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.
9	National Environmental Impact Assessment Guidelines, 1993 (2050 BS)	The guidelines provide guidance to project proponent on integrating environmental mitigation measures, particularly on the management of quarries, borrow pits, stockpiling of materials and spoil disposal, operation of the work camps, earthworks and slope stabilization, location of stone crushing plants, etc.
10	APPROACH for the Development of Agricultural and Rural Roads, 1999 (2055 BS)	Emphasizes labor based technology and environmental friendly, local resource oriented construction methods to be incorporated actively in rural infrastructure process.
11	Reference Manual for Environmental and Social	This helps to integrate social and environmental considerations, including public involvement strategies,

S. No.	Environmental Acts, Regulations and Guidelines	Description of Requirements
	Aspects of Integrated Road Development, 2003(2060 BS)	with technical road construction practices. It suggests stepwise process of addressing environmental and social issues alongside the technical, financial and others. The Manual recommends various environmental and social approaches, actions and strategies.
12	Green Roads in Nepal, Best Practices Report: An Innovative Approach for Rural Infrastructure Development in the Himalayas and Other Mountainous Regions, 1999 (2055 BS)	Focuses on participatory, labor based and environment friendly technology with proper alignment selection, mass balancing, proper water management, bioengineering and phased construction
13	*Batabaraniya Nirdesika* (Environmental Directives) (Nepali), 2057 BS (2000 AD)	The directive is focused in the practical implementation of small rural infrastructures through the minimization of environmental impacts. This directive includes the simple methods of environmental management in the different phases of the project cycle.
14	IEE Rural Access Programme (RAP) Guidelines, 2003(2060 BS)	It clearly indicates the objectives and process of IEE in terms of project screening, preparation of terms of reference, desk review, field work, data analysis and interpretation (identification, prediction and analysis of impacts), mitigation measures, monitoring plan and reporting.
15	Labour Rules (1993)	The labour rules sets out the regulations to be followed in Nepal, with respect to general terms for employment, working hours, remuneration and welfare arrangements, health, sanitation and safety.
16	Resettlement Policy Framework, RRRSDP	It establishes the resettlement and compensation principles, organizational arrangements and design criteria to be applied to meet the needs of the people who may be affected by the project activities resulting due to land acquisition, loss of shelter, assets or livelihoods, and/or loss of access to economic resources.
17	The Fourteenth Three Year Plan (2016/17-2018/19)	The government has recently endorsed the Fourteenth Three Year Plan. This plan will cover the period of 2016/17 to 2018/2019. Its long-term vision is to promote Nepal from its current status of a least developed country to a developing country by 2022. Its aim is to reduce human and economic poverty, bring change in the living standard of citizen by promoting green economy focusing on poverty reduction and reducing the percentage of population living below the poverty line from 23.8% to 18.0% during the plan period. The plan also aims to achieve 6.0% of annual economic growth rate. The priority areas of the plan are hydropower, energy, agriculture, basic education, health, drinking water, good governance, tourism, and environment. The GoN will increase the participation and contribution of private sector, public sector, and cooperatives for the promotion and development of the priority areas during the plan period.
18	The Constitution of Nepal, 2071 (2015 AD).	Article 25 (2) of the constitution has mentioned that the state shall acquire legal private property only for public interest, and Article 25 (3) has mentioned that compensation shall be provided for such acquired property on the basis of compensation as prescribed by law. Article

S. No.	Environmental Acts, Regulations and Guidelines	Description of Requirements
		30 (1) has mentioned that every citizen has the right to live in a clean and healthy environment. Under state policy, Article 51 (f) clause (2) has mentioned that state is to develop balanced, environment friendly, quality and sustainable physical infrastructures, while according priority to the regions lagging behind from development perspective, and clause (3) mentions that state is to enhance local public participation in the process of development works. Article 51 (g) explains about applying appropriate minimization or mitigation measures for negative impact on nature, environment or biodiversity.
19	Community Forest Inventory Guidelines, (2005)	Community Forest Inventory Guidelines details the processes and procedures for evaluating the forest stock and it's harvesting potentials while preparing the operational plans with an objective to ensure sustainable harvesting by limiting the extraction with the annual increment.
20	Community Forest Guidelines, (2009)	The objective of the community forestry guideline is to develop the community forest through the active participation of the poor, disadvantaged, indigenous, Janajati, Madhesi, women, communities lagging behind due to various reasons and the traditional community forest users. The guideline sets process and procedures to identify and capacitate the community groups, establish and register the community forest user groups, preparation of the forest management plan and registration, regulations and implementation of the forest management plan, amendments of regulation and management plan, and roles and responsibilities of the forest stakeholders. The community forest guideline was endorsed by GoN in 2009. The guideline provides clear direction and demarcation for development works and projects. It was developed to maximize people participation and protect the sovereignty and rights of the local people on natural resources: community forests and associated natural resources as per the ILO 169 convention.
22	Guidelines for use of forest area for development works (2006)	Guideline for the use of the forest area for development projects reiterates the use of the forest area only if other options are not available. The projects requiring the forest land area have to make alternative studies to minimise the forest land use areas. Development projects of national priority will be allocated with such lands on the decision of the Ministry of Forests. To compensate the forest area and resource lost the project proponent has to comply with the following provisions: - The propnent has to afforest the area equal to the forest area lost at the minimum, if the forest area occupied by the project is a barren land. The land area for afforestation will have to be decided based on the discussion with the district forest office. Or the proponent could deposit the required amount as per the forest norms to the district forest office. - The proponent should plant 25 trees for every lost tree of above 30cm DBH in areas designated by the district forest office and look after the plantation for 5 years to ensure their protection and growth of every planted tree.

S. No.	Environmental Acts, Regulations and Guidelines	Description of Requirements
		Or the proponent should deposit the required amount for plantation and protection for five years to the district forest office. - The proponent will have to compensate the lost forest land for 30 years. The compensation amount for the forest land per ha will be as per the provisions of leasehold forest.
23	Forest Products Collection and Sales Distribution Guidelines, 2001	Clause 3 to 10 of the Guideline have specified various procedure and formats for getting approvals for vegetation clearance, delineation of lands for vegetation clearance, evaluation of the wood volume etc. and government offices and officials responsible for the approval, delineation and valuation.
24	Child Labour Prohibition and Regulation Act 2001	Section 3 of the act prohibits a child from engaging in work, sub clause 1 of the clause 3 states “Nobody shall engage in work a child who has not completed fourteen years of age as a labour and sub clause 2 states “Nobody shall engage a child in a risk full occupation or work set forth in the Schedule”. The section 4 states “Child not to be engaged in work against his will by temptation or fear or pressure or by any other means”. Child labor will be strictly prohibited in the project work.
25	Soil and Watershed Conservation Act, 1982	Soil and Watershed Conservation Act makes provision to control floods landslides (watershed conservation rules, 1985). The watershed conservation office is authority and district watershed conservation committee must implement watershed conservation practices and public participation for soil and land protection
26	Water Resources Act, 1992	Water Resources Act (1992) makes provision for the rational use of surface and underground water. The act seeks to prevent environment and hazardous effects from the use of water and prohibit water pollution by chemicals, industries waste. Water may only be used in manner that does not permit soil erosion, landslide or flood. Pollution of drinking water is prohibited under the Nepal drinking water corporation act (1989).
27	The Aquatic Animal Protection Act, 1961 (with amendment)	This Act indicates an early recognition of the value of wetlands and aquatic animals. Section 3 renders punishment to any party introducing poisonous, noxious or explosive materials into a water source, or destroying any dam, bridge or water system with the intent of catching or killing aquatic life. Under Section 4 of the Act, Government is empowered to prohibit catching, killing and harming of certain kinds of aquatic animals by notification in Nepal Gazette.
28	Motor Vehicle and Transportation Management Act, 1993	This act sets standard for vehicles emission and mechanical condition for vehicle registration by the Transport Management Office (TMO) and the TMO can deny a permit based on environmental factor. Standards are set for petrol and diesel engines under the Nepal vehicle mass emission standard 1999.

D. Permissions and Clearance Required for the Project

45. The legal framework of the country consists of several acts, notifications, rules, and regulations to protect environment and wildlife. List of required clearances / permissions related to environment has been summarized in **Table 6** below.

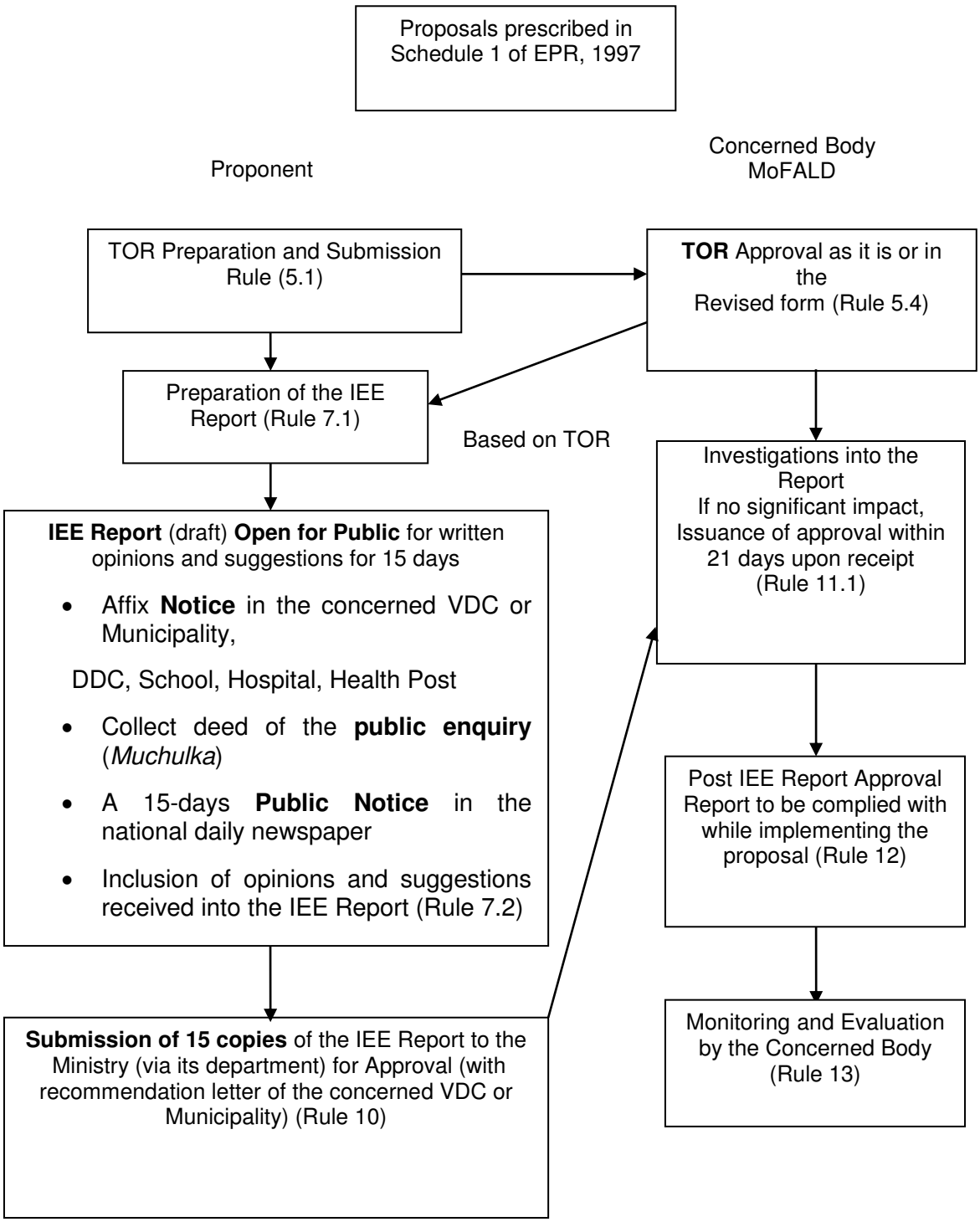
46. As of writing this IEE report, DoLIDAR has secured approval of all IEEs from the MoFALD and has initiated all forest clearances.

Table 6: Permissions and Clearance Required

S.N.	Clearance	Act/Rule/Notification /Guideline	Concerned Agency	Responsibility
A. Pre-construction Stage				
1	Environmental Clearance (categorized as "B" with IEE requirement)	Environment Protection Act 1996 and Environment Protection Rules, 1997 (with amendments).	Ministry of Federal Affairs and Local Development (MoFALD)	Department of Local Infrastructure and Agricultural Roads (DOLIDAR)
2	Land Acquisition and Compensation	Land Acquisition Act, 1977(with amendments)	Ministry of Federal Affairs and Local Development (MoFALD)	Department of Local Infrastructure and Agricultural Roads (DOLIDAR)
3	Forestry clearance for felling of Trees	Forest Act, 1993 (with amendment), Forest Rule, 1995, Forest Products Collection and Sales Distribution Guidelines, 2001 and Local Self-Governance Act, 1999	Ministry of Forest and Soil Conservation, Department of Forest	Department of Local Infrastructure and Agricultural Roads (DOLIDAR)
B. Implementation Stage				
4	Permission for construction material quarrying (stone, cobble, sand, gravel, soil etc)	Local Self-Governance Act, 1999 and Soil and Watershed Conservation Act, 1982 and Watershed Conservation Rule, 1985. PA,1996 and EPR, 1997 (with amendments)	Concerned Project and Concerned Rural municipality, DDC and Municipality	Contractor
5	Consent to operate Hot mix plant, Crushers, Batching Plant	Local Self-Governance Act, 1999	Concerned Project and Concerned Rural municipality, DDC and Municipality	Contractor
6	Consent for disposal of sewage from labour camps	Water Resource Act, 1992	Concerned Project	Contractor
7	Pollution Under Control Certificate	Motor Vehicle and Transportation Management Act, 1993	Department of Transport Management	Contractor

E. Environmental Clearance Process

Figure 4: Environmental Clearance Procedure in Nepal



IV. DESCRIPTION OF THE ENVIRONMENT

A. Physical Environment

1. Climate

47. Nepal extends from 26°22' to 30°27'N in latitude and 80°04' to 88°12'E in longitude. The country is approximately 885 km from east to west, and the north-south width varies from 130 km to 260 km. Within this range, the altitudinal variation is from approximately 60m above mean sea level in the southern plain (called Terai) to the Mount Everest (8848m) in the northeast. Out of 147,181 km^2, the total area of the country, about 86% is comprised of hilly and mountainous regions, with the remaining 14% as flat land.

48. Rapid changes in altitude and aspect along the latitude, creates a wide range of climatic conditions in Nepal. As a consequence, within a span of less than 200 km Nepal encounters almost all types of climates, subtropical to alpine/arctic. The temperature in Nepal varies mainly with topographic variations along south - north direction. Eighty percent of the precipitation in Nepal comes in the form of summer monsoon rain and winter rains are more common in the western hills. As the occurrence of monsoon rains is dominant in the temporal distribution of precipitation, the season can be defined as: monsoon (June to September), post - monsoon (October to November), winter (December to February), and pre - monsoon (March to May). The climate of Nepal is mainly characterized by altitude, topography and seasonal atmospheric circulations.

49. Nepal has five climatic zones broadly corresponding to the altitudes. The tropical and subtropical zones lie below 1,200 meters (3,937 ft), the temperate zone 1,200 to 2,400 meters (3,937 to 7,874 ft), the cold zone 2,400 to 3,600 meters (7,874 to 11,811 ft), the subarctic zone 3,600 to 4,400 meters (11,811 to 14,436 ft), and the Arctic zone above 4,400 meters (14,436 ft).

50. Terai region is located in sub-tropical climatic zone characterised by hot and humid summers, intense monsoon rain, and dry winters. The annual rainfall decreases gradually from the Eastern to the Western Terai. The annual total rainfall in this region varies from 1,138 mm to 2,680 mm, and the mean monthly precipitation ranges from 8 mm to 535 mm.

51. In Middle Mountains, the climate ranges from sub-tropical, sub-humid in river valleys to warm temperate in valleys to cool-temperate in the high hills. Annual precipitation varies from east to west with the highest in the Western Development Region (1,898 mm).

2. Topography/Landforms and Drainage

52. **Topography:** District wise topography of the project area is illustrated below:

Table 7: Details of Topography of Project Districts

District	Topography	Elevation
Kathmandu	The district lies partly in the plain and partly in the hills.	1262 - 2732 m
Bhaktapur	The district lies partly in the plain and partly in the hills.	1372 m - 2166 m
Dolakha	All the part of Dolakha District lies in mountainous region. About 35% area lies in High-Himalaya, 40% in High-Mountain and 25% in Mid-Mountain range.	732 to 7183 m
Sindhuli	The district lies in hill covering an area of 2491 Sq Km.	168 m to 2797 m.
Kabhrepalanchok	The district lies between 27° 20' to 27° 45' North latitude and 85° 24' to 85° 49' East longitude in Mahabharata range. Most of the parts of the districts lies in the Mahabharata range and have steep slope.	300 m to 3018 m
Sindhupalchok	The district lies partly in the Mid-Hills and partly in the High-	747m to 7085m

	Hills/Mountain.	
Chitwan	It lies between longitudes 83°54' 45"to 84°48'15"E and latitudes 27°21'45" to 27°52' 30"N Most part of Chitwan district lies on Siwalik region (86.5%) followed by Mid-mountain region (12.7%) and Terai region (0.8%).	244 m to 1945 m
Sunsari	Spatially it is located between 26°25' and 26°55' North latitude, and between 87°5' to 87°16' East longitude. The district lies in terai covering an area of 1,257 Sq Km. The district lies mostly in the *Terai* and partly in the *Mid-Hills*.	610 m to 1430 m
Morang	It is located between 26°20' and 26°53' North latitude, and between 87°16' to 87°41' East longitude. The district lies in terai covering an area of 1,855 Sq Km. 80% of the Morang District lies in the Terai Region but some lie in the Siwalik and Mahabharat lekh. Morang district can be divided into 3 geomorphic units as such: Mahabharat lekh, Inner Terai and Terai.	60 m - 2410 m
Jhapa	The entire district lies in the *Terai*.	58 m - 500 m
Panchthar	Panchthar district is a hilly district located at Mechi zone in the Eastern Development region of Nepal. The district lies on 26' 53'' to 27' 26'' north latitude and 87' 30'' to 28' 5'' east longitude in the global position.	609 m - 3,675 m
Ilam	Spatially it is located between 26°40' and 27°08' North latitude, and between 87°10' to 88°10' East longitude. The district is a mountainous terrain	140 m – 3636 m
Dhankutta	The district lies on 26^0 53' to 27^0 19' north latitude and 87^0 8' to 87^0 33' east longitude in the global position. The topographical settings of the district comprises with the high hill, mid hill and some river basins.	120 m to 2702m
Parbat	The area is stretched over mid hill covering 494 sq. km.	520 m – 3300 m
Rolpa	The district lies in Mid-Hills.	701 m to 3639 m
Rukum	Rukum District is a "hill" and "mountain" district. Geographically, it ranges from 28°02'09" to 29°00'00" N latitude and 82°00'12" to 82°00'53" E longitude.	754 m to 5,849 m

3. Drainage

53. Project districts are drained by a number of rivers. The status of project road rivers/streams is mentioned in table below.

Table 8: Details of Rivers of Project Districts

District	Rivers/Streams
Kathmandu	Some of the significant streams that cross the road section include Sikte Khola and Khani Khola .
Bhaktapur	Ghattakhola at 0+675 which provides irrigation water, Dry creek at 4+183
Dolakha	Khimti and Tamakoshi are the major rivers of Dolakha district. Other major streams of the district are Sagu Khola, Khare Khola, Chandrawati Khola etc. and all these streams including Khimti River drain to Tamakoshi. Khimti River also forms the east boundary for the district.
Sindhuli	**Tallo Ranibas - Harshahi Road**: Devdani river (1+980), Minor streams (5+840 – 5+860, 6+840, 7+170 – 7+190, 7+810 – 7+820, 9+050, 9+760 – 9+780, 10+160 – 10+200, 10+900 – 10+9450,) Jogiya Khola (12+120 – 12+400) **Dudhauli - Lakhima road:** Some of the small streams along the road section are Lakhima khola, Katha khola, Jalkani khola, Tekan khola, Chisapani khola, Sisang khola etc.
Kabhrepalanchok	Raspat Khola (1+425 km), Jhyape Khola (9+230 km), Sungure Khola (15+650 km) and Charuri Khola are the river which is crossed by the road alignment.
Sindhupalchok	Andheri khola (1+950), Damar khola (3+500), Ghatte khola (5+300), Govindedovan khola (5+900), Kavre khola (6+500), Bete khola (7+100), Chapleti khola (8+900)
Chitwan	Trisuli River lies at northern side of the starting point of the road at Phisling which is the major river of the project site and Rhiddhi Khola (22+180), Shikhari Khola (39+520) and Darbetar Khola (40+100) are the rivers which are crossed by the road alignment. Similarly, 12 numbers (13+950,

District	Rivers/Streams
	17+110, 17+290, 19+530, 19+830, 20+140, 20+570, 20+740, 20+850, 32+850, +32+600, 32+100,) of small streams crosses the road alignment
Sunsari	**Inaruwa-Satterjhoda-Chitaha-Purbakusha-Biratnagar Road:** No large rivers lie in this section of the road but the road crosses seven small streams, and in two occasions, passes adjacent to irrigation canal (3+720, 9+660, 10+770, 18+080, 18+250-18+260, 18+300. **Jhumka-Shingiya-Ramdhuni-Prakashpur-Paschimkusaha-laukahi Road:** Road crosses 6 streams at 2+310, 3+480,5+495, 6+340, 9+450, 9+950.
Morang	**Khorsani-Kerabari-Singhadevi *Road:*** The road crosses the four small springs (almost dry except rainy season) at the CH 10+694, 10+821, 11+390, 24+492 and 25+149 (spring water runs at this chainage). **Laxmimarga- Dangihat-Banol-Babiyabirta-Amahi Road:** The road alignment crosses the Banoul irrigation canal at the CH 9+030 and CH 22+760 and natural stream at the chainage 21+080. Similarly, at the CH 10+560, CH 16+ 640, CH 17+660, CH 25+110, CH 27+200 and CH 27+340.
Jhapa	**Amaldangi-Samayagadh-Basbari-Solmari Road:** The nearest stream is Dhyangre khola, which is 0.5 Km to 1.5 Km far from the road alignment in east and Kisni Khola in west which is 0.7 Km to 2 km far from the road alignment. **Charpane-Chaitubari-Matigada-Sadhukuti-Ghodamara-Rajgadh Road:** The nearest River is Biring and the nearest distance to road alignment is 1.81 Km. This river lies west of the road alignment. **Kharsangbari-Jalthal-Manglabare-Bahundhoka- Adhikari Chowk Road:** The nearest stream is Bhuteni khola, which is 0.81 Km to 1.75 Km far from the road alignment in west of the road alignment. **Padajungi- Gohawari-Laldhwandra-Jharkaha-Balubathan-Chapramari Road:** The nearest stream is Ratuwa River, which is 0.37 Km (nearest) to 1 Km far from the road alignment in west of the road alignment.
Panchthar	**Phidim-Nagin-Yangnam-Sidin-Prangbung-Falot Road:** There are 15 small and large natural drainages (including seasonal streams) within the proposed project alignment. The road crosses three rivers such as Feme khola (Ch4+941), Mabewa khola (Ch 30+207) and Muwa khola (Ch 34+819) while others are kholsa (stream/drainage) at 0+820,2+055, 2+125, Ch 3+275, Ch 4+227, Ch 6+875, Ch 7+196, Ch 20+658, Ch 22+539, Ch 22+678, Ch 22+622, Ch 23+941, Ch 24+924, Ch 29+247 and Ch 31+860. **Samdin-Chokmagu-Shiva-Nawamidada-Faktep Ghurbise Panchami Road (Samdin-Nawamidada Sector):** There are 10 small and large natural drainages at different chainage within the 15 Km road length. Among them 4 are rivers (Hukme Khola, Baramule Khola, Maluwa Khola and Siwa Khola) while others are Kholsa (drainage).
Ilam	**Manglbare - Punphung-Ekatappa - Sikari Bhangyang – Phakphok - Ra.Ma.Bi. Khamwang – Thingepur – Aamchok - Jungetar-Phuyatappa - Rabi road:** Number of rivers and kholsicross the road alignment at various chainage of 0+803, 1+158, 1+329, 1+382, 1+763, 2+175, 2+362, 6+066, 6+385, 7+502, 8+277, 8+882, 11+425, 11+752, 12+092, 12+198, 12+438, 12+694, 12+827, 12+960, 12+547, 13+770, 14+302, 15+530, 16+036, 16+377, 16+737, 16+787, 16+852, 17+022, 17+183, 17+420 and 17+760. **Nepaltar-Shantidada-Gagrlbhangyang-Mangalbare-Ibhang-Chaturemode Adipur-Chapeti-Beldagi- Damak Road (Ibhang-Chaturemode Sector):** some of the significant streams that cross the road section include Tama Khola at chainage 3+858 and Maija Khola. Various streams and Kholsi crosses the road alignment at chainage of 3+855, 4+236, 4+482, 4+553, 4+657 and 5+ 143.
Dhankutta	**Mudhesanischare-Dadagaun-Chanuwa Road:** Several small streams were observed along the road section, with both seasonal and perennial nature. Some of these streams pass across the road alignment.
Parbat	**Lunkhu - Mudikuwa Road:** The road crosses the streams at several locations and these are, stream (0+269), stream (0+684), stream (0+879), stream (1+033), stream (1+750), stream (7+500), stream (7+553), Chirdi Khola (8+146), Phedi Khola (8+681), stream (9+199), stream (9+997), stream (10+946), stream (11+228), Lamahe Khola (12+228), Tunibote Khola (15+565), Bhuke Khola (16+220). **Armadi- Banou road:** The streams that cross the project road are: Kholsi (8+650), Kholsi (8+925) and Kholsi (9+786). The rainfall around project area drains along these streams and rivers to reach several small streams and Khahare Khola and then to tributaries of Kali Gandaki and finally drain down to the Kali Gandaki River.

District	Rivers/Streams
Rolpa	**Mijhing - Dhuleodar-Namja – Sirpa - Pang road:** Minor streams cross the road at chainage 0+226, 0+245, 0+260, 2+205, 2+786, 2+824, 3+112. **Mijhing-Ruininwan Badachaur-Gumchal-Siuni-Gam road:** Some of the significant streams that cross the road section include Lungri Khola and Bojayang Khola (0+320, 1+600, 9+400, 13+020, 23+050, 23+850, 24+100).
Rukum	**Shital Pokhari – Jhulkhet – Chunwang Road:** The main river in the project area is Sankh Khola. Other rivers & kholsi lies in the alignment are Ghorneta Khola (5+860), Tyau Khola (3+900) **Solabang - Baluwa - Naayegadpul - Jamabagar- Simalchaur-Hukam- Ranmaikot road:** Sani Bheri is the major river in the proposed road alignment and other rivers and Kholsi along the alignment. (2+110, 3+580, 12+130, 12+790, 13+630, 14+000, 14+520, 15+210, 16+910, 17+210, 17+880)

4. Geology and Soil

54. The major geological formation of the districts in which proposed roads are sited is summarized in the following table 8.

Table 9: Major Geological Formation of Project Districts

S. No.	District	Major Geological Formation
1	Kathmandu	This road follows the rocks of Sarung Khola Formation of the Lesser Himalaya. Along the road section, rocks of gneiss and schist is exposed and also covered by the residual soil with thick colluvial deposits as well as valley sediments.
2	Bhaktapur	The geological formation of the project area comes under Tistung and Tawa Khola formation of Lesser Himalaya. The major rocks found at the sub-project area include Quartzite, Schist, Gneiss, Silicate and Phyllite.
3	Dolakha	The road corridor falls in the Higher Himalayan Crystallines rocks mainly gnesissess and migmatites. The road alignment passes on colluvial and deposits and some part on residual soil deposits.
4	Sindhuli	Project district encompasses two type of Physiographic division namely Siwalik and Lesser Himalaya. In regional context with respect to the Dudhauli lakhima road is sandwiched between the Lesser Himalaya and Siwalik Physiographic division and with respect to the Tallo Ranibas - Harsahi road subproject follows the rocks of the Lower, Middle and Upper Siwalik Physiographic division. The Lower Siwalik Middle Siwalik and Upper Siwalik Formations are comprised of mudstone/sandstone, sandstone and conglomerate, respectively
5	Kabhrepalanchok	Along the road section, the rocks of quartzite, schist, slate, dolomite and phyllite are found whereas the soil deposits are thick colluvial and residual soil.
6	Sindhupalchok	It lies in Lesser Himalaya geological division with sedimentary rocks and surrounded by major thrust of the Himalaya such as Main Frontal Thrust (MFT) in south and Main Central Thrust (MCT) in North. The MCT zone lies in the north of the Bhairabkund. The road buffer follows the rocks of the Ranimatta Formation, Naudanda Quartzite, Ghanpokhra, Sangram, Syangja, Formations. The Ranimatta Formation is comprised of quartzite and phyllite. The Naudanda Quartzite is composed of quartzite whereas the Ghanpokhara Formation is comprised of limestone, quartzite and slate. The Syangja Formation contents of dolomite, quartzite and shale. Road alignment passes through the rocky terrain of the Lesser Himalaya as well as residual soil and colluvial as well as alluvial deposits. More than 60% terrain passes though different soil deposits mainly the residual soil and colluvial deposits and remaining in the rocky area.
7	Chitwan	This road alignment passes through the rocky terrain of the Lesser Himalaya and Siwaliks as well as residual soil and colluvial deposits. More than 60% terrain passes though the different soil deposits mainly the colluvial and residual soil deposits and remaining in the rocky area. The rocks are quartzite, schist, slate, dolomite and phyllite.
8	Sunsari	**Inaruwa-Satterjhoda-Chitaha-Purbakusha-Biratnagar Road:** This road lies in terai and consists of alluvial soil, mostly sandy loam soil. Absence of large rivers/streams near to this road lessens the risk of flood. As the entire length of the road lies in terai, there is no

S. No.	District	Major Geological Formation
		risk of landslides. The road does not pass through any thrusts or faults. **Jhumka-Shingiya-Ramdhuni-Prakashpur-Shukrabare-Madhuban-Paschimkusaha-laukahi Road:** This road lies in terai and consists of alluvial soil, mostly sandy loam soil. The road does not pass through any thrusts however the Main Frontal Thrust (MFT) lies north of the road (at Siwalik).
9	Morang	**Laxmimarga- Dangihat-Banol-Babiyabirta-Amahi Road:** This road alignment passes through a plain Terai containing alluvial soil and mostly sandy loam soil. As absence of large rivers/streams near to this road, there is not risk from flood. **Khorsane-Kerabari-Singhadevi Road:** This road follows the sediments of the Indo-Gangetic Plain. It is composed of loose sediments and some part of the road alignment passes on the sedimentary rocks of the Siwalik Group then the last portion of the road falls on the rocks of the Lesser Himalaya. The Lesser Himalaya is composed of dolomite, quartzite rocks.
10	Jhapa	**Amaldangi-Samayagadh-Basbari-Solmari Road:** This road lies in terai and consists of alluvial soil, mostly sandy loam soil. The road does not pass through any thrusts however the Main Frontal Thrust (MFT) lies north of the road's starting point (at Siwalik). **Charpane-Chaitubari-Matigada-Sadhukuti-Ghodamara-Rajgadh Road:** This road lies in terai and consists of alluvial soil, mostly sandy loam soil. As the entire length of the road lies in terai, there is no risk of landslides. The road does not pass through any thrusts or faults. **Kharsangbari-Jalthal-Manglabare-Bahundhoka- Adhikari Chowk Road:** This road lies in terai and consists of alluvial soil, mostly sandy loam soil. As the entire length of the road lies in terai, there is no risk of landslides. The road does not pass through any thrusts or faults. **Padajungi-Gohawari-Laldhwandra-Jharkaha-Balubathan-Chapramari Road:** This road lies in terai and consists of alluvial soil, mostly sandy loam soil. As the entire length of the road lies in terai, there is no risk of landslides. The road does not pass through any thrusts however the Main Frontal Thrust (MFT) lies north of the road's starting point (at Siwalik).
11	Panchthar	**Phidim-Nangeen-Yangnam- Sidin-Prangbung road (Phidim-Falot road):** The road follows the rocks of the Lesser Himalaya. The road alignment passes through the rocks of the Ranimatta (Seti) Formation of the Midland Group. The Ranimatta (Seti) Formation is composed of phyllite and quartzite and Higher Himalayan rocks. **Samdin-Chokmagu-Shiva-Nawamidada-Faktep Ghurbise Panchami Road (Samdin-Nawamidada Sector) Road**: More than 70% road alignment passes on the different types of the soil, mainly colluvial and residual soil deposits, the rocks of the quartzite and also schist of the Seti Formation can be found. This road alignment follows the rocks of the Lesser Himalaya. More than 80% road alignment passes on the different types of the soil, mainly colluvial and residual soil deposits, the rocks of the quartzite and also schist of the Seti Formation can be found.
12	Ilam	**Manglbare - Punphung-Ekatappa - Sikari Bhangyang – Phakphok - Ra.Ma.Bi. Khamwang – Thingepur – Aamchok - Jungetar-Phuyatappa - Rabi road:** The road alignment incorporates the rocks of the Lesser Himalaya and the road alignement passes through Sarung Khola formation. More than 80% road aliment passes on the different types of the soil, mainly colluvial and residential soil deposited the rock of the quartzite and also schist. **Nepaltar-Shantidada-Gagrlbhangyang-Mangalbare-Dhuseni-Gajurmukhi-Ibhang-Chaturemode Adipur-Larumba-Gharti Dobhan-Chapeti-Beldagi- Damak Road (Ibhang-Chaturemode Sector):** The road alignment incorporates the rocks of the Midland Group of the Lesser Himalaya and the road alignment passes through Sarung Khola and Shipring Khola formation. More than 80% road alignment passes on the different types of the soil, mainly colluvial and residential soil deposited, the rock of the quartzite and also schist.
13	Dhankutta	**Mudheshanischare- Dandagaun- Chanuwa road:** This road follows the rocks of the Midland Group of the Lesser Himalaya. The road runs on the rocks of the Ulleri Formation of the Midland Group, Lesser Himalaya. The Ulleri Formation is composed of augen gneiss. This road alignment passes through a thrust also of the Himalaya. Between Mudheshanischare and Chanuwa village, most of the road alignment passes on the colluvial soil residual soil deposits on the rocky terrain.

S. No.	District	Major Geological Formation
14	Parbat	**Armadi-Banou Road:** Along the road section, the rocks of the limestone, quartzite and shale of the Kushma Formation, quartzite and phyllite of the Seti Formation can be found. The road passes on the colluvial and residual soil and rocky terrain. **Lunkhu - Mudikuwa Road:** The road follows the rocks of the Midland and Dadeldhura Groups of the Lesser Himalaya. The Midland Group is subdivided into the Seti, Naudanda Quartzite, Glalyang, Syangja and Lakharpata Formations. The road runs on the rocks of the Seti Formations of the Midland Group of the Lesser Himalaya. The Seti Formation is composed of quartzite and phyllite. Initially, the road alignment starts from Lukhu and passes through the rocky terrain of the Lesser Himalaya as well as colluvial and residual soil deposits.
15	Rolpa	**Mijhing - Dhuleodar-Namja – Sirpa - Pang road:** The proposed road subproject lies within the Lesser Himalayan region where limestone, dolomite, schist, phyllite, etc. dominates. The soil in the road alignment is mainly of hard / gravel mixed soil with some rocky area in between. **Mijhing-Ruinibang-Badachaur-Gumchal-Harjang-Syuri-Gaam Road:** The road alignment passes through the rocks of the Midland Group of the Lesser Himalaya. These include Quartz, Schist, Phyllite etc. whereas, the soil in the road alignment is mainly of hard / gravel mixed soil with some rocky area in between.
16	Rukum	**Shital Pokhari – Jhulkhet – Chunwang Road:** The predominant soil types are residual soil and Colluvial deposits, which are extensively distributed along the hill slopes and along Chun Khola. The road is commonly covered by residual soil and colluviums which is mixed patches of Gneiss, schist and quartzite exposures and basically it is landslide prone area. **Solabang Rahukhet Baluwa Naayegadpul Jamabagar Simalchaur Hukam Ranmamaikot Road (Baluwa-Naayegadpul-Jamabagar Sector):** Along the road section, the rocks of dolomite, shale, limestone and quartzite of the Lakharpata Formation and can be found. The road passes through colluvial (more than 5 m thickness), residual and alluvial deposits.

Source: IEE Reports (GoN), RCIP Roads, 2017

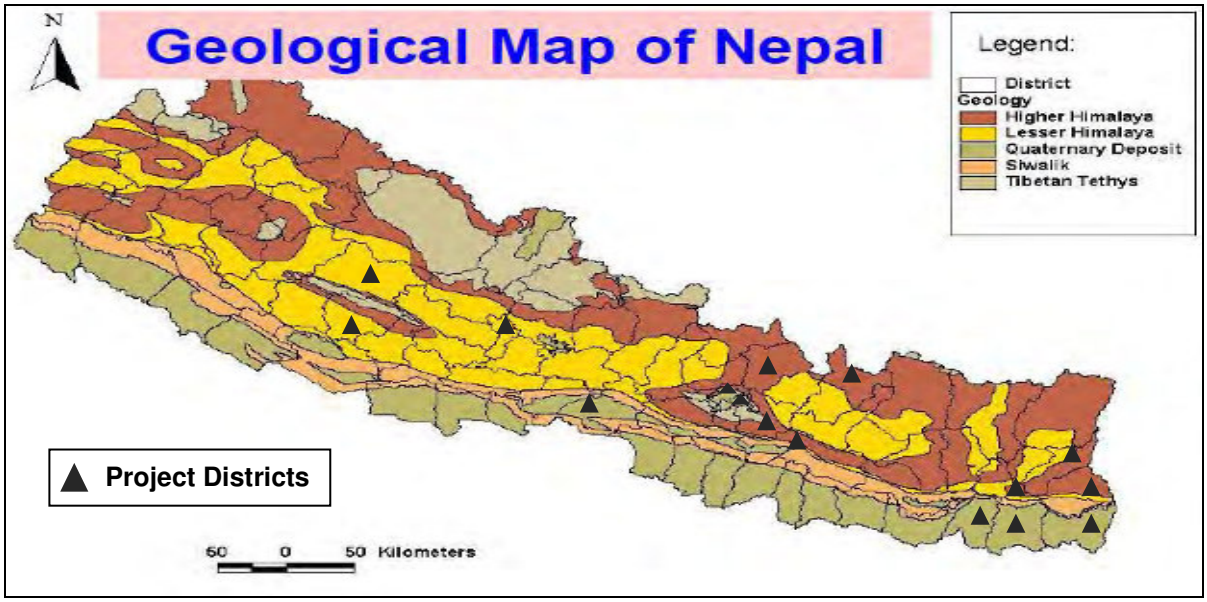


Figure 5: Geological Map of Nepal

55. Terai region consists of recent and post Pleistocene alluvial deposits that form a piedmont plain (Carson *et al.,* 1986). The lower Churia is largely composed of very fine-grained sediments such as variegated mudstone, siltstone and shale with smaller amounts of fine-grained sandstone (Upreti, 1999). The middle Churia has thick beds of multi-storied sandstones alternating with subordinate beds of mudstone. The upper Churia is characterised by very coarse sediments such as loose boulder conglomerates. Dominant

soil texture found in Middle Mountains region ranges from fragmented sandy to loamly/boulderly, loamy, loamy skeletal as per the diverse land forms. High Mountains soils are rocky mostly derived from phyllite, schist, gneiss and quartzite of different ages. High Himal physiographic region is characterised by rocky soils originated from gneiss, schist, limestone and shale of different ages (Pariyar, 2008).

56. The project roads have been divided into four clusters namely; Central East Districts Cluster (Kathmandu, Bhaktapur, Sindhuli, Dolakha, Kavre, Sindupalchowk), Central West Districts Cluster (Parbat and Chitwan) Eastern Districts Cluster (Sunsari, Morang, Jhapa, Panchthar, Ilam, Dhankutta), and Western Districts Cluster (Rolpa and Rukum). Out of 16 project districts, 4 districts are located in terai region, 10 in hilly region and 2 in mountain region respectively.

Table 10: Type of Soil by Area of Holdings and by Development Region, Nepal

S. N.	Type of Soil	Eastern Development Region		Central Development Region		Western Development Region		Mid -Western Development Region		Far Western Development Region	
		Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%
1.	Sand	198604	26.9	143885	27.1	85893	18.0	92983	25.6	68091	32.3
2.	Loam	273424	37.0	204719	38.5	174045	36.5	140687	38.8	91822	43.6
3.	Silt	53289	7.2	36094	6.8	28316	5.9	35415	9.8	14708	7.0
4.	Clay	171696	23.2	119527	22.5	144043	30.2	70175	19.3	27047	12.8
5.	Clay Loam	41692	5.6	27212	5.1	44381	9.3	23467	6.5	9025	4.3
	Total	**738704**	**100.0**	**531437**	**100.0**	**476678**	**100.0**	**362727**	**100.0**	**210693**	**100.0**

Source: Central Bureau of Statistics (National Sample Census of Agriculture, Nepal, 2001/02)

5. Natural Hazard

57. The entire territory of Nepal lies in high seismic hazard zone. The country's high seismicity is related to the movement of tectonic plates along the Himalayas that has caused several active faults. A total of 92 active faults have been mapped throughout the country by the Seismic Hazard Mapping and Risk Assessment for Nepal carried out as part of the Building Code Development Project – 1992-1994 (MHPP, 1994). Earthquakes of various magnitudes occur almost every year and have caused heavy losses of lives.

58. The entire country falls in a high earthquake intensity belt: almost the whole of Nepal falls in high intensity scale of MMI IX and X for the generally accepted recurrence period. The seismic zoning map of Nepal, which depicts the primary (shaking hazard), divides the country into three zones elongated in northwest-southeast direction; the middle part of the country is slightly higher than the northern and the southern parts. As per the seismic zone classification of Nepal, project districts lie in mild to most active i.e.; Zone II-V.

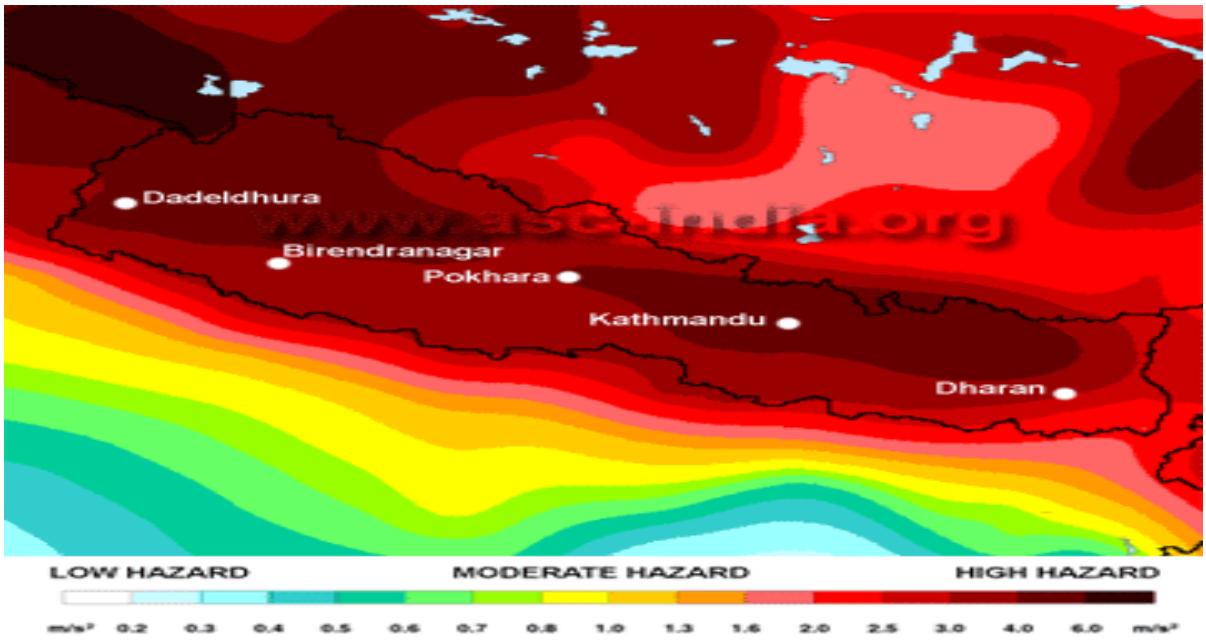


Figure 6: Earthquake Zone of Project Area

59. Of the 27 project roads, 18 are vulnerable to climate change variability and extremes as these are already exposed to flooding, erosion, and landslide risks.

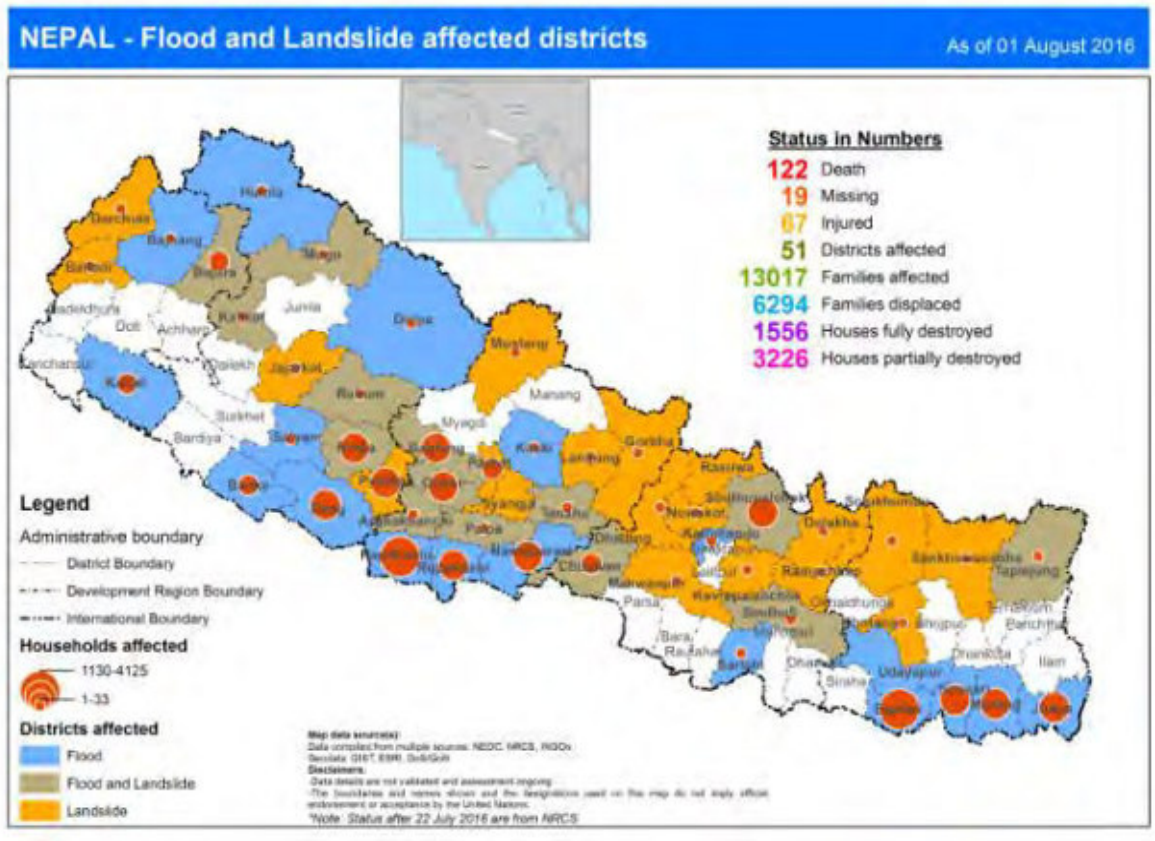


Figure 7: Flood and landslide Zone of Project Area

6. Land Use and Land Cover

60. Land use pattern of project districts is described briefly in the table below.

Table 11: Land Use Pattern by Project District

S. N.	District	Total Forest Area (ha.)	Shrub	Agricultural land/grass	Water bodies	Barren land	Snow	Others	Total
1.	Panchthar	53182	14369	54078	181	326	326 29	0	122165
2.	Ilam	72214	31649	64595	236	2873	0	0	171567
3.	Jhapa	13239	1863	141795	778	6517	0	0	164192
4.	Morang	43814	6040	126955	1374	4996	0	0	183179
5.	Sunsari	21304	1508	91799	6262	6861	0	0	127734
6.	Dhankuta	26324	14598	47350	549	982	0	0	89803
7.	Sindhuli	136302	25708	71842	1268	8442	0	0	243562
8.	Dolakha	78111	41194	54778	401	16031	22913	2985	216413
9.	Sindhupalchok	92955	36017	67105	162	17404	32560	2679	248882
10.	Kavre	46448	29511	67492	434	750	0	0	144635
11.	Bhaktapur	583	611	5440	1	316	0	0	6951
12.	Kathmandu	12680	5219	22677	69	2375	0	0	43020
13.	Chitawan	132746	6230	77280	2465	3696	0	0	222417
14.	Parbat	26189	7756	15371	141	735	7	0	50199
15.	Rolpa	150095	486	16458	67	19027	0	0	186133
16.	Rukum	174725	2130	12961	130	77148	23253	0	290347

Source: Department of Forest (Information System Development Project for the Management of Tropical Forest; Activity Report of Wide Area and Tropical Forest Resource Survey, March, 2001).

7. Air Quality

61. Project area is characterized mainly by rural/open areas and intermittently traversed by few semi-urban settlements/built-up areas. Sources of air pollution in the project area are mainly vehicular emission, dust emanation due to use of unpaved shoulders/deteriorated roads by vehicles and domestic fuel burning as the project area is rich in vegetation, all such emissions will be very well dissipated.

8. Noise Level

62. Traffic noise is the principal source of noise in the project area. The area mostly includes rural open areas with a good vegetation cover and therefore the noise levels are relatively low.

9. Waterways and Water Bodies

63. Project roads are crossing many minor rivers as summarized in the following table. Besides there are a number of ponds/stagnant water bodies. All waterways and water bodies has been listed in Table below.

Table 12: List of waterways/ Water Bodies

District	Rivers/Streams
Kathmandu	Some of the significant streams that cross the road section include Sikte Khola and Khani Khola.
Bhaktapur	Ghattakhola at 0+675 which provides irrigation water, Dry creek at 4+183
Dolakha	Khimti and Tamakoshi are the major rivers of Dolakha district. Other major streams of the district are Sagu Khola, Khare Khola, Chandrawati Khola etc. and all these streams including Khimti River drain to Tamakoshi. Khimti River also forms the east boundary for the district.
Sindhuli	**Tallo Ranibas - Harshahi Road**: Devdani river (1+980), Minor streams(5+840 – 5+860, 6+840, 7+170 – 7+190, 7+810 – 7+820, 9+050, 9+760 – 9+780, 10+160 – 10+200, 10+900 –

District	Rivers/Streams
	10+9450,)Jogiya Khola (12+120 – 12+400) **Dudhauli - Lakhima road:** Some of the small streams along the road section are lakhima khola, Katha khola, Jalkani khola, Tekan khola, Chisapani khola, Sisang khola etc.
Kabhrepalanchok	Raspat Khola (1+425 km), Jhyape Khola (9+230 km), Sungure Khola (15+650 km) and Charuri Khola are the river which is crossed by the road alignment.
Sindhupalchok	Andheri khola (1+950), Damar khola (3+500), Ghatte khola (5+300), Govindedovan khola (5+900), Kavre khola (6+500), Bete khola (7+100), Chapleti khola (8+900)
Chitwan	Trisuli River lies northern side of the starting point of the road at Phisling which is the major river of the project site and Rhiddhi Khola (22+180), Shikhari Khola (39+520) and Darbetar Khola (40+100) are the rivers which are crossed by the road alignment. Similarly, 12 numbers (13+950, 17+110, 17+290, 19+530, 19+830, 20+140, 20+570, 20+740, 20+850, 32+850, +32+600, 32+100,) of small streams crosses the road alignment
Sunsari	**Inaruwa-Satterjhoda-Chitaha-Purbakusha-Biratnagar Road:** No large rivers lie in this section of the road but the road crosses seven small streams, and in two occasions, passes adjacent to irrigation canal (3+720, 9+660, 10+770, 18+080, 18+250-18+260, 18+300. **Jhumka-Shingiya-Ramdhuni-Prakashpur-Paschimkusaha-laukahi Road:** Road crosses 6 streams at 2+310, 3+480,5+495, 6+340, 9+450, 9+950.
Morang	**Khorsani-Kerabari-Singhadevi *Road:*** The road crosses the four small springs (almost dry except rainy season) at the CH 10+694, 10+821, 11+390, 24+492 and 25+149 (spring water runs at this chainage). **Laxmimarga- Dangihat-Banol-Babiyabirta-Amahi Road:** The road alignment crosses the Banoul irrigation canal at the CH 9+030 and CH 22+760 and natural stream at the chainage 21+080. Similarly, at the CH 10+560, CH 16+ 640, CH 17+660, CH 25+110, CH 27+200 and CH 27+340.
Jhapa	**Amaldangi-Samayagadh-Basbari-Solmari Road:** The nearest stream is Dhyangre khola, which is 0.5 Km to 1.5 Km far from the road alignment in east and Kisni Khola in west which is 0.7 Km to 2 km far from the road alignment. **Charpane-Chaitubari-Matigada-Sadhukuti-Ghodamara-Rajgadh Road:** The nearest River is Biring and the nearest distance to road alignment is 1.81 Km. This river lies west of the road alignment. **Kharsangbari-Jalthal-Manglabare-Bahundhoka- Adhikari Chowk Road:** The nearest stream is Bhuteni khola, which is 0.81 Km to 1.75 Km far from the road alignment in west of the road alignment. **Padajungi- Gohawari-Laldhwandra-Jharkaha-Balubathan-Chapramari Road:** The nearest stream is Ratuwa River, which is 0.37 Km (nearest) to 1 Km far from the road alignment in west of the road alignment.
Panchthar	**Phidim-Nagin-Yangnam-Sidin-Prangbung-Falot Road:** There are 15 small and large natural drainages (including seasonal streams) within the proposed project alignment. The road crosses three rivers such as Feme khola (Ch4+941), Mabewa khola (Ch 30+207) and Muwa khola (Ch 34+819) while others are kholsa (stream/drainage) at 0+820,2+055, 2+125, Ch 3+275, Ch 4+227, Ch 6+875, Ch 7+196, Ch 20+658, Ch 22+539, Ch 22+678, Ch 22+622, Ch 23+941, Ch 24+924, Ch 29+247 and Ch 31+860. **Samdin-Chokmagu-Shiva-Nawamidada-Faktep Ghurbise Panchami Road (Samdin-Nawamidada Sector):** There are 10 small and large natural drainages at different chainage within the 15 Km road length. Among them 4 are rivers (Hukme Khola, Baramule Khola, Maluwa Khola and Siwa Khola) while others are Kholsa (drainage).
Ilam	**Manglbare - Punphung-Ekatappa - Sikari Bhangyang – Phakphok - Ra.Ma.Bi. Khamwang – Thingepur – Aamchok - Jungetar-Phuyatappa - Rabi road:** Number of rivers and kholsi cross the road alignment at various chainage of 0+803, 1+158, 1+329, 1+382, 1+763, 2+175, 2+362, 6+066, 6+385, 7+502, 8+277, 8+882, 11+425, 11+752, 12+092, 12+198, 12+438, 12+694, 12+827, 12+960, 12+547, 13+770, 14+302, 15+530, 16+036, 16+377, 16+737, 16+787, 16+852, 17+022, 17+183, 17+420 and 17+760. **Nepaltar-Shantidada-Gagrlbhangyang-Mangalbare-Ibhang-Chaturemode Adipur-Chapeti-Beldagi- Damak Road (Ibhang-Chaturemode Sector):** some of the significant streams that cross the road section include Tama Khola at chainage 3+858 and Maija Khola. Various streams and Kholsi crosses the road alignment at chainage of 3+855, 4+236, 4+482, 4+553, 4+657 and 5+ 143.
Dhankutta	**Mudhesanischare-Dadagaun-Chanuwa Road:** Several small streams were observed along the road section, with both seasonal and perennial nature. Some of these streams pass across the

District	Rivers/Streams
	road alignment.
Parbat	**Lunkhu - Mudikuwa Road:** The road crosses the streams at several locations and these are, stream (0+269), stream (0+684), stream (0+879), stream (1+033), stream (1+750), stream (7+500), stream (7+553), Chirdi Khola (8+146), Phedi Khola (8+681), stream (9+199), stream (9+997), stream (10+946), stream (11+228), Lamahe Khola (12+228), Tunibote Khola (15+565), Bhuke Khola (16+220). **Armadi- Banou road:** The streams that cross the project road are: Kholsi (8+650), Kholsi (8+925) and Kholsi (9+786). The rainfall around project area drains along these streams and rivers to reach several small streams and Khahare Khola and then to tributaries of Kali Gandaki and finally drain down to the Kali Gandaki River.
Rolpa	**Mijhing - Dhuleodar-Namja – Sirpa - Pang road:** Minor streams cross the road at chainage 0+226, 0+245, 0+260, 2+205, 2+786, 2+824, 3+112. **Mijhing-Ruininwan Badachaur-Gumchal-Siuni-Gam road:** Some of the significant streams that cross the road section include Lungri Khola and Bojayang Khola (0+320, 1+600, 9+400, 13+020, 23+050, 23+850, 24+100).
Rukum	**Shital Pokhari – Jhulkhet – Chunwang Road:** The main river in the project area is Sankh Khola. Other rivers & kholsi lies in the alignment are Ghorneta Khola (5+860), Tyau Khola (3+900) **Solabang - Baluwa - Naayegadpul - Jamabagar- Simalchaur-Hukam- Ranmaikot road:** Sani Bheri is the major river in the proposed road alignment and other rivers and Kholsi along the alignment. (2+110, 3+580, 12+130, 12+790, 13+630, 14+000, 14+520, 15+210, 16+910, 17+210, 17+880)

Source: Transect Survey Report, 2017

B. Ecological Resources

1. Region Profile

64. **Forest:** Nepal is located between 26^0 20' 53" N to 30^0 26' 51" N latitude and 80^0 03' 30" E to 88^0 12' 05" E longitude. There are five physiographic regions in Nepal (Figure 7) based on geology and geomorphology (LRMP, 1986).

65. Terai physiographic region of Nepal occupies 13.7% of the total land area of the country. In terms of geomorphology, it consists of gently sloping recent and post-Pleistocene alluvial deposits, which form a piedmont plain south of the Himalayas. Its elevation varies from 63 m to 330 m above mean sea level (LRMP*,* 1986).

66. Churia region is the youngest mountain range in the Himalayas. Just north of the Terai, it runs the entire length of southern Nepal, from east to west, skirting the southern flanks of the Himalayas. The region occupies about 12.8 % of the total land area of the country, and covers parts of 36 districts of Nepal (DoS, 2001). The elevation of Churia varies from 93 to 1,955 m above mean sea level.

67. Middle Mountains region lies north of Churia along the southern flanks of the Himalayas. The region occupies 29.2% of the total land area of the country and covers parts of 55 districts. The elevation of Middle Mountains region varies from 110 m in the lower river valleys to 3,300 m above mean sea level.

68. High Mountains region occupies 20.4% of the total land area of the country and covers parts of 40 districts. The elevation of High Mountains region varies from 543 m in the river valley floors to 4,951 m above mean sea level. The region is characterised by the rugged landscape and very steep slopes.

69. High Himal region which includes the highest Himalayan massifs occupies about 23.9% of the total land area of the country, and covers parts of 25 districts. The region's elevation ranges from 1,960 m to 8,848 m above mean sea level.

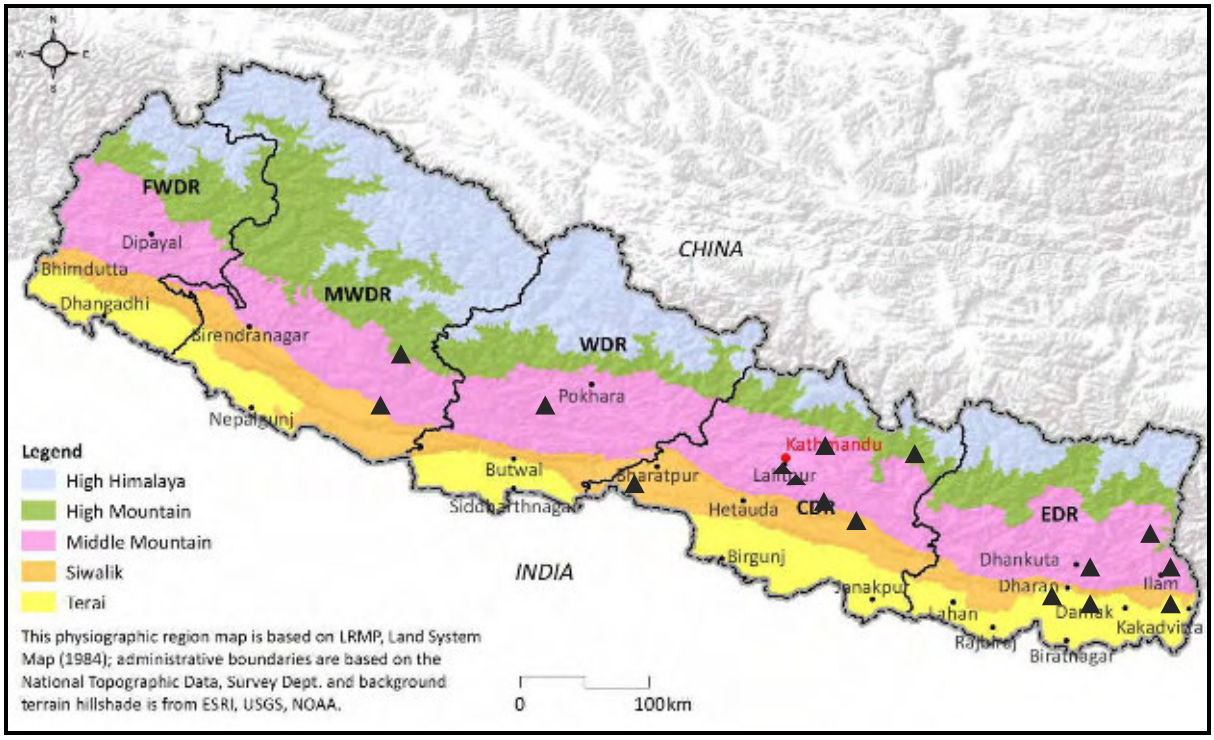


Figure 8: Physiographic regions of Nepal

2. Forest Cover by Physiographic and Development Region

70. Out of the total Forest in Terai physiographic region, FWDR has the highest proportion (30.93%) whereas Western Development Region (WDR) has the lowest (11.47%). Similarly, out of the total Forest in Churia, CDR has the highest proportion (31.30%), whereas Eastern Development Region (EDR) has the lowest (12.62%). Forest in Middle Mountains physiographic region is more or less evenly distributed in all the Development Regions. Out of the total Forest in High Mountains and High Himal physiographic region, Mid-Western Development Region (MWDR) has the highest proportion (34.43%) of Forest whereas the Central Development Region (CDR) has the lowest (13.74%) (Table 12).

Table 13: Forest cover by physiographic and Development Region (ha)

Development Region	Terai	Churia	Middle Mountains	High Mountains and High Himal	Total
EDR	56,220	173,298	481,314	361,547	1,072,379
CDR	95,219	430,029	479,295	264,124	1,268,667
WDR	47,209	175,133	440,204	357,519	1,020,065
MWDR	85,618	414,795	428,187	662,122	1,590,722
FWDR	127,314	180,489	424,807	277,597	1,010,207
National total	**411,580**	**1,373,743**	**2,253,807**	**1,922,909**	**5,962,038**

Source: State of Nepal's forests, Department of Forest Research and Survey, 2015

71. **Protected area Network:** Government of Nepal has established a network of 20 protected areas since 1973, consisting of ten national parks, three wildlife reserves, six conservation areas and one hunting reserve. There are 2 protected areas located within the RCIP project districts. None of these protected areas are located within 10 km radius of the project site.

3. Forest along the Project Roads

72. Most of the subproject roads are passing through plain terrain with land use being agriculture. Details of the forest locations along the subproject road sections are listed in Table 14. The Manglbare - Punphung-Ekatappa - Sikari Bhangyang – Phakphok - Ra.Ma.Bi. Khamwang – Thingepur – Aamchok - Jungetar-Phuyatappa - Rabi road crossed a private forested land although not included in the Table below also required clearance fro tree cutting only and compensation of the the land owner.

Table 14: Details of Forest Locations along the Project Road sections

Sl. No.	Road Section	Road Length (Km)	Length Passing through Forest Areas (km)	Chainage	Name
1.	Phidim-Nagin-Yangnam-Sidin-Prangbung-Falot Road	23.56	0.09	10+360-10+450	Salleri Community Forest
2.	Samdin-Chokmagu-Shiva-Nawamidada-Faktep Ghurbise Panchami Road (Samdin-Nawamidada Sector)	14.85	0.625	10+450-10+650 3+900-4+050 0+625-0+900	Dhumi Community Forest Banpale Community Forest Trikal Community Forest
3.	Nepaltar-Shantidada-Mangalbare-Dhuseni-Gajurmukhi-Ibhang-Chaturemode Adipur-Chapeti-Beldagi- Damak Road (Ibhang-Chaturemode Sector)	13..28	2.244	0+710-0+880; 1+750-2+350; 8+500-8+900	Thike Ghumti National Forest
4.	Charpane-Chaitubari-Matigada-Sadhukuti-Ghodamara-Rajgadh Road	15.48	0.433	7+557-7+990	Badarasi Community Forest
5.	Khorsane-Kerabari-Singhadevi Road	13.62	5.16	6+530-7+690, 19+500-21+300 23+800- 26+00	Chhatiwan Community Forest Shree Bisasho Batisjure Community Forest Jaifale Community Forest
6.	Jhumka-Shingiya-Ramdhuni-Prakashpur-Shukrabare-Madhuban-Paschimkusaha-laukahi Road	18.76	2.01	17+300-18+700	Ram Dhuni CF
7.	Mudheshanischare-Dandagaun- Chanuwa road	10.34	8.53	6+800-10+650 9+900 till the end	Mudesanischare Road-Dhankuta: Chhammu CF; Khanepani Banpala CF

Sl. No.	Road Section	Road Length (Km)	Length Passing through Forest Areas (km)	Chainage	Name
8.	Dudhauli Lakhima Road	13.01	7	1+000-3+200, 4+500-9+300	Swayambhu CF, Puspanjali CF, Deurali CF, Lakhima CF
9.	Tallo Ranibas - Harsahi Road	12.78	2.455	00+600-2+135, 3+700-4+300, 5+500-5+820	Gauri CF, Bikashpur CF, Deurali CF, Barahi CF, Vishal CF, Chaukani CF, Laxmipur CF
10.	Nayapul-Pawati-Dadakharka Road	12.08	1.5	6+800-11+500	Mulpani CF, Charnavati CF, Sitakunda CF, Bhyakure Dhokebhir CF
11.	Barhabise-Maneshwor-Ghumthang-Listi-Bhairabkunda Road	12.38	2.3	2+000-3+000	Barabise Community Forest
12.	Dolalghat-Falate-Kolati-Dhadkharka-Pokharichauri-Guranse Road	18.63	4.46	1+470-3+340, 17+900-18+400. 6+460-8+190, 13+400- 13+800.	Bghkhor Matakhoriya Community Forest and Rolko Community Forest
13.	Badbhangyang – Sano Masino – Thulo Masino – Satghumti road	6.4	0.74	3+050-3+400, 5+250-5+450 (private)	Salleri Bhitta C. F.
14.	Phisling-Toalang-Baspur-Orlang-Mayatar-Terse-Upradang Gadi-Shaktikor Bazar Road	38.49	7.66	4+260-5+100, 12+630-13+150, 28+000-31+130	Shree Janapragati community forest, Jharana Community Forest and Shree Jamuna Community Forest
15.	Lunkhu – Mudikuwa Road	13.00	10.10	4+00-8+000, 10+000-11+000	Kurga C.F., Kalo CF, Ban Dada CF, Chhahare Salaichi CF
16.	Armadi- Banou road	12.80	1.41	1+800-2+330, 6+450-7+330	Kalibanzar Ketichaur Community Forest Jhauri Community Forest (6+450 to 7+330)
17.	Mijhing - Dhuleodar-Namja – Sirpa - Pang road	6.00	3.5	0+100 - 4+800	Chhaharekhau Community Forest, Dhanchari CF,

Sl. No.	Road Section	Road Length (Km)	Length Passing through Forest Areas (km)	Chainage	Name
					Gumchal CF, Laligurans CF
18.	Mijhing-Ruininwan Badachaur-Gumchal-Siuni-Gam road	13.70	5.6	1+600-1+900, 2+200-8+750, 10+700-12+300	Sarpa Chautara CF, Sano sarpa CF
19.	Shital Pokhari – Jhulkhet – Chunwang Road	18.42	6.834	1+400-1+600, 2+400- 2+750, 4+800-5+800, 6+340-6+575, 8+045-8+125, 8+845-8+910, 9+055-10+775, 10+875-11+120, 13+200-16+310, 16+910-18+000	Thado Dhunga CF, Mauwabari CF
20.	Solabang – Baluwa – Naayegadpul – Jamabagar-Simalchaur-Hukam-Ranmaikot road (Baluwa-Jamabagar- Tribeni Section)	11.63	9	2+000-6+100 8+800-10+300) (8+900 till the end, one side only	Prati Gunjari CF Janachetana Baraha CF Gajawang CF
	Total (km)	**382.14**	**83.251**		

Source: Transect Survey Report, 2017

Table 15:Details of Forest species along the Project Road sections

S. No.	Name of Road	Vegetation and Wildlife
Panchthar		
1.	Phidim-Nagin-Yangnam-Sidin-Prangbung-Falot Road	There are nine community forests along the road alignment. But the road intersects only two of the nine CF; they are Sallery CF and Sathi chulthe CF once. Dominant plant species around the road alignment are Uttis (Alnus nepalensis), Chilaune (Schima wallichii), Pine (Pinus roxburghii), Kutmiro (*Litsea polyantha*), Malato (*Macaranga indica*) and Mauwa (*Bassialati folia*).
2.	Samdin-Chokmagu-Shiva-Nawamidada-Faktep Ghurbise Panchami Road (Samdin-Nawamidada Sector)	The road intersects community forests at three sections, at (2+100 – 3+000), (3+175- 4+200) and (7+600- 8+100). Dominant forest and fodder species along the road alignment are Uttis (*Alnus nepalensis*), Chilaune (*Schima wallichii*), Siris (*Albizia lebbek*), Tanki (*Bahunia purpurea*), Bakaino (*Melia azedarach*), Salla (*Pinus roxburghii*), Kutmiro (*Litsea polyantha*), Badahar (*Artocarpus lakoocha*), Malato (*Macaranga indica*) and Mauwa (*Bassia latifolia*)
Ilam		
3.	Manglbare-Punphung-Ekatappa-Sikari Bhangyang – Phakphok - Ra.Ma.Bi. Khmwang – Thingepur – Aamchok-Jungetar-Phuyatappa-Rabi Road section	Vegetation within the project road alignment has various species of trees such as Chilaune (*Schima wallichi)*, Bar (*Ficus benghalensis*), Katus (Castanopis indica), Kaulo (Persia odoratissima), Pipal (*Ficus religiosa),* Maleto *(Macaranga indica),* Mauwa *(Engelhardia spicate),* Rudraksya *(Elaeocarepus sphaericus),* Siris *(Albizia lebeeck)* and Uttis *(Alnus nepalensis).*
4.	Nepaltar-Shantidada-Gagrlbhangyang-Mangalbare-Dhuseni-Gajurmukhi-Ibhang-Chaturemode Beldagi- Damak Road (Ibhang-Chaturemode Sector)	The forests of the project area are mixed temperate type. The dominant tree species found in the project area are Salla (*Pinus roxburghii*), Naspati (*Pyrus communis*), Chilaune (*Schima wallichii*) and Uttis (*Alnus nepalensisis)* while the shrub species are Bhimsenpati (*Buddleja asiatica*), Tetipati (*Artemesis vulgaris*), Chiraito (*Swertia chirayita*), etc. The common mammals reported in the project area are Barking deer (*Muntiacus muntjak*), Dumsi (*Hystrix spp.*), Monkey (*Macaca mulatta*), Rabbit (*Lepus nigricollis*), Wild cat (*Felis chaus*), Fox (*Vulpes bengalensis*), Wolf (Canis lupus*)*, Nyauri musa (*Herpestes auropunctatus*), Malsapro (*Mustella strigidorsa*) etc.
Jhapa		
5.	Amaldangi-Samayagadh-Basbari-Solmari Road	The dominant tree species found in the nearby forest is Sal (*Shorea robusta),* other species found in this locality are Sissau (*Delbergia sisoo),* Masala *(Eucalyptus sps),* Bel *(Aegle marmelos),* Siaml *(Bombex ceiba),* Kabro *(Ficus lacor),* Bakaino *(Melia azerdarch),* Pipal *(Ficus religiosa), Bar (Ficus benghlensis),* Teak *(Tectona grandis),* Kadam *(Anthrocephalus chinensis),* Bans *(Bambusa vulgaris),* Jamuna *(Syzygium cumini),* Saaj *(Terminalia alata),* Dharayo *(Lagerstroemia perviflora) and* Kyamuna *(Syzygium operculatum).* The road does not pass through any Conservation zone,

S. No.	Name of Road	Vegetation and Wildlife
		Buffer area or other places of ecological importance.
6.	Charpane-Chaitubari-Matigada-Sadhukuti-Ghodamara-Rajgadh Road	Though for relatively smaller length, the road passes through 1 Community Forest. The dominant tree species found in Community forest is Sal (*Shorea robusta),* other species found in this locality are Sissau (*Delbergia sisoo),* Masala *(Eucalyptus sps),* Bel *(Aegle marmelos),* Simal *(Bombex ceiba),* Kabro *(Ficus lacor),* Bakaino *(Melia azerdarch),* Pipal *(Ficus religiosa), Bar (Ficus benghlensis),* Teak *(Tectona grandis),* Kadam *(Anthrocephalus chinensis),* Bamboo *(Bambusa vulgaris),* Jamun *(Syzygium cumini),* Saaj *(Terminalia alata),* Dharayo *(Lagerstroemia perviflora) and* Kyamuna (Syzygium operculatum). Chheparo *(Lacertilia spp,),* Malsapro *(Martes flavigula),* Shyal *(Canis aureus),* Nyauri Musa *(Herpestes edwardsi), Gohoro (Varanus Indicus),* Dhaman Sarpa (*Ptyas mucosus),* Goman Sarpa (*Naja naja) are the wild animals reported around and nearby forest.* Similarly, Crow (*Corvus splendens),* Parrot *(Psittacula himalayana),* Chil *(Ictinaetus malaynesis),* Giddha *(Gyps bangalnesis),* Bakulla *(Bubulcus ibis), Dhukur (Streptopelia senegalensis),* Latkosero *(Bubo coromandus)* and Bhangera *(Passer domesticus)* are the avifauna found there.
7.	Kharsangbari-Jalthal-Manglabare-Bahundhoka- Adhikari Chowk Road	The dominant tree species found in the nearby forest is Saal (*Shorea robusta),* other species found in this locality are Siaasu (*Delbergia Sisoo),* Masala *(Eucalyptus sps),* Bel *(Aegle marmelos),* Siaml *(Bombex ceiba),* Kabro *(Ficus lacor),* Bakaino *(Melia azerdarch),* Pipal *(Ficus religiosa), Bar (Ficus benghlensis),* Teak *(Tectona grandis),* Kadam *(Anthrocephalus chinensis),* Bans *(Bambusa vulgaris),* Jamuna *(Syzygium cumini),* Saaj *(Terminalia alata),* Dharayo *(Lagerstroemia perviflora) and* Kyamuna *(Syzygium operculatum). Hatti (Elephaus maximus),*Badel, Khirkhire, *Cheparo (Lacertilia spp),* Malsapro*(Martes flavigula),* Shyal *(Canis aureus),* Nyauri Musa *(Herpestes edwardsi), Gohoro (Varanus Indicus), Python (Python molurus),* Dhaman Sarpa (*Ptyas mucosus),* Goman Sarpa (*Naja naja) are the wild animals reported around and nearby forest.* Similarly Kaag (*Corvus splendens),* Sunga *(Psittacula himalayana),* Chil *(Ictinaetus malaynesis),* Giddha *(Gyps bangalnesis),* Bakulla *(Bubulcus ibis), Dhukur (Streptopelia senegalensis),* Latkosero *(Bubo coromandus),* Jalewa (*Phalacrocorax carbo),* Kalij *(Catreus wallichii*) and Bhangera *(Passer domesticus)* are the avifauna found there.
8.	Padajungi- Gohawari-Laldhwandra-Jharkaha-Balubathan-Chapramari Road	The dominant tree species found in the nearby forest is Sal (*Shorea robusta),* other species found in this locality are Siaasu (*Delbergia Sisoo),* Masala *(Eucalyptus sps),* Bel *(Aegle marmelos),* Siaml *(Bombex ceiba),* Kabro *(Ficus lacor),* Bakaino *(Melia azerdarch),* Pipal *(Ficus religiosa), Bar (Ficus benghlensis),* Teak *(Tectona grandis),* Kadam *(Anthrocephalus chinensis),* Bans *(Bambusa*

S. No.	Name of Road	Vegetation and Wildlife
		vulgaris), Saaj *(Terminalia alata).* The road does not passess through any Conservation zone, Buffer area or other places of ecological importance.
Morang		
9.	Laxmimarga- Dangihat-Banol-Babiyabirta-Amahi Road	The dominant species around the road alignment are Nariwal (*Cocos nucifera*), Pipal (*Ficus religiosa*), Kadam (*Anthrocephalus chinsensis*), Mango tree (*Mangifera indica*) etc. The common wild life includes Snake, Chheparo and Nyaurimusa (*Callosciurus pygerythrus*). Sparrow (*Passer domesticus*), Crow (*Corvus splendens*), Parrot (*Psittacula krameri*) are birds found in the project area. The alignment does not pass through any forest.
10.	Khorsane-Kerabari-Singhadevi Road	The dominant species around the road alignment are Saal (*Shorea robusta*), Simal (*Bombex ceiba*), Saaj (*Terminalia alata*) Uttis (*Alnus nepalensis*), Chilaune (*Schima* wallichi), etc. The Chutro (*Berberis asiatica)*, Koiralo *(Bauhinia Variegata)*, Haledo (*Curcuma angustifolia)*, Bojho (*Acorus calamus*), Harro (*Terminalia chebula*), Barro (*Terminalia bellirica*) etc are NTFP present in the project area. The common wild life includes Jackel (*Canis aureus*), Banbiralo (*Felis chaus*), Bandel (*Sus scrofa*), Mriga (*Muntiacus spp.*), Mansapro (*Martes flavigula*), Dumsi (*Hystricomorph hystricidae*), Nyaurimusa (*Callosciurus pygerythrus*) etc. are wild animals and Sparrow (*Passer domesticus*), Koili, Jurali, Mujur, Lampuchhare, Parrot (*Psittacula krameri),* Crow (*Corvus splendens*), Dove (*Strptopelia senegalensis*), Kalij (*Lophura leucomelana*), etc are birds found in the project area. The alignment pass throug the community and government forest but not any bufferzone and conserved area.
Sunsari District		
11.	Inaruwa-Satterjhoda-Chitaha-Purbakusha-Biratnagar Road	The dominant tree species found in the nearby forest is Sal (*Shorea robusta),* other species found in this locality are Saal (*Shorea robusta*), Siaasu (*Dalbergia sisoo),* Masala *(Eucalyptus sps),* Bel *(Aegle marmelos),* Simal *(Bombex ceiba),* Kabro *(Ficus lacor),* Bakaino *(Melia azerdarch),* Pipal *(Ficus religiosa), Bar (Ficus benghlensis),* Teak *(Tectona grandis),* Kadam *(Anthrocephalus chinensis),* Pithari, Bans *(Bambusa vulgaris),* Jamuna *(Syzygium cumini),* Saaj *(Terminalia alata) and* Julabi, . Khirkhire*, Cheparo (Lacertilia spp),* Malsapro *(Martes flavigula),* Nyauri Musa *(Herpestes edwardsi), Gohoro (Varanus Indicus), Python (Python molurus),* Dhaman Sarpa (*Ptyas mucosus),* Goman Sarpa (*Naja naja) are the wild animals reported around and nearby forest.* Similarly Kaag (*Corvus splendens),* Sunga *(Psittacula himalayana),* Chil *(Ictinaetus malaynesis),* Giddha *(Gyps bangalnesis),* Bakulla *(Bubulcus ibis), Dhukur (Streptopelia senegalensis),* Owl*(Bubo coromandus),* and Bhangera *(Passer domesticus)* are the avifauna found there.

S. No.	Name of Road	Vegetation and Wildlife
12.	Jhumka-Shingiya-Ramdhuni-Prakashpur-Shukrabare-Madhuban-Paschimkusaha-laukahi Road	The dominant tree species are Sal (*Shorea robusta),* other species found in this locality are Siaasu (*Delbergia Sisoo),* Masala *(Eucalyptus sps),* Bel *(Aegle marmelos),* Simal *(Bombex ceiba),* Kabro *(Ficus lacor),* Bakaino *(Melia azerdarch),* Pipal *(Ficus religiosa), Bar (Ficus benghlensis),* Teak *(Tectona grandis),* Kadam *(Anthrocephalus chinensis),* Bans *(Bambusa vulgaris),* Jamuna *(Syzygium cumini),* Saaj *(Terminalia alata),* Dharayo *(Lagerstroemia perviflora),* Phadir*,* Barro, Karam, Hallude, Pithari, Babul, Neem, Julabi, Jiyal and Kyamuna *(Syzygium operculatum).*Khirkhire*, Cheparo,* Malsapro*,* Shyal *(Canis aureus),* Nyauri Musa *(Herpestes edwardsi), Gohoro (Varanus Indicus),* Dhaman Sarpa (*Ptyas mucosus),* Goman Sarpa (*Naja naja) are the wild animals reported around and nearby forest.* Similarly Kaag (*Corvus splendens),* Sunga *(Psittacula himalayana),* Chil *(Ictinaetus malaynesis),* Giddha *(Gyps bangalnesis),* Bakulla *(Bubulcus ibis), Dhukur (Streptopelia senegalensis),* Lato kosero *(Bubo coromandus)* and Bhangera *(Passer domesticus)* are the avifauna found there.
13.	Mudhesanischare-Dadagaun-Chanuwa Road Dhankuta District	The forests of the project area range from tropical to temperate deciduous. The dominant tree species are *Alnus nepalensis and Schima wallichii* while some medicinal plants like Ghodtapre (*Centella asiatica*), Chiraito (*Swertia chirayita*), Payum (*Prunus cerasoides*), Tote (*Euphorbia hispida*), etc. are also found in project area. Mammals reported in the project area are include Monkey (Macaca sp.), Kharayo (Ochotona sp.), Mreega (Cervus sp.), Jangali birolao (Felis chaus), Syal (Canius aureus), Dumsi (Hystrix indica), Malsaapro (Martes flavigula), Musa (*Rattus sp.)*, Chamero (*Pteropus leucocephalus*), Nyauri Muso (*Herpestes edwardsii*), Lokharke (*Funambulus palmarum)*, Bandel (*Sus scrofa cristatus)etc*.The most commonly found bird species are Kalij (*Lophura leucomelana*), Dhukur (*Streptopelia senegelensis)*, Jureli (*Pycnonotus spp.)*, Rupi (*Acridotheres tritis)*, Mayur (*Pavo cristatus)*and Kande Bhyakur (*Spiny babbler)*.
14.	Nayapul-Pawati-Dadakharka Road in Dolakha district	The major tree species identified in the project area are Sal *(Shorea Robusta),* Chilaune (*Schima wallichii)*, Salla (*Pinus roxburghii),* Parijot (*Nyctanthes arbo-tristis)*, Pipal (*Pericampylus glaucus),* Kutmero (*Litsea monopelata*), Uttis (*Alnus nepalensis*), Bamboo (*Bambusa vulgare)*, Bar (*Ficus benghalensis)*, Mango, Mauwa (*Engelhardia spicata*), Lakuri, Guava (*Psidium guajava*), Dudelo (*Euphorbia hirta*) and Lapsi(*Choerospondias axillaris*). The ethno-botanical plants observed are*Timor* (*Zanthoxylum armatum*), Pipal (*Pericampylus glaucus), bar*(*Ficus benghalensis)*, *amala*(*Ohyllanthus emblica*)(Field Survey, 2014). The wild mammals present in the project area were squirrels (Faunambulus sps), Dumsi (Hystrix, brachyuran), Phaura (Vulpes, bengaleasis), Monkey (Macaca, mulatta), Sarus (Grus, nigricollis).

S. No.	Name of Road	Vegetation and Wildlife
		Common herpeto fauna species include Bufo melanostictus, frogs (calotes vensicolor), Snakes (green snakes). The common bird species observed in the project site are sparrows, Kalij (Caphura leucomelanos) Kafal pakyo, kag, Parrot and flying fox.
	Sindhuli	
15.	Dudhauli - Lakhima Road (13.01 km)	Most of the forest segments along the road section are owned by community and private individuals. Some of the common flora species found in project affected area are Khote salla *(Pinus roxburghii),* Chilaune *(Schima wallichii), Uttis(Alnus nepalensis), Aanp (Mangifera indica),* Peepal *(Ficus religiosa), Sal (Shorea robusta), Bahj (Quercus lanata),* Dhupi *(Cryptomeria japonica),* Jamuna *(Syzygium cumini), siris (Albizia lebekh).*Some of the NTFPs listed are Chirraito (*Swertia angustifolia)*, Titepati (*Artemisia indica*), Kaulo, Gurans (*Rhododendron arboretum)*, Amala, Harro (*Terminalia chebula)*, Barro, Timur, Kurilo (*Terminalia chebula)* etc. The common mammals reported in the project area are Langur(*Semnopithecus schistaceus),*Rhesus monkey (*Macaca mulata*), Bandel (*Sus scrofa cristatus)*, Ratuwa (*Muntiacus muntijak*), Dumsi(*Hystrix indica),*Nyarimuso*(Herpestes javanicus),*Kharayo(*Lepus nigricollis),*Malsapro(*Martes Flabigula),*Ban Biralo(*Felis chaus).*
16.	Tallo Ranibas - Harsahi Road	Different varieties of tree species were observed on either side of the road alignment. Some of the common flora species found in project affected area are Peepal (*Ficus religiosa),*Sal *(Shorea robusta),* Aanp*(Mangifera indica),* Dudhilo *(Ficus neriifolia),* Katahar *(Artocarpus heterophyllus),* Bar*(Ficus benghalensis),* Karam*(Adiina cordifolia),* Bakaino*(Melia azederach),* Kavro*(Ficus lacor),* Chhatiwan *(Alstonia scholaris),* Kusum *(Carthamus tinctorius),* Botdhayero (*Lagerstroemia parviflora) ,* Khunew *(Ficus semicordata).* Different numbers of faunal species were reported such as Langoor *(Semnopithecus schistaceus)* ,Syal*(Canis aureus)* Rato Bandar *(Macaca mulata),* Nyarimuso *(Herpestes javanicus),* Lokharke *(Ratufa indica),,* Mirga *(Muntiacus muntjac),* Dumsi *(Hystrix indica),* Kharayo *(Lepus nigricollis),* Malsapro *(Martes Flabigula),* Wild cat *(Felis chaus).* Some of the common bird species reported in the project site are Kaag *(Corvus splendens),* Suga *(Psitta chrysaetos),* Bhangera *(Passer domesticus)*, Parewa *(Columbia Livia),* Giddha *(Neophron Percnopterus),* Chil *(Spizaetus nipalensis),* Kaliz *(Lophura leucomelanos),* Luiche *(Gallus gallus)* ,Dhukur *(Streptopelia chinensis),* Koili *(Eudynamys scolopacea),* Lato kosero *(Bubo zeylonensis).*
17.	Phisling-Toalang-Baspur-Orlang-Mayatar-Terse-Upradang Gadi-Shaktikor Bazar Road in Chitwan District	The dominant species around the road alignment are Saal (*Shorea robusta*), Uttis (Alnus nepalensis), Chilaune (Schima wallichi), Katus (*Castanopsis indica*), Sisaoo (*Delbergia sisoo*) and Simal (*Bombax ceiba*). The Chutro (*Berberis asiatica)*, Koiralo *(Bauhinia Variegata)*, Dalchini (*Cinnamom tamala), Sikari Lahara (Poranopsis paniculata)* and Amala (*Phyllanthus emblica)* are NTFP present in the project area.

S. No.	Name of Road	Vegetation and Wildlife
		The common wild life includes Mriga (Muntiacus spp.), Jackel (*Canis aureus*), Banbiralo (*Felis chaus*), and Nyaurimusa (*Callosciurus pygerythrus*) are wild animals and Dove (*Strptopelia senegalensis*), Parrot (*Psittacula krameri*), Koili (*Cuculus micropterus*), Kalij (*Lophura leucomelana*), Jureli (*Pycnonotus cafer*), Sparrow (*Passer domesticus*), Crow (*Corvus splendens*) etc are birds found in the project area. The alignment pass throug the private and government forest but not any conserved area.
18.	Barhabise-Maneshwor-Ghumthang-Listi-Bhairabkunda Road	The vegetation along the road alignment are varies from Tropical to Sub-tropical types mainly tropical evergreen forest, sub-tropical deciduous forest, schima-castanopsis forest and sub-tropical semi-ever green hill forest are found. The major floras found on either side of the road alignment are Chilaune (*Schima wallichi*), Mauwa (*Engelhardia spicata*), Katus (*Schima castanopsis*), Simal *(bombax ceiba),* Falendo (*Erythrina stricta*), Bakaino (*Melia azederach*), Tuni *(Toona ciliate),* Kutmero (*Litsea monopelata)*, Painyu (*Prunus cerasoides*), Siris *(Albizzia lebbeck).* The alignment does not hamper simal tree, but found in the local forest. The road does not fall under any protected areas or their buffer zone, wetlands of biological importance or other ecologically sensitive areas.
19.	Dolalghat-Falate-Kolati-Dhadkharka-Pokharichauri-Guranse Road in Kaverepalanchok District	The dominant species around the road alignment are Saal (*Shorea robusta*) Uttis (Alnus nepalensis), Chilaune (Schima wallichi), Painyu (Prunus cerasoides), and Salla (*Pinus roxburghii*). The Chutro (*Berberis asiatica)*, Koiralo *(Bauhinia Variegata)*, Haledo (*Curcuma angustifolia)* and Dhasingare (*Gaultheria fragrantissima)* are NTFP present in the project area. The common wild life includes Jackel (*Canis aureus*), Banbiralo (*Felis chaus*), Monkey (*Macaca mulatta*) and Nyaurimusa (*Callosciurus pygerythrus*) are wild animals and Sparrow (*Passer domesticus*), Crow (*Corvus splendens*), Dove (*Strptopelia senegalensis*), Parrot (*Psittacula krameri*) and Kalij (*Lophura leucomelana*) are birds found in the project area. The alignment pass throug the private and government forest but not any conserved area.
20.	Badbhangyang - Sano Masino - Thulo Masino - Satghumti road in Kathmandu district	The forests of the project area are mixed temperate type. The dominant tree species found in the project area are Salla (*Pinus roxburghii)*, Chilaune (*Schima wallichii),* Naspati *(Pyrus communis),* Uttis (*Alnus nepalensis,* *robusta*)and some shrubs species present along project alignment are Ainselu (*Rubus* ellipticus), Bhimsenpati (*Buddleja* asiatica), Titepati (*Artemesia* vulgaris), Chiraito (*Swertia* chirayita). Similarly, Titepati and Chiraito were of medicinal significance. The common mammals reported in the project area are Deer (*Muntiacus muntjak*), Dumsi (*Hystrix spp.*), Monkey (*Macaca mulatta*), Rabbit (*Lepus nigricollis*), Wild cat (*Felis chaus*), Fox (*Vulpes bengalensis*), Nyauli musa (*Herpestes auropunctatus*), Salak (*Manis carassicaudata*). The most commonly found bird species are dhukur (*Streptopelia spp.*), jureli (*Pycnonotus cafer*), Fiste

S. No.	Name of Road	Vegetation and Wildlife
		(*Prinina spp.*), Kalij (*Lophura leucomelanos*), Eagle (*Hieraaetus spp.*), Rupi (*Acridotheres spp.*), Huchil (*Ketupa zeylonensis*), Lampuchre (*Urocissa spp.*). Likewise, Gohoro (*Varanus spp.*), Chameleon, Snake, Toad (*Paa spp.*), Frog (*Rana tigrina*), etc. were the reptiles around the project area.
21.	Bansbari-Bageswori Purano Health-Post Way - VDC Building Road	The dominant tree species found in the project are Bakaino (Melia azadirach), Painyu (*Prunus cerasoides*), Mauwa (*Engelhardia spicata),* Uttis *(Alnus nepalensis)*, Chilaune *(Schima wallichii)* and herbs species that were present in the project area were Tetipati (*Artemesis vulgaris*), Aiselu (*Rubus ellipticus*), and Bhojo (*Acorus calamus*). The common mammals found in the project area are common, Barking deer (*Muntiacus muntjak*), Porcupine (*Hystrix brachyura*), Fox (*Vulpes bengalensis*), Wild boar (*Suss crofa*), etc. Similarly, bird species that can be frequently observed on the forests of the area include Koili (*Eudynamys scolopacea*), Kalij (*Lophura leucomelanos*), Crow (*Corvus splendens*), Sparrow (*Passer domesticus*), Dhukur (*Streptopelia spp.*), Titra (*Francolinus francolinus*), Myna (*Acridotheres tristis*), Lampuchre (*Urocissa spp.*), etc.The road does not fall under any protected areas or their buffer zone, wetlands of biological importance or other ecologically sensitive areas.
Parbat		
22.	Armadi-Banou road, Parbat District	The forests of the project area are mixed temperate type. The dominant tree species found in the project area are Chilaune (*Schima walihii*), Sisso (*Dalbergia sisso*), Khanyu (*Ficus semicordata*), Mauwa (*Engelhardia spicata*), Uttis (*Alnus nepalensis*), Salla (*Pinus roxburgii*), Katus (*castanopsis indica*), Tuni (*Toona ciliata*), Pipal (*Ficus religiosa*) and Laligurans (*Rhododendron aboratum*). Similarly, some of the ethnobotanical plants that are recoreded in the project area are Timur (*Zanthoxylum armatum*), Tite pati *(Artimisia vulgaris),* and Naagbeli (*Lycopodium clavatum*). The common mammals reported in the project area Dumsi (*Hyxtris* spp.), Ratuwa (*Muntiacus muntijak*), Hundar (*Hyena hyena,)* Golden jackal (*Canis aureus*), Rhesus monkey (*Macaca mulata*), Bengal fox (*Vulpes bengalensis*), Indian hare (*Lepus migricllis*) and Squirrel (*Funambulas spp.*). The most commonly found bird species are Sparrow (*Leucosticte spp.*), Spotted dove (*Streptopelia chinensis),* Red collared dove (*Streptopelia tranquebarica*), Kalij pheasant (*Lophura leucomelana*), Haleso (*Treton* spp.) Jureli (*Pycnonotus spp.*) and Drongo (*Dicrurus macrocercus*).
23.	Lunkhu - Mudikuwa Road	The forests of the project area are mixed temperate type. The dominant tree species found in the project area are includes Chilaune (*Schima walichii*), Maleto (*Macaranga indica*), Dudhilo (*Fiscus neriifolia*), Lapsi (*Choerospondias axillaris*), Salla (*Pinus roxburghii*), Sal (*Shorea robusta*), Bar

S. No.	Name of Road	Vegetation and Wildlife
		(*Ficus bengalensis*), Paiyau (*Betula alnoides*), Pipal (*Ficus reigiosa*), Khannu (*Ficus semicordata*), Sisau (*Dalbergia sisso*) and Uttis (*Alnus nepalensis*)and shrubs like Banmara (*Ageratina adenophora*), Sisno (*Utrica dioca*), Aaiselu (*Rubus ellipticus*), Timur (*Zanthoxylum armatum*) and Tite pati *(Artimisia vulgaris)* were present around the project area found in project area. The common mammals reported in the project area are Golden jackal (*Canis aureus*), Rhesus monkey (*Macaca mulata*), and Dumsi (*Hystrix spp.*).The most commonly found bird species are House crow (*Corvus splendens*), Sparrow (*Passer domesticus*), Drongo (*Dicrurus leucophaeus*),Gauthali (*Hirundo rustica*) and Dove (*Streptopelia spp.*).
	Rukum	
24.	Shital Pokhari – Jhulkhet – Chunwang Road	The dominant forests pecies found in the road alignment are *Pinusroxburghii*(Salla),*Juglansregai* (Okhar),*Shoerarobusta*(Saal),*Alnusnepalensis*(Uttis),*Bassiabutyracea*(Cheure), *Bambusa spps* (Bamboo), *Juniperus cummunis*(Dhupi), *Mangifera indica* (Mango), *Prunus persica*(Aaru) etc. and the main NTFP species found along the road alignments are *Rubia manjith* (Majitho), (*Lindera neesiana)* Siltimur, Chiraito, Harro etc. There is a community forest along the proposed road alignment. (Jackal) *Canis aureus*, (Lokharke) *Ratufa indica*,(Banbiralo), *Felis chaus,(*Malsanpro*), Martef Flabigula* are the wild animals reported in the forests of proposed road area. The road does not fall under any protected or buffer zone area.
25.	Solabang - Baluwa - Naayegadpul - Jamabagar- Simalchaur-Hukam-Ranmaikot road (Baluwa- Jamabagar- Tribeni Section)	The dominant forest species found in the road alignment are *Pinus roxburghii* (Salla),*Juglans rega*(Okhar),*Shoera robusta* (Saal),*Alnus nepalensis* (Uttis), *Bassia butyracea* (Cheure), *Bambusa spps* (Bamboo), *Juniperus cummunis* (Dhupe), *Mangifera indica* (Mango), *Prunus Persica* (Aaru) etc and the main NTFP species found along the road alignments are *Rubia manjith* (Majitho), (*Lindera neesiana)* Siltimur,Chiraito,Harro etc. There are national forests along the proposed road alignment. (Shyaal) *Canis aureus*,(Lokharke) *Ratufa indica*, (Ban biralo) *Felis chaus,(*Malsanpro*) Martef Flabigula* are the wild animals reported in the forests of proposed road area. Similarly birds are Laughing Dove (Dhukur) *Alpine chough* (Crow), *Eye-Browened Thrush* (Bhyakur), *Peacock* (Mayur), *common sandpiper* (Hutityau) etc. The road does not fall under any protected or buffer zone area.
Rolpa		
26.	Mijhing - Dhuleodar-Namja – Sirpa - Pang road	The forests of the project area are mixed temperate type. The dominant tree species found in the project area are *Pinus roxburghii* (ranisalla), *Schima wallichii, Shorea robusta and Quercus semicarpifolia* and some medicinal plants are Dalchini(*Cinnamomum zeylanicum*),

S. No.	Name of Road	Vegetation and Wildlife
		Kurilo(*Aspagarus racemosus*), Kaulo(*Persea odoratissima*), Paiyu(*Betula alnoides*), Sisnu(*Urtica dioca*) and Tite(*Swertia nervosa*)found in project area. The common mammals reported in the project area are dumsi (*Hystrix spp.*), monkey (*Macaca mulatta*), fox (*Vulpes bengalensis*), nyauli musa (*Herpestes edwardsi*), ghoral (*Nemorhaedus goral*), malsapro (*Martes Flacigula*) etc.The most commonly found bird species are dhukur (*Streptopelia spp.*), Kalij (*Lophura leucomelanos*), lampuchre (*Urocissa spp.*), Sarau (*Acridotheres tristis*), Crow (*Corvus spp.*), Sparrow (*Passer spp.*), Koile(*Cacomantis spp.*), White-vulture (*Neophron percnopterus*), Kalchaud, Piegon (*Columba livia*), Parrot(*Psittacula spp.)*, Himalayan Griffon (*Gyps himalayansis*). The road does not fall under any protected areas or their buffer zone, wetlands of biological importance or other ecologically sensitive areas.
27.	Mijhing-Ruininwan Badachaur-Gumchal-Siuni-Gam Road	The forests of the project area are mixed temperate type. The dominant tree species found in the project area are Bakaino (*Melia azederach*), Jhingada (*Lannea coromandelica*), Khirro (*Sapium insigne*), Salla (*Pinus roxburghii*), Sal (*Shorea robusta*), Chilaune (*Schima wallichi*), Uttis (*Alnus nepalensis*), Paiyu (*Betula cerasoides*),Laliguras (*Rhododendron arboretum*), Dudhelo (*Hedera nepalensis*), Lakure (*Fraxinus floribunda*), Pangra (*Entada phaseoloides*), Khasru (*Quescus semecarpifolia*), Angeri (*Lyonia ovalifolia*), Banjh (*Quescus lanata*), Chandan (*Santalum album*), Wallnut (*Juglans regia*), Chiuri (*Aesandra butyracea*) etc. The common mammals reported in the project area are Wolf (*Canis lupus lupus*), Bat (*Myotis lucifugus*), Dumsi (*Hystrix spp.),* Ghoral (Nemorhaedus) Monkey (*Macaca mulata),* Rabbit (*Lepus nigricollis),* Wild cat (*Felis chaus*), and Fox (*Vulpes bengalensis)*. Similarly, Bird species around the project area include Dhukur (*Streptopelia* spp.), Titra (*Francolinus* spp.),Kalij (*Lophura leucomelanos),*Pigeon (*Columba*spp.) Ghoghate, Gauthali (*Glareola* spp.), Sparrow (*Leucosticte* spp.), Parrot *(Psittacula* spp.) etc. The road does not fall under any protected areas or their buffer zone, wetlands of biological importance or other ecologically sensitive areas.

4. Trees within the Corridor-of-Construction

73. The road side plantation is mixed type and natural regeneration is seen. A total of 5,142 trees have been enumerated within the corridor-of-construction. Predominant species in the project district are Sal, Uttis, Bakaino, Salla, Chilaune, Paiyu etc. Majority of trees are of girth size are between 120-180 cm. All efforts will be made to restrict the tree cutting to toe line of the formation width considering the safety issue. Details of the trees enumerated in project district are given in Table below.

Table 15: Affected Trees due to Project Development

District	Road Section	Tree Number
Panchthar	Phidim-Nagin-Yangnam-Sidin-Prangbung-Falot Road	677
	Samdin-Chokmagu-Shiva-Nawamidada-Faktep Ghurbise Panchami Road (Samdin-Nawamidada Sector)	359
Ilam	Manglbare - Punphung-Ekatappa - Sikari Bhangyang – Phakphok - Ra.Ma.Bi. Khamwang – Thingepur – Aamchok - Jungetar-Phuyatappa - Rabi road	225
	Nepaltar-Shantidada-Mangalbare-Dhuseni-Gajurmukhi-Ibhang-Chaturemode Adipur-Chapeti-Beldagi- Damak Road (Ibhang-Chaturemode Sector)	237
Jhapa	Amaldangi-Samayagadh-Basbari-Solmari Road	12
	Charpane-Chaitubari-Matigada-Sadhukuti-Ghodamara-Rajgadh Road	118
	Kharsangbari-Jalthal-Manglabare-Bahundhoka- Adhikari Chowk Road	1
	Padajungi- Gohawari-Laldhwandra-Jharkaha-Balubathan-Chapramari Road	11
Morang	Laxmimarga- Dangihat-Banol-Babiyabirta-Amahi Road	6
	Khorsane-Kerabari-Singhadevi Road	94
Sunsari	Inaruwa-Satterjhoda-Chitaha-Purbakusha-Biratnagar Road	87
	Jhumka-Shingiya-Ramdhuni-Prakashpur-Shukrabare-Madhuban-Paschimkusaha-laukahi Road	83
Dhankuta	Mudheshanischare- Dandagaun- Chanuwa road	632
Sindhuli	Dudhauli Lakhima Road	22
	Tallo Ranibas - Harsahi Road	69
Dolakha	Nayapul-Pawati-Dadakharka Road	124
Sindhupalchok	Barhabise-Maneshwor-Ghumthang-Listi-Bhairabkunda Road	120
Kavre	Dolalghat-Falate-Kolati-Dhadkharka-Pokharichauri-Guranse Road	10
Bhaktapur	Bansbari-Bageswori Purano Health-Post - VDC Building Road	12
Kathmandu	Badbhangyang - Sano Masino - Thulo Masino - Satghumti road	24
Chitawan	Phisling-Toalang-Baspur-Orlang-Mayatar-Terse-Upradang Gadi-Shaktikor Bazar Road	207
Parbat	Lunkhu - Mudikuwa Road	665
	Armadi- Banou road	145
Rolpa	Mijhing - Dhuleodar-Namja – Sirpa - Pang road	236
	Mijhing-Ruininwan Badachaur-Gumchal-Siuni-Gam road	308
Rukum	Shital Pokhari – Jhulkhet – Chunwang Road	405
	Solabang - Baluwa - Naayegadpul - Jamabagar- Simalchaur-Hukam- Ranmaikot road (Baluwa- Jamabagar- Tribeni Section)	253
	Total	**5142**

5. Wildlife movement along the Project Roads

74. The project road sections are not renowned for wildlife population.

C. Social and Cultural Resources

1. Demography:

75. According to the latest census of 2011, Nepal's population was 26,494,504 as of June 2011. The average annual growth rate of population during the last decade i.e. 2001-2011 was 1.35 percent (CBS 2011). The census also revealed that the sex ratio i.e. males per 100 females was 94.6. In other words, in Nepal's population, 48.5% are male and 51.8% are female. Facts and figures about demography of the project district is summarized in the succeeding Table.

2. Educational Facility:

86. The project districts have pre-primary, primary, lower secondary, and higher secondary level educational institutions. District wise education institutions are described briefly hereunder:

- **Panchthar:** Panchthar district has 317 pre-primary, 433 primary, 170 lower secondary, 91 secondary and 36 higher secondary level institutions.
- **Ilam:** Ilam district has 517 pre-primary, 505 primary, 184 lower secondary, 97 secondary and 40 higher secondary level institutions.
- **Jhapa:** Jhapa district has 933 pre-primary, 663 primary, 368 lower secondary, 218 secondary and 102 higher secondary level institutions.
- **Morang:** Morang district has 1020 pre-primary, 690 primary, 334 lower secondary, 212 secondary and 107 higher secondary level institutions.
- **Sunsari:** Sunsari district has 997 pre-primary, 727 primary, 346 lower secondary, 207 secondary and 75 higher secondary level institutions.
- **Dhankuta:** Dhankuta district has 347 pre-primary, 352 primary, 124 lower secondary, 82 secondary and 42 higher secondary level institutions.
- **Sindhuli:** Sindhuli district has 426 pre-primary, 580 primary, 206 lower secondary, 113 secondary and 65 higher secondary level institutions.
- **Dolakha:** Dolakha district has 315 pre-primary, 429 primary, 183 lower secondary, 93 secondary and 44 higher secondary level institutions.
- **Sindhupalchok:** Sindhupalchok district has 350 pre-primary, 576 primary, 225 lower secondary, 129 secondary and 53 higher secondary level institutions.
- **Kabhrepalanchok:** Kabhrepalanchok district has 570 pre-primary, 690 primary, 316 lower secondary, 202 secondary and 82 higher secondary level institutions.
- **Kathmandu:** Kathmandu district has 1099 pre-primary, 1298 primary, 1096 lower secondary, 883 secondary and 279 higher secondary level institutions.
- **Bhaktapur:** Bhaktapur district has 344 pre-primary, 320 primary, 258 lower secondary, 188 secondary and 56 higher secondary level institutions.
- **Chitwan:** Chitwan district has 680 pre-primary, 521 primary, 289 lower secondary, 197 secondary and 80 higher secondary level institutions.
- **Parbat:** Parbat district has 336 pre-primary, 367 primary, 126 lower secondary, 87 secondary and 37 higher secondary level institutions.
- **Rolpa:** Rolpa district has 359 pre-primary, 429 primary, 146 lower secondary, 167 secondary and 25 higher secondary level institutions.
- **Rukum:** Rukum district has 299 pre-primary, 393 primary, 136 lower secondary, 67 secondary and 31 higher secondary level institutions.

Table 16: Population, Households and Population Density of Project Districts

S. N.	District	Population 2011			Annual Growth Rate (%)	Sex Ratio (males per 100 females)	Number of Household	Average Household Size	Area in Sq.km.	Population Density (Persons /sq. km.)
		Total	Male	Female						
1.	Panchthar	191,817	90,186	101,631	-0.52	89	41,196	4.66	1,241	155
2.	Ilam	290,254	141,126	149,128	0.26	95	64,502	4.50	1,703	17
3.	Jhapa	812,650	385,096	427,554	1.66	90	184,552	4.40	1,606	506
4.	Morang	965,370	466,712	498,658	1.35	94	213,997	4.51	1,855	520
5.	Sunsari	763,487	371,229	392,258	1.99	95	162,407	4.70	1257	607
6.	Dhankuta	163,412	76,515	86,897	-0.19	88	37,637	4.34	891	183
7.	Sindhuli	296,192	142,123	154,069	0.57	92	57,581	5.14	2,491	119
8.	Dolakha	186,557	87,003	99,554	-0.91	87	45,688	4.08	2,191	85
9.	Sindhupalchok	287,798	138,351	149,447	-0.61	93	66,688	4.32	2542	113
10.	Kavrepalanchowk	381,937	182,936	199,001	-0.10	92	80,720	4.73	1396	274
11.	Bhaktapur	304,651	154,884	149,767	3.01	103	68,636	4.44	119	2560
12.	Kathmandu	1,744,240	913,001	831,239	4.78	110	436,344	4.00	395	4416
13.	Chitawan	579,984	279,087	300,897	2.06	93	132,462	4.38	2,218	261
14.	Parbat	146,590	65,301	81,289	-0.74	80	35,719	4.10	494	297
15.	Rolpa	224,506	103,100	121,406	0.67	85	43,757	5.13	1,879	119
16.	Rukum	208,567	99,159	109,408	1.01	91	41,856	4.98	2,877	72

Source: Central Bureau of Statistics, Population Census 2011

76. According to Census of 2011, the literacy rate of project districts is summarized in the table below.

Table 17: Population aged 5 years and above by literacy status

S. No.	District	Population aged 5 years & above	Population who are			Literacy not stated	Literacy rate
			Can read & write	Can read only	Can't read & write		
1.	**Panchthar**						
	Both Sex	174,563	126,697	5,515	42,283	68	72.58
	Male	81,486	65,471	2,586	13,407	22	80.35
	Female	93,077	61,226	2,929	28,876	46	65.78
2.	**Ilam**						
	Both Sex	269,760	210,179	6,367	53,057	157	77.91
	Male	130,666	109,964	3,084	17,548	70	84.16
	Female	139,094	100,215	3,283	35,509	87	72.05
3.	**Jhapa**						
	Both Sex	743,957	558,615	13,047	172,072	223	75.09
	Male	349,759	288,007	6,299	55,364	89	82.34
	Female	394,198	270,608	6,748	116,708	134	68.65
4.	**Morang**						
	Both Sex	880,229	621,687	17,520	240,604	418	70.63
	Male	423,298	333,245	8,339	81,549	165	78.73
	Female	456,931	288,442	9,181	159,055	253	63.13
5.	**Sunsari**						
	Both Sex	695,435	476,103	13,887	205,155	290	68.46
	Male	336,594	259,040	6,421	71,024	109	76.96
	Female	358,841	217,063	7,466	134,131	181	60.49
6.	**Dhankuta**						
	Both Sex	148,935	110,764	2,946	35,194	31	74.37
	Male	69,168	56,991	1,280	10,885	12	82.40
	Female	79,767	53,773	1,666	24,309	19	67.41
7.	**Sindhuli**						
	Both Sex	265,265	160,558	8,344	96,176	187	60.53
	Male	126,320	88,173	4,148	33,918	81	69.80
	Female	138,945	72,385	4,196	62,258	106	52.10
8.	**Dolakha**						
	Both Sex	170,820	107,238	5,979	57,447	156	62.78
	Male	79,064	57,989	2,629	18,400	46	73.34
	Female	91,756	49,249	3,350	39,047	110	53.67
9.	**Sindhupalchok**						
	Both Sex	264,274	157,469	7,635	98,960	210	59.59
	Male	126,532	86,010	3,674	36,771	77	67.97
	Female	137,742	71,459	3,961	62,189	133	51.88
10.	**Kavrepalanchok**						
	Both Sex	353,924	247,049	9,665	96,942	268	69.80
	Male	168,411	134,037	4,547	29,750	77	79.59
	Female	185,513	113,012	5,118	67,192	191	60.92
11.	**Kathmandu**						
	Both Sex	1,632,640	1,408,199	25,606	198,225	610	86.25
	Male	853,486	786,704	11,471	55,116	195	92.18
	Female	779,154	621,495	14,135	143,109	415	79.77

12.	**Bhaktapur**						
	Both Sex	284,829	232,657	4,896	47,119	157	81.68
	Male	144,259	130,526	2,090	11,589	54	90.48
	Female	140,570	102,131	2,806	35,530	103	72.65
13.	**Chitwan**						
	Both Sex	537,183	413,526	10,579	112,785	293	76.98
	Male	256,694	215,282	4,946	36,351	115	83.87
	Female	280,489	198,244	5,633	76,434	178	70.68
14.	**Parbat**						
	Both Sex	133,055	98,257	3,032	31,665	101	73.85
	Male	58,306	48,636	1,373	8,253	44	83.42
	Female	74,749	49,621	1,659	23,412	57	66.38
15.	**Rolpa**						
	Both Sex	195,969	117,590	6,086	72,181	112	60.00
	Male	88,582	63,379	2,712	22,449	42	71.55
	Female	107,387	54,211	3,374	49,732	70	50.48
16.	**Rukum**						
	Both Sex	184,251	114,396	4,762	64,994	99	62.09
	Male	86,955	61,936	2,126	22,856	37	71.23
	Female	97,296	52,460	2,636	42,138	62	53.92

Source: National Census, CBS, 2011

3. Health Infrastructure:

87. All the VDCs of project area have facility of sub-health post[10]. The health posts/sub-health posts provide basic health facilities including immunization programs and minor healthcare. Apart from this, the district headquarters have District Public Health Offices including District Hospitals. The district Public Health Offices are primarily focused on public health and District Hospitals on curative cure.

Table 18: Health facilities in project districts

District	Health Facility					
	Hospital	**Institution**	**PHCC**	**Health Post**	**Sub-health Post**	**EPI Clinic**
Panchthar	1	0	2	10	30	211
Ilam	1	2	4	6	38	177
Jhapa	1	30	6	6	38	268
Morang	2	12	7	10	49	319
Sunsari	1	6	5	7	40	297
Dhankuta	2	2	2	19	16	152
Sindhuli	1	1	3	17	35	205
Dolakha	1	6	2	9	43	169
Sindhupalchok	1	0	3	10	65	254
Kabhrepalanchok	2	3	5	9	80	332
Kathmandu	9	234	8	15	43	174
Bhaktapur	1	8	2	7	12	144
Chitwan	2	28	4	5	31	226
Parbat	1	0	2	10	42	163
Rolpa	1	0	2	15	34	215
Rukum	1	1	2	7	34	165

Source: District Profile, Intensive Study and Research Center, 2013

[10] Sub-health post is health facility that exists at VDC level. It provides health assistance to the community. Each sub-health post has one health assistant (a certificate course) in charge with primary health care facility. The sub-health post is under Health Post, which is under the District Hospital.

D. Archaeological and Historical Monuments and Sensitive Receptors

88. There are no archeological or historical monuments along the project roads. However, there are a number of religious structures and other community property resources (CPR)[11] including sensitive receptors like schools and health centers. There are 50 schools, 20 temples, 3 health posts, 2 waiting places/sheds, 2 police posts, and 2 community buildings along the project roads in total. List of all sensitive receptors have been listed in road specific EMPs. The list excludes the receptors which are very close to the alignment and are likely to be relocated. In addition to the specific sensitive structures enlisted in the tables above there are few residential areas or towns (residential cum commercial areas) along the project roads.

E. Economic Development

1. Industries

89. The large industries include agro-based and distilleries, pipe and steel, textile, tobacco and, soap and detergent; whereas small industries are cereal processing mills, stones, and bricks. There are small and cottage industries like rice and flour mill, weaving industry located in various settlements of project districts. Detail of industries and financial institutions in the project districts is summarized in the table below:

Table 19: Financial institutions in project districts

District	Financial Institution			
	Bank	Co-operatives	Industry	Small/cottage industries
Panchthar	7	204	9	456
Ilam	13	513	34	1004
Jhapa	84	717	81	4959
Morang	97	993	202	4489
Sunsari	80	547	110	3402
Dhankuta	11	260	16	724
Sindhuli	11	433	2	807
Dolakha	19	495	19	914
Sindhupalchok	28	594	32	1420
Kabhrepalanchok	51	1322	118	2866
Kathmandu	509	4246	2467	34480
Bhaktapur	48	604	134	2940
Chitwan	129	643	144	5430
Parbat	14	202	2	1099
Rolpa	4	112	3	788
Rukum	4	110	2	479

Source: District Profile, Intensive Study and Research Center, 2013

2. Minerals

90. There are no metallic minerals extraction reported in the project districts. However, perennial and seasonal rivers provide ample supply of sand, boulders, and stones for construction purposes and are even exported to neighboring districts and Indian cities close to the border, especially from Terai districts. A brief summary of mineral resources in project districts is presented in the table below:

[11] CPRs are structures or facilities that belong to a community such as hand pumps, wells, schools, health centers, temples, grave yards etc. Some Physical Cultural Resources (PCR) such as temples can also be a CPR if it belongs to the community

Table 20: Mineral Resources of Project districts

S. N.	District	Metallic Minerals	Non-Metallic Minerals			Fuel Minerals and Thermal Springs
			Chemicals, Fertilizers, Insulators, Ceramics, Refractories and Abrasives	Germ Minerals	Construction Materials	
1.	Panchthar		Garnet	Tourmaline		
2.	Ilam	Arsenic, Bismuth, Copper, Gold, Lead, Nickel, Silver, Tungsten, Zinc	Corundum, Graphite, Mica, Pyrite	Tourmaline		
3.	Jhapa		Mica			Coal, Oil and Gas
4.	Morang					
5.	Sunsari	Copper	Phosphorite			Coal
6.	Dhankuta	Copper	Clay, Phosphorite	Tourmaline	Limestone, Marble, Quartzite	
7.	Sindhuli	Lead, Nickel, Uranium, Zinc	Mica, Pegmatite		Granite, Limestone	
8.	Dolakha	Copper, Tungsten	Magnesite, Ocher, Pyrite, Talc		Quartzite, Slate	
9.	Sindhupalchok	Copper, Iron	Magnesite, Mica, Ocher, Pegmatite, Pyrite, Talc	Aquamarine/Beryl	Quartzite, Slate	Geothermal Hot Springs
10.	Kavrepalanchok	Cobalt, Iron, Lead, Nickel, Tin, Zinc	Clay, Dolomite		Granite, Limestone, Marble, Slate	
11.	Bhaktapur		Clay			
12.	Kathmandu	Gold, Uranium	Clay, Mica, Pegmatite, Pyrite, Sillimanite	Aquamarine/Beryl, Tourmaline	Limestone	Coal, Oil and Gas
13.	Chitwan	Copper, Gold, Iron, Uranium	Talc		Slate	
14.	Parbat	Copper, Gold, Iron, Lead			Quartzite	
15.	Rolpa	Arsenic, Copper, Gold, Iron, Molybdenum	Barite		Gypsum	Coal
16.	Rukum	Copper, Gold				

Source: Department of Mines and Geology (Mineral Resources of Nepal, 2004)

3. Infrastructure Facility

77. Road is the dominant mode of transportation in the project area. The total length of road in 16 project districts alongwith the road density and population influenced per km road is presented in the table below.

Table 21: Total Strategic Road Network (SRN) Length of Project Districts

S. N.	District	Total Population 2011	Total Area in Sq. km.	Type of Road				Population Influenced per km. Road	Road Density (km./100 sq.km.)
				Black Topped	Graveled	Earthen	Total		
1.	Panchthar	191,817	1,241	34.86	57.00	107.00	198.86	965	16
2.	Ilam	290,254	1,703	108.75	12.10	127.10	247.95	1171	15
3.	Jhapa	812,650	1,606	139.92	39.68	17.00	196.60	4134	12
4.	Morang	965,370	1,855	150.52	25.50	40.20	216.22	4465	12
5.	Sunsari	763,487	1257	115.03	66.00	10.00	191.03	3997	15
6.	Dhankuta	163,412	891	76.68	49.00	9.00	134.68	1213	15
7.	Sindhuli	296,192	2,491	42.50	29.60	129.90	202.00	1466	8
8.	Dolakha	186,557	2,191	86.68	30.00	20.00	136.68	1365	6
9.	Sindhupalchok	287,798	2542	107.31	19.84	69.10	196. 25	1466	8
10.	Kavrepalanchowk	381,937	1396	111.09	33.73	4.30	149.12	2561	11
11.	Bhaktapur	304,651	119	81.50	23.09	7.00	111.59	2730	94
12.	Kathmandu	1,744,240	395	149.59	34.10	37.20	220.89	7896	56
13.	Chitawan	579,984	2,218	136.25	54.00	39.00	229.25	2530	10
14.	Parbat	146,590	494	24.11	0.00	26.50	50.61	2896	10
15.	Rolpa	224,506	1,879	33.40	61.00	94.02	188.42	1192	10
16.	Rukum	208,567	2,877	0.00	20.00	38.90	58.90	3541	2

Source: Central Bureau of Statistics, Population Census 2011, Department of Roads (Statistics of Strategic Road Network SSRN 2009/10)

92. Percentage of households having electricity facility for the project districts namely, Panchthar, Ilam, Jhapa, Morang, Sunsari, Dhankuta, Sindhuli, Dolakha, Sindhupalchok, Kavrepalanchok, Bhaktapur, Kathmandu, Chitwan, Parbat, Rolpa and Rukum districts are 27.9%, 65.5%, 82.1%, 75.8%, 81.7%, 83.98%, 37.86%, 81.8%, 88.28%, 87.3%, 97.8%, 98.1%, 85.9%, 80.15%, 21.48% and 14.77%, respectively. They are getting electricity from various sources (e.g Nepal Electricity Authority or Micro-hydropower or Solar System). Electricity facility for Jhapa, Morang, Sunsari, Dhankuta, Sindhupalchok, Kavrepalanchok, Bhaktapur, Kathmandu, Chitwan, and Parbat districts is higher than the national average (67.3%) whereas Panchthar, Ilam, Sindhuli, Rolpa and Rukum districts has the lower value than the national average[12]. Majority of the households in the project areas are dependent on firewood for cooking food. Use of LPG and bio-gas are gradually increasing especially in the urban areas.

Table 22: Households by usual source of lighting in project districts

S. No.	District	Total household	Fuel usually used for lighting					
			Electricity	Kerosene	Bio gas	Solar	Others	Not Stated
	Nepal	5,423,297	3,647,746	991,510	15,264	403,504	330,170	35,103
1.	Panchthar	41,176	11,474	16,278	298	11,028	1,962	136
2.	Ilam	64,477	42,261	14,875	440	4,397	2,155	349

[12] CBS, 2011

S. No.	District	Total household	Fuel usually used for lighting					
			Electricity	Kerosene	Bio gas	Solar	Others	Not Stated
3.	Jhapa	184,384	151,374	29,894	914	1,004	418	780
4.	Morang	213,870	162,107	47,348	705	2,190	639	881
5.	Sunsari	162,279	132,618	26,986	556	864	384	871
6.	Dhankuta	37,616	31,590	4,335	114	1,148	336	93
7.	Sindhuli	57,544	21,791	12,810	92	15,449	7,168	234
8.	Dolakha	45,658	37,349	5,775	5	1,362	1,026	141
9.	Sindhupalchok	66,635	58,827	6,124	3	837	460	384
10.	Kavrepalanchowk	80,651	70,415	6,692	147	1,756	939	702
11.	Bhaktapur	68,557	67,037	670	251	49	113	437
12.	Kathmandu	435,544	427,363	2,330	1,815	200	407	3429
13.	Chitawan	132,345	113,728	7,211	333	7,468	3,066	539
14.	Parbat	35,698	28,614	5,129	66	1,589	209	91
15.	Rolpa	43,735	9,395	2,180	107	20,747	11,127	179
16.	Rukum	41,837	6,181	2,349	118	19,291	13,782	116

Source: Central Bureau of Statistics, Population Census 2011

V. IMPACT ASSESSMENT AND MITIGATION MEASURES

78. Road improvement projects are likely to bring several changes in the local environment both beneficial and adverse. This section of IEE identifies nature, extent and magnitude of all such likely changes vis-a-vis project activities for all stage of project cycle i.e. pre-construction, construction and operation.

79. This Chapter presents the environmental assessment process and planning undertaken by DOLIDAR in addressing the environmental impacts and risk associated with the upgrading of rural roads under the RCIP. This chapter starts with the identification and screening of potential impacts. The identification of impacts was conducted by identifying the general project components e.g. site mobilization, establishment of camps, road construction, and road operation and corresponding interaction with specific environmental aspects e.g. physical, biological, and human.

80. The ADB Environmental Safeguards Good Practices Sourcebook (2015) encourages the impact magnitude to be described quatitatively whenever possible and should include: impact type, extent (area of influence), duration (short-, medium-, long-term), irreversibility (reversible or permanent), performance against a recognized standard, and the value of the affected/lost resource. Once the impacts have been analyzed and their size or magnitude predicted, the significance of each impact should be determined. Prediction of a large impact may not mean that it is significant, either because there are no sensitive receptors or the change is still within acceptable environmental limits. Likewise, a small size impact may be considered significant if the change results in new conditions above acceptable levels. The size of the change needs to be compared against a standard or criterion.

81. In this initial environmental examination, the impact description starts with emumeration and depiction of key road upgrading construction activities that have the potential to affect the environment. This information is overalyed with the environemental components, namely: physical, biological, and human environment to identify intersections as focus to focus impact identification in addition to the REA checklist. Each of the potential impact were characterized based on intensity, duration and scope and based on these the significance were assessed.

82. The critical project components that will have substantial interaction with the environment are as follows:

i) Preconstruction Phase:

a. Road alignment and design – involves the screening and selection roads to avoid environment sensitive areas, finalization of road alignment including by-passes to minimize land acquisition, minor geometric realignment like eccentric road widening where the available corridor-of-construction permits to preserve the trees on one side of the road from being cleared, and cross-drainage design to incorporate wildlife crossing function
b. Utility shifting – removal and transfer the carriage way of electric, telephone, and water supply pipelines, drainage pipes, and hand pumps etc.
c. Construction mobilization - land clearing, installation of electricity and other utility connections, perimeter fencing, establishment of storage areas, waste disposal, and installation of production equipment (hot mix, concrete batching, rock crusher, casting) in the labor and camp sites.
d. Tree cutting and clearing – tree marking, cutting, and grubbing

ii) Construction Phase:

a. Road construction – includes earthworks for sub-grade, sub-base, gravelling of base; preparation of wearing course, and construction of shoulders
b. Quarries and borrow area site management
c. Construction plants operation for hot mix and cement batching

d. Maintenance of by-passed roads - routine maintenance of sealed road pavement, foot paths, kerbs and channels, storm drainage, and pavement markings.
e. Site-Restoration involves the clean-up and restoration of construction zones to near its original condition prior to Contractor demobilization to include: river beds used for sand mining; camps; hot mix plant, crushers, batching plant sites; and borrow areas rehabilitated.

iii) Post-Construction Phase:

a. Road maintenance similar to the by-passed roads
b. Vegetation control – involves periodic mechanical mowing, trimming, removal of brush, and removal of trees when necessary to enhance aesthetics and to prevent potential safety hazards (e.g. reduced visibility, obstruction of signs, and debris in the roadway).

A. Identification and Assessment of Environmental Impacts

83. The identification of potential effect requires identifying the components of the physical, biological, and human environments that are at risk of being impacted in the upgrading of rural roads in sixteen districts of Nepal. Similar to the classical Leopold matrix, it involved an integration grid between the valued environmental components and project activities. The valued environmental components for this project were drawn from the environmental baseline and are as follows:

a) Physical environment – air quality and greenhouse gas emissions, land and soil, surface water quality and quantity, and groundwater quality and quantity,
b) Biological environment – terrestrial vegetation, mammals, avifauna, and special status species
c) Human environment – private land and buildings, public infrastructures, sound environment, aesthetic and visual, and community and occupational health and safety.

84. The assessment of potential environmental impacts requires the definition of the effects associated with road upgrading in terms of intensity, duration, and scope as follows:

a) **Intensity of the effect:** The intensity of the effect refers to the level of disruption to the component. Three levels have been defined:
    i. Low: Little change in the characteristics of the component. Difficult to quantify;
    ii. Average: Change in certain characteristics of the component. The change may be quantifiable;
    iii. High: Change in all or in the main characteristics of the component. The change is quantifiable
b) **Duration of the effect:** Duration means the time dimension of the effect. The terms permanent, temporary and short are used to describe the period of time:
    i. Short-lived: the effect disappears promptly;
    ii. Temporary: the effect is felt during one project activity or, at most, throughout implementation of the project;
    iii. Permanent: the effect has repercussions for the life of the infrastructure.
c) **Scope of the effect**: The scope describes the spatial dimension of the effect caused by an action in the environment. It refers to the distance or area covered by the disruption. The terms regional, local and limited are used to describe the scope:
    i. Limited: the scope is limited when the action affects only one environmental element located near the project;
    ii. Local: the scope is local when the action affects the study area;
    iii. Regional: the scope is regional when the action affects areas beyond the study area

d) **Assessment of the potential effect**. These three parameters are incorporated into a multicriteria matrix, making it possible to place the potential effect into one of three categories:

i. Major (MAJ): signifies an effect that is permanent and that affects the integrity, diversity and sustainability of the element. Such an effect substantially or irremediably alters the quality of the environment.

ii. Medium (MED): signifies a perceptible, temporary and/or low return effect that has little impact on the environmental component and is not irreversible. Such an effect is short-lived and/or limited in scope.

iii. Minor (MIN): signifies that the effect is non-existent or virtually non-existent, that it does not affect the environmental component in any observable or quantifiable way and that it is related to a randomly occurring natural effect. As a rule, this would be a short-lived effect, limited in scope.

Table 23: Multi-Criteria Analysis to Determine the Potential Environmental Impacts

Intensity	Scope Duration	Short-lived	Temporary	Permanent
Low	Limited	MIN	MIN	MED
	Local	MIN	MIN	MED
	Regional	MIN	MED	MAJ
Average	Limited	MIN	MED	MED
	Local	MED	MED	MAJ
	Regional	MED	MAJ	MAJ
High	Limited	MED	MAJ	MAJ
	Local	MED	MAJ	MAJ
	Regional	MAJ	MAJ	MAJ

The relationship between these project phases and its components, and the environment were established to identify anticipated environmental impact is provided in the succeeding Figure.

Table 24: Grid Displaying the Interaction between Environmental Components and RCIP Roads Upgrading

Environmental Component	Pre-Construction					Construction						Operation	
	Road Alignment and Design	Construction and Camp Site Location	Utility shifting	Construction Mobilization	Tree Cutting/Land Clearing	Drainage works	Road Construction	Quarries and borrow sites	Construction plants and camp site operations	Maintenance of bypassed roads	Site Restoration	Road Maintenance	Vegetation Control
Physical Environment													
Air Quality and GHG							x	x	x	x		x	
Land and Soil				x		x	x	x			x		

Environmental Component	Pre-Construction					Construction						Operation	
	Road Alignment and Design	Construction and Camp Site Location	Utility shifting	Construction Mobilization	Tree Cutting/Land Clearing	Drainage works	Road Construction	Quarries and borrow sites	Construction plants and camp site operations	Maintenance of bypassed roads	Site Restoration	Road Maintenance	Vegetation Control
Surface Water Quality and Quantity				X		X	X	X	X				
Groundwater Quality and Quantity				X				X					
Biological Environment													
Terrestrial Vegetation	X	X			X		X		X				
Avifauna					X								
Human Environment													
Private Land and Buildings	X	X					X		X				
Public Infrastructures			X				X					X	
Sound Environment				X			X	X	X				
Heritage and archeology			X				X						
Aesthetic and Visual			X										
Community and OH Safety	X						X	X		X		X	X

85. Mitigation measures were identified to reduce the adverse impacts including residual effects. However, the analysis of impacts shown in the succeeding Table revealed the following:

a) During the pre-construction phase, major potential negative impacts include permanent loss of trees, disturbance of national protected species, and increase road crashes from inadequate road alignment and design. While medium potential impacts includes increase in animal-vehicle crashes from unregulated higher vehicular speed, and localized flooding from inadequate drainage design.
b) During construction, major potential negative impacts from the project includes the loss of productive soil from new borrow areas. Medium potential impacts from increase dust emissions, generation of noise, risks of accident from improper management of borrow areas, and inadequate clean-up operation, restoration and rehabilitation prior to decommissioning.
c) Only minor environmental impacts were identified during project operation

Table 25: Analysis of Environmental Impacts-RCIP Roads

S. No.	Project Phase	Project Component	Environmental Components	Description of the Environmental Effects	Intensity	Duration	Scope	Assessment of Potential Effect	Required Mitigation Measures
1.	Pre-Construction	Road Alignment and Design	Terrestrial Vegetation	Tree cutting	High	Permanent	Local	Major	Avoid or minimize the number of trees to be cleared through minor geometric realignment or eccentric widening. Roadside trees to be removed with prior approval of competent authority. Compensatory plantation at 1:25 basis and additional plantation as per the NRS guidelines in consultation with Forest Department. Avoid or minimize diversion of forest
2.	Pre-Construction	Road alignment and design	Land and Buildings	Localized flooding from inadequate drainage	Average	Permanent	Limited	Medium	Construction of concrete pavement in habitat areas considering alignment level and drainage. Raise road level above the nearby areas with provision of adequate side drains to evacuate the rain water and domestic discharges (drained by habitats occasionally to prevent damage to road and rain water entry to habitats' houses. Provision of adequate no. of cross drainage structures based on drainage pattern around the alignment Raise embankment height above the HFL levels in the flood prone areas. Provision of adequate balancing culverts. Improvement in existing culverts.
4.	Pre-Construction	Road alignment and design	Community Safety	Road crashes	Low	Permanent	Local	Medum	Provision of rumble strips in habitat areas to regulate speed. Provision of retro-reflective warning sign boards nears school, hospital, religious places and forests areas Provision of proper side-walks /pedestrian zone along the road near habitat areas, school, hospital, religious places and forests Compliance with norms specified in NRC codes for rural roads for curvature and grading Provision of safety kerb at all bridges. The design should attempt to equalize cut and fill. Minimize the cutting in hill areas. Incorporate slope stabilization measures to prevent any landslide situation
5.	Pre-Construction	Construction and Camp Site Location	Terrestrial Vegetation Special Status Species Mammals Land and Building	Tree cutting Encroachment in protected areas Disturbance or Hunting Disturbance of inhabited areas	**Low**	**Permanent**	**Local**	**Medium**	All camps should maintain minimum distance from following: # 500 m from Habitation # 500 m from forest areas where possible # 500 m from water bodies where possible # 500 m from through traffic route where possible. The average distance between two camps should be 25 km The location, layout and basic facility provision of each labor camp will be submitted to CSC and PIU prior to their construction. The construction shall commence only after approval of CSC. Preparation of solid waste management plan that includes collection, storage, and disposal subject to the review and approval of the CSC.
6.	Pre-Construction	Utility shifting	Public infrastructures	Disruption of utility services to local community	Low	Short-lived	Limited	Minor	All electrical poles/wires should be shifted before start of construction Necessary permission and payments should be made to relevant utility service agencies to allow quick shifting and restoration of utility

									services Local people must be informed through appropriate means about the time of shifting of utility structures and potential disruption of services if any
7.	Pre-Construction	Utility shifting	Heritage and archeology	Digging may unearth chance artifacts	Low	Short-lived	Limited	Minor	procedure upon discovery, a rapid response procedure to protect chance finds while minimizing disruption to project activities
8.	Pre-Construction	Utility shifting	Aesthetic and visual	Diggings, shifting and reestablishment of poles will impair the view of community areas	Low	Short-lived	Limited	Minor	Immediately complete the utility shifting to reduce the duration of impact and restore the disturbed areas Provide visual barriers, when necessary, on active construction zones Consultation with affected people prior to the start of utility shifting presenting construction timelines and guidelines Proper disposal of demolition debris
9.	Construction	Site Mobilization	Air quality	Construction of temporary facilities, hauling of equipment and materials may result to short term air quality deterioration	Low	Short-lived	Local	Minor	Transport, loading and unloading of loose and fine materials through covered vehicles. Paved approach roads. Storage areas to be located downwind of the habitation area. Water spraying on earthworks, unpaved haulage roads and other dust prone areas. Provision of PPEs to workers
10.	Construction	Site Mobilization	Surface water	Accidental spills	Low	Temporary	Limited	Minor	No vehicles or equipment should be parked or refueled near water-bodies, so as to avoid contamination from fuel and lubricants. Oil and grease traps and fueling platforms to be provided at refueling locations. All chemicals and oil shall be stored away from water and concreted platform with catchment pit for spills collection. All equipment operators, drivers, and warehouse personnel will be trained in immediate response for spill containment and eventual clean-up. Readily available, simple to understand and preferably written in the local language emergency response procedure, including reporting, will be provided by the contractors
11.	Construction	Site Mobilization	Groundwater quality	Accidental spills when transporting construction materials particularly fuels and lubricants could affect groundwater quality	Low	Temporary	Limited	Minor	Construction vehicles and equipment will be maintained and refueled in such a fashion that oil/diesel spillage does not contaminate the soil. To avoid soil contamination Oil-Interceptors shall be provided at wash down and refueling areas Waste oil and oil soaked cotton/ cloth shall be stored in containers labeled 'Waste Oil' and 'Hazardous' sold off to authorized vendors
12.	Construction	Site Mobilization	Sound environment	Mobilization of heavy equipment and machineries will increase noise	Low	Temporary	Limited	Minor	Construction equipment and machinery to be fitted with silencers and maintained properly. Only GoN approved equipment shall be used for construction activities. Timing of noisy activities shall be done during night time and weekends near schools and selected suitable times

				level					near temples when there are no visitors, concurrent noisy operations may be separated to reduce the total noise generated, and if possible re-route traffic during construction to avoid the accumulation of noise beyond standards. Else provision of temporary noise barrier at sensitive locations or near sources. Time regulation near residential, built up and forest areas to daylight hours. Honking restrictions near sensitive areas
13.	Construction	Tree cutting and clearing	Terrestrial Vegetation	Loss of trees and vegetation	High	Permanent	Limited	Major	Avoid or minimize the number of trees to be cleared through minor geometric realignment or eccentric widening. Roadside trees to be removed with prior approval of competent authority.
14.	Construction	Tree cutting and clearing	Avifauna	Disturbance of potential avifaunal habitat	Low	Short-lived	Limited	Minor	Avoid cutting of trees during nesting time for birds
15.	Construction	Drainage work	Land and soil	Compaction of soil and impact on quarry haul roads due to movement or vehicles	Low	Temporary	Limited	Minor	Equipment to be stationed in the designated ROW to avoid compaction. Approach roads/ haulage roads shall be designed along the barren and hard soil area to reduce the compaction.
16.	Construction	Drainage work	Surface water quality	Disturbance of waterway bed to cause increase suspended solids	Low	Temporary	Limited	Minor	Provision of Silt fencing shall be made at water bodies. Silt/sediment should be collected and stockpiled for possible reuse as surfacing of slopes where they have to be revegetated. Earthworks and stone works to be prevented from impeding natural flow of rivers, streams and water canals or existing drainage system.
17.	Construction	Drainage work	Public Infrastructure	The works may damage the road used by local and regional population	Low	Temporary	Local	Medium	Temporary access and diversion, with proper drainage facilities shall be planned by the contractor and approved by the 'Engineer'. Access to the schools, temples and other public places must be maintained when construction takes place near them. Fencing wherever cattle movement is expected. The traffic control plans shall contain details of diversions; traffic safety arrangements during construction; safety measures for Night time traffic and precautions for transportation of hazardous materials. The Contractor will ensure that the diversion/detour is always maintained in running condition, particularly during the monsoon to avoid disruption to traffic flow. On stretches where it is not possible to pass the traffic on the part width of existing carriageway, temporary paved diversions will be constructed. Restriction of construction activity to only one side of the existing road. The contractor shall inform local community of changes to traffic routes, and pedestrian access arrangements with assistance from "Engineer".
18.	Construction	Road Construction	Air quality and GHG	Fugitive dust emission and fumes from construction	High	Short-lived	Local	Medium	Transport, loading and unloading of loose and fine materials through covered vehicles. Paved approach roads. Storage areas to be located downwind of the habitation area. Water spraying on earthworks, unpaved haulage roads and other dust prone areas such as unpaved

				vehicles					roads Provision of PPEs to workers. Regular maintenance of machinery and equipment.
19.	Construction	Road Construction	Land and Soil	Slope failure and Soil erosion due to construction activities, earthwork, and cut and fill, stockpiles etc.	Low	Temporary	Limited	Minor	Ecoengineering of embankments to protect slopes. Slope protection by providing frames, dry stone pitching, masonry retaining walls, planting of grass and trees. The side slopes of all cut and fill areas will be graded and covered with stone pitching, grass and shrub as per design specifications. Care should be taken that the slope gradient shall not be greater than 2:1. The earth stockpiles to be provided with gentle slopes to prevent soil erosion.
20.	Construction	Road Construction	Surface water quality and quantity	Sourcing of water during construction could compete with the local demand	Low	Temporary	Limited	Minor	Provisions shall be made to connect road side drains with exiting nearby ponds otherwise make provision water harvesting pits intermittently Existing drainage system to be maintained and further enhanced. Embankment slopes to be modified suitably to restrict the soil debris entering water bodies. Provision of Silt fencing shall be made at water bodies. Silt/sediment should be collected and stockpiled for possible reuse as surfacing of slopes where they have to be revegetated. Earthworks and stone works to be prevented from impeding natural flow of rivers, streams and water canals or existing drainage system. No vehicles or equipment should be parked or refueled near water-bodies, so as to avoid contamination from fuel and lubricants. Oil and grease traps and fueling platforms to be provided at refueling locations. All chemicals and oil shall be stored away from water and concreted platform with catchment pit for spills collection. All equipment operators, drivers, and warehouse personnel will be trained in immediate response for spill containment and eventual clean-up. Readily available, simple to understand and preferably written in the local language emergency response procedure, including reporting, will be provided by the contractors Arrangements shall be made by contractor that the water availability and supply to nearby communities remain unaffected.
21.	Construction	Road Construction	Terrestrial Vegetation	Loss of vegetation	Low	Temporary	Limited	Minor	Minimize tree cutting to the extent possible. Provision of LPG in construction camp as fuel source to avoid tree cutting, wherever possible. Plantation of trees on both sides of the road. Integrate Vegetation management with the carriage way completely clear of vegetation. From the edge of the road to the boundary of ROW, vegetation structured with smaller plants near the line and larger trees further away to avoid costly and provide habitats for a wide variety of plants and animals. Additional plantation near river banks to check erosion as part of compensatory plantation. In the event of design changes during the construction stages additional assessments including the possibility to save trees shall be made by the DOLIDAR.
22.	Construction	Road Construction	Mammals	Disturbance/ crashes with	Low	Local	Tempo rary	Minor	Installation of active wildlife crossing for equipment operator to reduce speed. Prohibit hunting

				animals					
23.	Construction	Road Construction	Private land and Building	Damage to private lands and buildings from vibration due to movement of heavy equipment	Low	Short-lived	Limited	Minor	Route heavily loaded trucks away from residential areas. Select areas with the fewest homes in routing haul trucks. Operate earthmoving equipment as far away from vibration sensitive sites Phase demolition of existing pavement and structures earth moving, and ground impacting activities not to occur simultaneously. Avoid nighttime activities. Avoid vibratory rollers and packers near sensitive areas
24.	Construction	Road Construction	Public Infrastructures	Soil compaction producing vibration can damage buildings and pipes	Low	Short-lived	Limited	Minor	Route heavily loaded trucks away from residential streets. Select streets with the fewest homes in routing haul trucks. Operate earthmoving equipment as far away from vibration sensitive sites Phase demolition of existing pavement and structures earth moving, and ground impacting activities not to occur simultaneously. Avoid nighttime activities. Avoid vibratory rollers and packers near sensitive areas
25.	Construction	Road Construction	Sound environment	Noise from construction vehicle, equipment and machinery can elevate ambient noise	High	Short-lived	Local	Medium	All equipment to be timely serviced and properly maintained. Traffic bottlenecks to be removed. Construction equipment and machinery to be fitted with silencers and maintained properly. Only approved equipment shall be used for construction activities. Timing of noisy construction activities shall be done during night time and weekends near schools and selected suitable times near temples when there are no visitors, concurrent noisy operations may be separated to reduce the total noise generated, and if possible re-route traffic during construction to avoid the accumulation of noise beyond standards. Else provision of temporary noise barrier at sensitive locations or near sources. Time regulation near residential, built up and forest areas construction shall be restricted to daylight hours. Honking restrictions near sensitive areas PPEs to workers
27.	Construction	Road Construction	Community and occupational health and safety	Increase human mortality and injuries	Average	Temporary	Local	Medium	The location, layout and basic facility provision of each labor camp will be submitted to CSC and PIU prior to construction. The construction shall commence only after approval of CSC. The contractor will maintain necessary living accommodation and ancillary facilities in functional and hygienic manner as approved by the PCU. Adequate water and sanitary latrines with septic tanks attached to soak pits shall be provided. Preventive medical care to be provided to workers including a First-Aid kit that must be available in the camp. Waste disposal facilities such as dust bins must be provided in the camps and regular disposal of waste must be carried out. The Contractor will take all precautions to protect the workers from insect and pest to reduce the risk to health. No alcoholic liquor or prohibited drugs will be imported to, sell, give, and barter to the workers of host community. Awareness raising to immigrant workers/local community on communicable and sexually transmitted diseases. Contractors to adopt and maintain safe working practices. Usage of fluorescent and

									retroreflector signage, in local language at the construction sites Training to workers on safety procedures and precautions. Mandatory appointment of safety officer. All regulations regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress shall be complied with. Provision of a readily available first aid unit including an adequate supply of dressing materials. The contractor will not employ any person below the age of 14 years for any work Use of hazardous material should be minimized and/or restricted. Emergency plan (to be approved by engineer) shall be prepared to respond to any accidents or emergencies. Temporary access and diversion, with proper drainage facilities. Access to the schools, temples and other public places must be maintained when construction takes place near them. Fencing wherever cattle movement is expected. To avoid the need for cattle underpasses, some of the proposed culverts near habitations may be widened to facilitate cattle movement. Restrict access to construction sites to authorized personnel. Physical separation must be provided for movement of vehicular and human traffic. Adequate signage must be provided for safe traffic movement
28.	Construction	Quarries and borrow sites	Air quality and GHG	Deterioration of air quality along haul road due to increase in dust	Low	Short-lived	Limited	Minor	Transport of materials in covered trucks. Ensure adequate water sprinkling of storage and rock crushing operation.
29.	Construction	Quarries and borrow sites	Land and soil	Loss of productive lands and topsoil	Average	Permanent	Limited	Major	Non-productive, barren lands, upland shall be used for borrowing earth with the necessary permissions/consents. Topsoil to be stockpiled and protected for use at the rehabilitation stage. (Recommended practice for borrow pits Annex 6, 7, ESMF: Strengthening National Rural Transport Program DOLIDAR MOFALD/2013) Borrow areas not to be dug continuously. Aggregates will be sourced from existing licensed quarries. The contractor will develop a Quarry Redevelopment plan, as per the Annex 6, 7, ESMF: Strengthening National Rural Transport Program DOLIDAR MOFALD/2013 and submit a copy of the approval to CSC and PIU.
30.	Construction	Quarries and borrow sites	Surface water quality	Deterioration of receiving water quality from surface runoff	Low	Temporary	Limited	Minor	Installation of bunds around exposed area Collection of surface runoff in sedimentation pond prior to disposal.
31.	Construction	Quarries and borrow sites	Sound Environment	Increase noise level in quarries from blasting, rock crushing, and hauling	Average	Short-lived	Limited	Minor	Comply with the location separation distance from nearest inhabited area Use materials storage piles to attenuate noise

32.	Construction	Quarries and borrow sites	Community And occupational health and safety	Increase risk of accident from open borrow areas	Low	Permanent	Limited	Medium	Depths of borrow pits to be regulated and sides not steeper than 25%. To the extent borrow areas shall be sited away from habituated areas. Borrow areas shall be leveled with salvaged material or other filling materials which do not pose contamination of soil. Else, it shall be converted into fishpond in consultation with land owner/community. Rehabilitation of the borrow areas as per Guidelines for re-development of Borrow Areas.
33.	Construction	Construction Plant operation	Air Quality and GHG	Air quality deterioration from plant combustion and fugitive emissions	Low	Short-lived	Limited	Minor	Batching, asphalt mixing plants and crushers at downwind (1km) direction from the nearest settlement. Only crushers licensed by the GoN shall be used DG sets with stacks of adequate height and use of low Sulphur diesel as fuel.
34.	Construction	Construction Plant and Camp Site Operation	Surface water quality	Deterioration of receiving water quality from batching and hot mix plants effluents	Low	Short-lived	Limited	Minor	Collection of all surface runoff and facility washing to a sedimentation basin prior to disposal Proper collection, storage, and disposal of waste according to the approved solid waste management plan.
35.	Construction	Construction Plant and Camp Site Operation	Groundwater quality	Deterioration of ground water quality	Low	Temporary	Limited	Minor	Construction vehicles and equipment will be maintained and refueled in such a fashion that oil/diesel spillage does not contaminate the soil. To avoid soil contamination Oil- Interceptors shall be provided at wash down and Refueling areas. Waste oil and oil soaked cotton/ cloth shall be stored in containers labeled 'Waste Oil' and 'Hazardous' sold off to authorized vendors Collection and treatment of sewage in septic tanks
36.	Construction	Construction Plant and Camp Site Operation	Mammals	Reduction of population from hunting by the workers	Low	Short-lived	Limited	Minor	Strictly prohibit the hunting of wild mammals by the workers
37.	Construction	Construction Plant and Camp Site Operation	Private lands and buildings	Damage to private lands and properties	Low	Short-lived	Limited	Minor	Locate plants and camp sites away from Community areas. In case of leased properties, ensure the proposed activities are clearly stated in the agreement and nearby properties are consulted and prior consent secured.
38.	Construction	Construction Plant and Camp Site Operation	Sound Environment	Increase in noise level due to batching plant and hot mix plant operations	Low	Short-lived	Limited	Minor	Observe regular and proper maintenance of plant equipment Install silencers on all tail/ emission pipes Establish multi-layer vegetation in-between the plant and nearest sensitive receptor for attenuation To the extent possible, enclose noise generating equipment with noise barriers
39.	Post Construction	Site Restoration	Land and soil Clean-up Operations, Restoration And		Low	Short-lived	Limited	Minor	Contractor will prepare site restoration plans, which will be approved by the CSC The clean-up and restoration operations are to be implemented by the contractor prior to demobilization. All construction zones including river-beds, culverts, road-side areas, camps, hot mix plant sites, crushers, batching plant sites and any other area

			Rehabilitation						used/affected by the project will be left clean and tidy, at the contractor's expense, to the satisfaction of the CSC. All the opened borrow areas will be rehabilitated and CSC will certify in this regard.
40.	Operation	Road Repair	Public Infrastructures	Localized flooding and damage to road from clogging of drainage	Low	Short-lived	Limited	Minor	Regular cleaning of drainage before start of monsoon and proper disposal of debris
41.	Operation	Road Repair	Community and occupational health and safety	Risk of injury to pedestrian and road users	Low	Short-lived	Limited	Minor	Training to workers on safety procedures and precautions. Mandatory appointment of safety officer. All regulations regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress shall be complied with. Provision of a readily available first aid unit including an adequate supply of dressing materials. The contractor will not employ any person below the age of 14 years for any work Emergency plan (to be approved by engineer) shall be prepared to respond to any accidents or emergencies. Temporary access and diversion, with proper drainage facilities. Access to the schools, temples and other public places must be maintained when construction takes place near them. Fencing wherever cattle movement is expected. Restrict access to construction sites to authorized personnel. Physical separation must be provided for movement of vehicular and human traffic. Adequate signage must be provided for safe traffic movement
42.	Operation	Vegetation Control	Community and occupational health and safety	Risk of injury to pedestrian and road users	Low	Temporary	Limited	Minor	Vegetation clearing to enhance aesthetic and prevent potential safety hazard like reduced visibility, obstruction of signs, and debris in the roadway.

F. Potential Beneficial Impacts

86. The immediate benefits of road construction and improvement will come in the form of direct employment opportunities during construction for the roadside communities and specially those who are engaged as wage labourers, petty contractors and suppliers of raw materials.

87. During operation stage, road-side economic activities supporting transport like gasoline stations, automotive repair shops, lodging, and restaurants will increase due to increased number of vehicles. Increase in agro-industrial activities are also expected to take advantage of improved access to urban centers where there are higher demands and better prices for agricultural products. Project will accelerate the industrial activities and induced development significantly. Increased industrial activities will significantly reduce migration. One important project specific benefit is avoidance of flooding or water logging by increasing waterway of bridges and provision of side drains. Other generic benefits of road improvement projects are: (i) reduction in travel time (ii) better mode and frequency of transport (iii) access to quality health care, educational and other infrastructural facilities (iv)improved quality of life of rural tribal population (v) reduced accident events and (vi) better investment climate for industries creating more employment opportunities to local people.

G. Climate Change Impacts and Risks

a. Climate Change Projection

(i) Historical Precipitation and Rainfall

88. Historical monthly average temperature and rainfall from 1901-2015 compiled by the Climatic Research Unit (CRU)–University of East Angliais presented in the succeeding Table. Average monthly temperature and rainfall are 12.2°C and 114.60 mm. Climate extremes occurred on June 2024 when the maximum were recorded at 20.6°C, maximum monthly rainfall of 670mm on August 1915.

Table 26: Historical Temperature and Rainfall

Month	Historical Average Monthly		Predicted Temperature Change (2020-2040) Ensemble			Predicted Rainfall Change (2020-2040) Ensemble		
	Temp. (°C)	Rainfall (mm)	Low 10%	Median	High (90%)	Low	Median	High
January	3.4	21.2	0.40	0.99	2.64	-112.6	-2.54	27.88
February	5	31.1	0.13	0.84	2.18	-13.88	-3.31	15.47
March	9.4	36.1	0.38	1.06	1.69	-12.33	-2.51	6.53
April	13.6	49.6	0.29	1.26	1.75	-7.64	8.4	16.95
May	16.6	88.5	0.47	1.11	2.14	-16.51	0.63	8.92
June	18.5	205.9	0.17	0.76	1.73	-29.51	11.17	52.46
July	18.6	342.8	0.03	0.69	1.47	-60.1	7.02	106.54
August	18.2	318.9	0.26	0.74	1.34	-33.94	0.3	61.59
Septembe r	17.0	204.2	0.08	0.76	1.3	-17.07	0.02	44.3
October	13.1	54.6	0.4	0.85	1.31	-17.87	-12.23	31.59
November	8.5	10.1	0.29	0.85	1.36	-28.32	-0.22	11.14
December	4.9	12.0	0.17	0.74	1.7	-32.4	-0.22	17.24
Max	20.6 (06/1924)	670 (08/1915)	0.47 (May)	1.26 (April)	2.64 (January)	-112.6 (January)	11.17 June	106.54 (July)
Min	1.3 (01/1905)	0 (12/1996)	0.03 (July)	0.69 (July)	1.3 (September)	-7.64 (April)	-12.23 (October)	6.53 (March)
Avg.	12.33	114.58	0.25	0.89	1.72	-31.85	1.56	33.38

Source: Climate Change Portal, The World Bank Group

(ii) Predicted Climate Change

89. Between 2020-2040, almost coinciding with the project life, there is a change in temperature anomally (difference between the baseline and predicted value) in Nepal ranging from 0.25-1.72 °C based on General Circulation Model ensemble average of the low (10%) and high (90%), RCP2.6 scenario. Limited change in annual average monthly rainfall is expected between -7.64 mm/month to 6,53 mm/month. However, seasonal variability is expected with an increase in rainfall during the months between July-September and December to March.

90. Using another data set from 1961-1990, this time using Climate Wizard also developed by the World Bank the GCM ensemble using A2 scenario predicted between 2046-2065 a similar trend in temperature. The future monthly mean of the daily average temperature is expected to increase between 20.15-22.73°C and the maximum temperature for the month and year between 30.10-32.47°C. Geographically, the southern border districts will experience higher temperatures compared to the rest of the country.

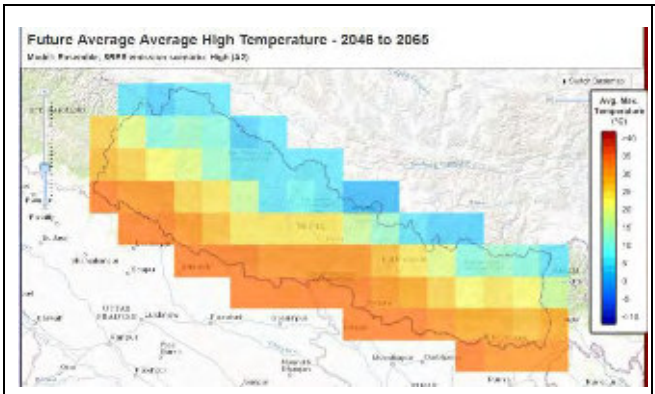


Figure 9: Future Average of Average High Temperature 2046-2065, Model Ensemble, SRES Emission Scenario: High(A2).

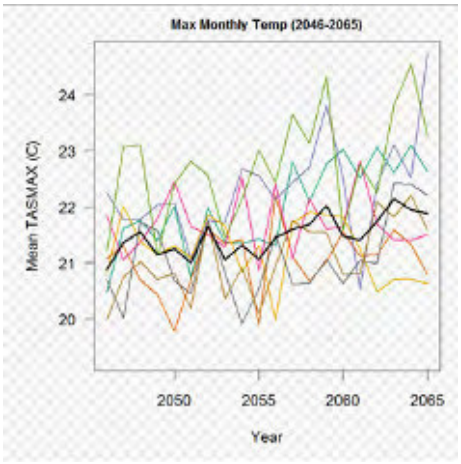


Figure 10: Predicted Future Average of Maximum Monthly Temperature

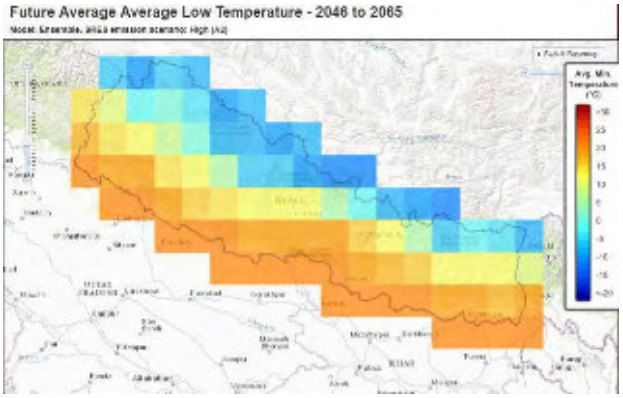


Figure 11: Future Average Low Temperature 2046-2065, Model Ensemble, SRES Emission Scenario: A2

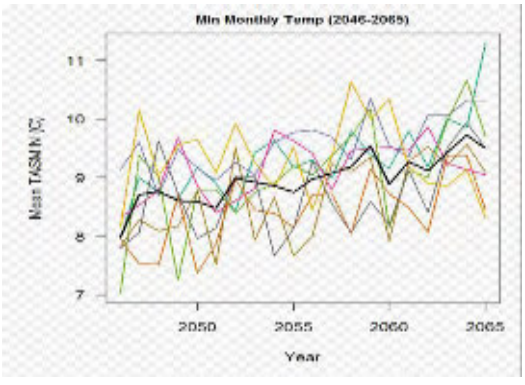


Figure 12: Future Minimum Monthly Temperature 2046-2065, Model Ensemble, SRES Emission Scenario: A2

91. Total precipitation is expected to slightly increase between 2046-2065 between 1,096-2,344 mm. The percent of wet days per year with rainfall> 90-percentile wet-day precipitation, where percentiles are based on reference period between 1961- 1990 is expected to increase from 7.84-17.22%. Geographically, the southeastern and southern districts were majority of the project roads are located will experience heavier rainfall compared to the rest of the country.

92. The detail engineering design of project road have been done considering the potential effects of climate change. From a road development perspective in Nepal, impact of climate change mainly takes the form of concentrated high rainfall resulting in the accelerated surface run-off from slopes and increased flows in gullies, drainage channels, streams, and rivers. These phenomena have a consequent effect on the stability and performance of road sections, bridges, and other structures.

93. The road sections fall on terai, hilly and mountainous terrains so particularly susceptible because of the location. Effects of climate change could include the possibility of flash floods/rapids, mud flows in rivers/streams, and an increase in incidence of landslides along the alignment. Other existing roads in the Hilly and mountain areas are also susceptible to landslides due to the limited drainage capability and nature of the soil type. For this reason, particular consideration has been given in the detail design of road formation and embankment heights and the size of waterways and soffit levels of cross drainage structures.

94. During detailed design, detail hydrological study/analysis has been conducted to determine water ways, span/length and height (i.e. soffit, invert levels) of major cross-drainage works. Design flood has been calculated considering 50 years return period for cross drainage and 5 years for side drains. The road structures have been designed considering the probability of natural hazards (i.e. floods, earthquakes etc.). Pavement surface has been designed considering the effect of temperature variation.

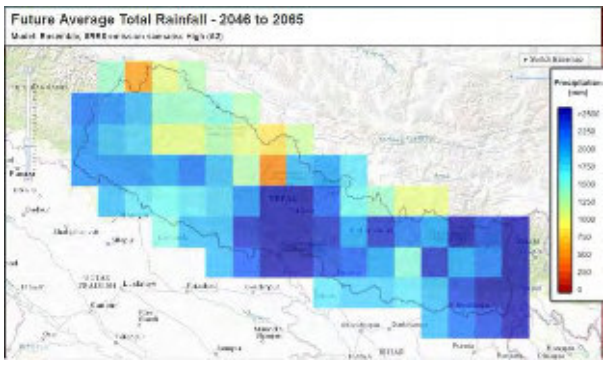


Figure 13: Future Total Rainfall 2046-2065, Model Ensemble, SRES Emission Scenario: A2

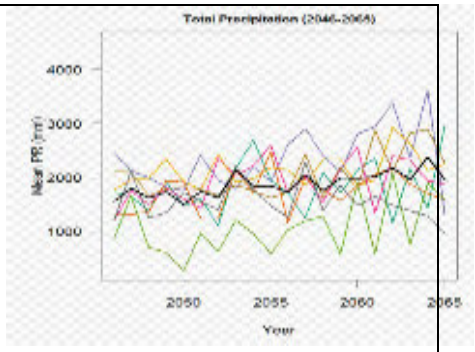


Figure 14:Future Total Precipitation, Model Ensemble, SRES Emission Scenario: A2

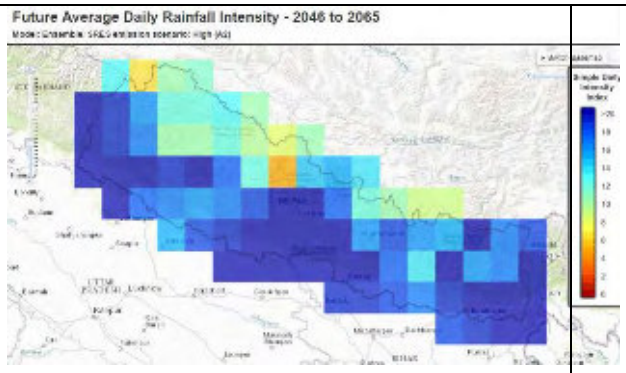


Figure 15: Future Average Rainfall Intensity, Model Ensemble, SRES Emission Scenario: A2

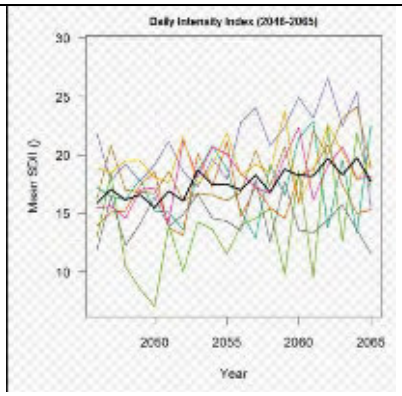


Figure 16: Future Daily Rainfall Intensity 2046-2065 Model Ensemble, SRES Emission Scenario: A2

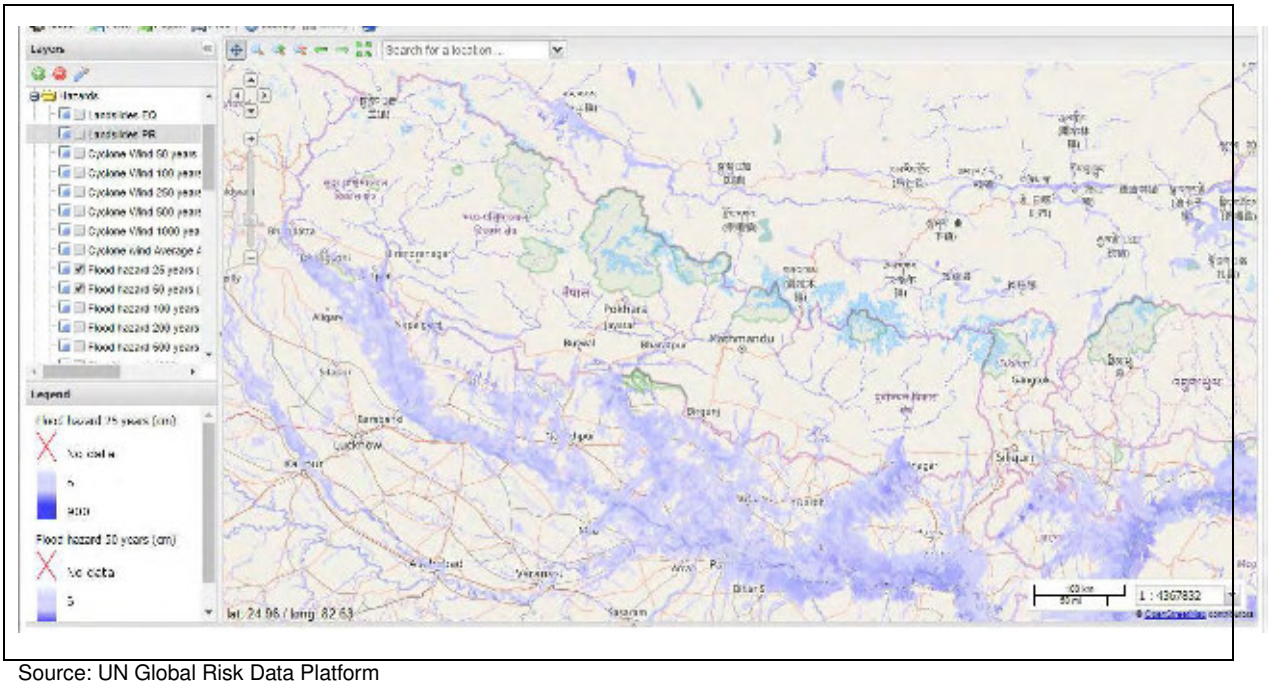
b. Natural Hazards and Climate Risks

95. The implications of the projected increases in temperature and rainfall coupled with the existing natural hazards in the districts increases the vulnerability of the project roads to climate change variability and extremes. The most dominant natural hazards to the projects roads that can be be exacerbated by climate change are flooding and landslide. The project districts that are at risk from flooding are Jhapa, Morang, and Sunsari. Districts along the main frontal and boundary thrusts and on the south Tibetan Detachment System geological formations are prone to landslides which includes Sindhuli, Chitwon, Kavrepalanchok, Parbat, Rukum, and Rolpa.

96. The Table below provides the climate change adaptation cost. This was derived based on discussions with the design engineers on the attribution of the the itemized civil works cost with the identified climate change risks. To address the flood risks, it was estimated that 10% of the drainage, 5% of bioengineering, and 15% of the embankment costs were attributed. Address the risk of erosion and landlslide, 5% of the drainage and 10% of the bioengineering costs were attributed. The total adaptation costs was estimated at NRs184 million for 16 roads representing about 3% of the total civil works of these roads which was estimated at NRs6.6 billion. The regulatory requirement of compensatory plantation was not included in the adaptation cost.

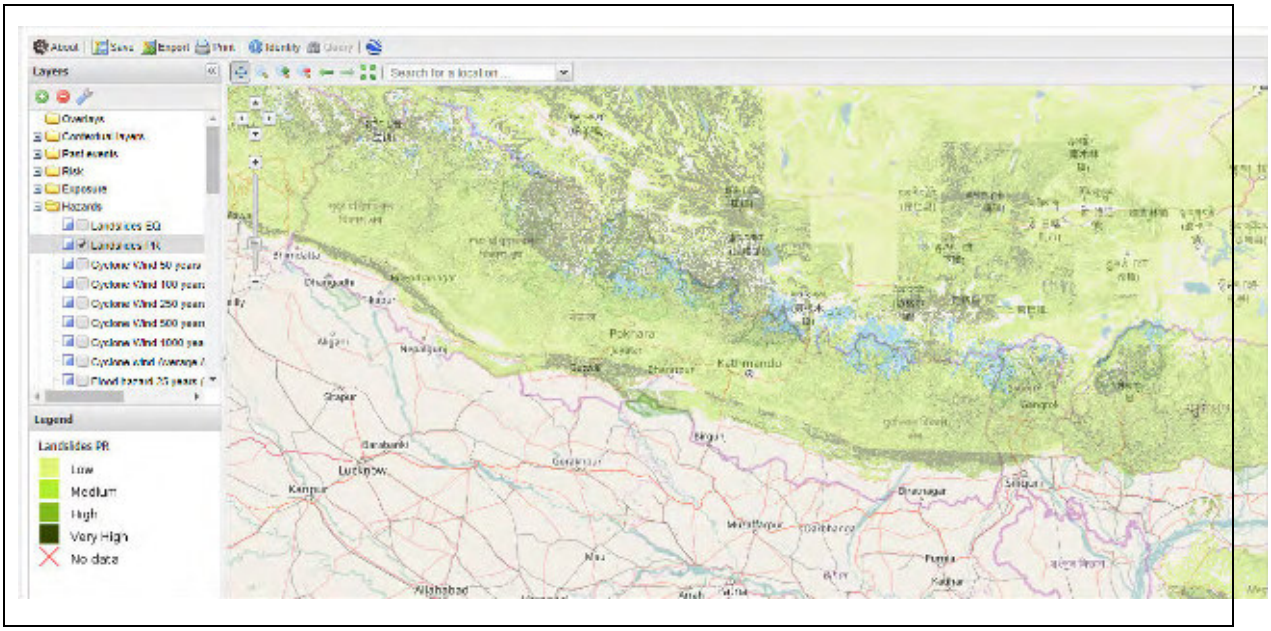
Table 27: Estimated Climate Change Adaptation Cost

Name of Road	Description of Cost (NRs.)			
	Drainage	Bio-engineering	Gabions	Embankment
Flooding Risk				
Jhapa				
Amaldangi-Samayagadh-Basbari-Solmari Road	1,722,270	151,807	-	4,623,714
Charpane-Chaitubari-Matigada-Sadhukuti-Ghodamara-Rajgadh Road	3,286,986	234,198	-	6,230,920
Kharsangbari-Jalthal-Manglabare-Bahundhoka- Adhikari Chowk Road	829,129	72,957	-	616,904
Padajungi- Gohawari-Laldhwandra-Jharkaha-Balubathan-Chapramari Road	1,967,443	156,697	-	4,934,968
Morang		-		-
Laxmimarga- Dangihat-Banol-Babiyabirta-Amahi Road	8,869,942	428,655	-	4,775,291
Khorsane-Kerabari-Singhadevi Road	12,992,370	553,934	-	464,938
Sunsari		-		-
Inaruwa-Satterjhoda-Chitaha-Purbakusha-Biratnagar Road	2,830,167	183,792	-	4,137,959
Jhumka-Shingiya-Ramdhuni-Prakashpur-Shukrabare-Madhuban-Paschimkusaha-laukahi Road	4,107,239	415,100	-	5,865,485
Landslide and Erosion Risks				
Chitwan				
Phisling-Toalang-Baspur-Orlang-Mayatar-Terse-Upradang Gadi-Shaktikor Bazar Road in Chitwan District	2,194,101.37	266,763.87	2,269,286	0
Kavrepalanchok			-	
Dolalghat-Falate-Kolati-Dhadkharka-Pokharichauri-Guranse Road in Kaverepalanchok District	6,309,156	659,772	10,534,391	0
Parbat		-	-	
Armadi-Banou road, Parbat District	2,479,616	343,847	638,091	0
Rukum			-	
Lunkhu - Mudikuwa Road	2,529,605	273,697	6,826,166	0
Shital Pokhari – Jhulkhet – Chunwang Road	3,768,823	699,788	13,505,216	0
Solabang - Baluwa - Naayegadpul - Jamabagar- Simalchaur-Hukam- Ranmaikot road (Baluwa- Jamabagar- Tribeni Section)	3,490,141	40,045,332	7,856,399	0
Rolpa			-	0
Mijhing - Dhuleodar-Namja – Sirpa - Pang road	2,122,879	213,176	102,010	0
Mijhing-Ruininwan Badachaur-Gumchal-Siuni-Gam road	6,263,435	554,191	255,026	0
TOTAL	65,763,303	45,253,704	41,986,585	31,650,179
Grand Total				**184,653,771**



Source: UN Global Risk Data Platform

Figure : Flood Frequency Map, Nepal



Source: UN Global Risk Data Platform

Figure 17: Landslide Prone Map, Nepal

The Anticipated Components and Activities

97. Upgrading of the existing road to increase its resilience to climate change will include:

- Raising embankment and strengthening the road pavement- to avoid deterioration due to high flood,
- Strengthening the road surface- improving resistance to traffic wear and tear, and enhancing runoff, thereby reducing deterioration,

- Improving longitudinal and cross-drainage – to avoid surface flooding which contributes to road deterioration,
- Improving protection of road embankment – to avoid erosion of road works during extreme rainfall

98. The specific intervention can be considered as three components, which will involve the following activities:

(i) Road carriageway/upgrading of existing road

99. The existing carriageway is single lane, mostly 3.0-3.5 meter wide, with earthen/gravel surface in fairly good to bad condition. Depending on the detailed assessment of the road condition, the scope of upgrading of existing road is fixed and the following interventions are proposed:

100. Construction have been proposed for all road sections with new 300 mm sub-base with river gravel, 150 mm crushed stone base course, and 50 mm Double Bituminous Surface Treatment (DBST) on surface over existing sub-grade.

(ii) Shoulder improvements

101. For upgrading of the road sections, 0.75 m shoulder on both sides has been provided in whole section of the roads.

(iii) Drainage:

- Drainage system has been upgraded in new design has been considered for drainage requirement along the road as per hydrological data for extreme rainfall of the year.
- The drainage design and proposed drainage works have been reviewed hydrologically and hydraulically, on the basis of extreme rainfall data of the year.
- The existing 60 cm diameter pipe has been replaced by 90 cm diameter RCC hume pipe due to climate change consideration (flash flood).

VI. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

A. Consultation Method and Information Disclosure

102. Public consultations were organized at two levels namely, (i) district level, and (ii) Project level. The key objectives of consultations were to disseminate the project concept, activities, and policies, rules, and regulations and effects and impacts of the project activities on the environment and to seek suggestions and opinions from all stakeholders and affected people. The more vigorous consultations were held at the project levels among the affected people and stakeholders. Table 27 show the details of the public consultations carried out along various road sections.

Table 28: Subproject wise details of the Public consultation

Sl. No.	Subproject/Road Section	Place/Date	No. of Participants		
			Male	Female	Total
1.	Phidim-Nagin - Sidin - Prangbung - Falot Road **(Phidim - Ludintar Sector)**	Phidim Municipality-11, Tritiya/07 May 2017	10	2	12
2.	Samdin - Chokmangu - Nawamidada - Faktep Ghurbisepanchami Road **(Samdin - Nawamidada Sector)**	Falgunanda Rural Municipality-1, (Nawamidanda bazaar)/ 29 May 2017	10	0	10
		Phidim Municipality -5 (Jorkulo village)/ 14 May 2017	6	2	8
3.	Nepaltar - Shantidada - Gagrebhangyang - Mangalbare - Dhuseni - Gajurmukhi - Ebhang - Chaturemoad Aadipur - Larumwa - Gharti Dobhan - Chapeti - Beldagi Damak Road **(Ebhang - Chaturemoad Sector)**	Tikhe Ghumti-Chature/14-June-2017	13	2	15
4.	Mangalbare - Pungfung - Ektappa Sikari Bhanjyang-Phakphok - Ra.ma.bi. Khambang Chowk - Thingepur - Aamchok - Jungetar - Phuyatappa - Rabi road (Suru bindu khanda)	Deumai Municipality/ 13-June-2017	15	5	20
5.	Padajungi (Lakhanpur)-Guhawari-Laladhbandra-Jharka-Baluwathan-Chapramari-Khajurgachhi	Kamal Rural municipality/4 July -2017	24	9	33
6.	Charpane-Chaitubari-Matigada-Sadhukuti-Khodamara-Rajgadh	Baradahsi rural municipality/ 20 & 21 June-2017	67	16	83
7.	Amaldagi - Samayaghad - Baswari - Solmari road	Kamal Rural municipality/03 July - 2017	50	15	65
8.	Kharsangwari-Jalthal-Mangalware-Baundoka-Adhikari Chowk Sadak	Haldibari rural municipality/ 17 & 18 June-2017	37	13	50
9.	Khorshane - Kerawari - Singhadevi Road	Kerabari & Letang Municipality/03 July - 2017	15	1	16
10.	Laxmimarga - Dangihat -				

	Banaul- Babiyabirta - Amahi Road				
11.	Inaruwa - Satterjhoda - Chhitaha - Purbakushaha - Biratnagar Road	Saterjhora Rural Municipality -2/ Baraha Municipality – 01/ 3 June 2017	9	1	10
		Gadi Rural Municipality -4/ 4 June 2017	8	3	11
12.	Jhumka - Shinghiya - Ramdhuni - Prakashpur - Madhuwan - Shukrabare - Paschimkushaha - Laukahi - Boarder Road	Laukahi Rural Municipality – 2/ 3June 2017	11	0	11
13.	Mudheshanischare - Dadagaun - Chanuwa Road	Mahalaxmi-4, Budhabare Bazar/ 7 June 2017	9	12	21
14.	Nayapul - Pawati - Dadakharka Road	Pawati- Melung/ June 10, 2017	7	0	7
		Sukathokar- 2, Melung/ 11 June 2017	9	0	9
15.	Tallo - Ranibas - Harshadi - Tadi - Dhanshari	Dudhali municipality -3, Tallo Dhutepani/ 9 June 2017	14	3	17
		Dudhauli municipality-3, Milan Chowk/ 9 June 2017	20	5	25
16.	Dhudhuli - Lakhima - Ratmata Kartha - Thakur Damar - Arunathakur	Dudhali municipality -9, Lakhima Chowk/ 10 June 2017	20	5	25
		Dudhauli municipality-10, Ratmate/ 10 June 2017	23	3	26
17.	Phisling - Tolang - Baspur - Oralang - Mayatar - Tarse - Upradanggadi - Shaktikhor bazar Road	Ichhakamana Rural Municipality Majhgau, Sirangaun-3/ 2 June 2017	18	4	22
18.	Barhabise - Maneswara - Ghumthang - Listi - Bhairabkunda	Barhabise-7,8,9/8 June 2017	5	1	6
19.	Dolalghat - Phalate - Kolati - Dhadkharka- Pokharichauri - Gurase Road	Bhumlu & Pokharichauri Rural Municipality/ 9/6/2017	7	2	9
20.	Badbhanjyang - Sanomasino - Thulomasino - Satghumti Road	Milan chaur (Chandragiri-2)/ 23 June 2017	7	2	9
		Kafalchaur, Dhading/ 24 June 2017	13	1	14
21.	Bansbari- Bageswori Purano Health Post to VDC Building Road	Dhaju Gaun/ Newar Gaun/2074/02/18	30	0	30
22.	Lunkhu- Mudikuwa Road	Limithana/15 june 2017	11	2	13
		Kurgha/16 June 2017	14	4	18
23.	Armadi- Banau Road	Kushma Municipality-2, Khurkot / 26 May 2017	22	10	32
24.	Solawang Raule Baluwa Naigadpul Jamaabagar Simalchaur Hukaam Ranmamaikot Road's (Naigadpul-Jamabagar Sector), Rukum	Putha Uttarganga-14 /24 May 2017	14	0	14
25.	Sital Pokhari- Jhulkhet-Chunwang Road	Musikot municipality/27 May 2017	21	2	23
26.	Mijhing-Ruinibang-Badachaur-Gumchal-Harjang-Syuri-Gaam Road	Badachaur, Mijhing/28 may 2017	16	8	24
27.	Mijhing-Dhulewodaar-Namjaa-Sirp-Pang Road	Namja/ 29 May 2017	13	3	16

Source: Transect surveys during DPR preparation, 2017

B. Compliance with Relevant Regulatory Requirements

103. As per GoN rule, a 15 days Public Notice on the project is published in a national daily newspaper and inclusion of opinions and suggestions received into the IEE report is mandatory (EPR 97, clause 7.2). The ADB SPS 2009, requires consultation to be carried out during the early stage of IEE report preparation. Public consultations were undertaken consistent with the ADB requirements. All the five principles of information dissemination, information solicitation, integration, coordination and engagement into dialogue were incorporated in the consultation process.

104. The consultation purposes and methods that were undertaken during the process are highlighted in **Table 28.**

Table 29: Consultation with Affected People and Stakeholders

Stakeholders	Purpose	Method
District level	To brief the project and project and objectives Request for the relevancy of the project To asses protected areas, wildlife reserves, forest situation, community managed forests, and other projects and programs ongoing in the district Request for relevant secondary information	Official letter Formal and informal meeting with district level stakeholders. viz. officials of Chief District Administration Office, District Development Committee, District Forest Office, District Soil Conservation Office, and other relevant district level agencies
Municipality Level	Disseminate all five principles of ADB Safeguard Policy including information dissemination, information solicitation, integration, co-ordination and engagement into dialogue Information dissemination about the project, project approach, likely environmental impacts-both: beneficial and adverse, and enhancement measures for beneficial and mitigation measures for adverse impacts and sharing on ideas, suggestions and perception	Earlier requests were made to stakeholders (affected people, NGOs, vulnerable groups of people, including the poor and Indigenous people) through Rural Municipality/Municipality to attend meeting. Group meetings/consultations, individual meeting/sharing including focus group discussions
Collection of ideas, opinions and suggestions from affected peoples, stakeholders		
Welcomed the project Shared experiences on difficulties faced due to bad condition of road especially risk of accidents, problem during monsoon season, increased dust pollution, marketing problem of agriculture production, increased cost of commodities, difficult access to neighbouring villages and districts. Shared encouragement in high value crops production if the road is improved. Shared possibility of tourism development in many potential sites after road improvement. Expressed concern on protection of religious and cultural sites and their reinstatement. Expressed concern on land and private properties compensation.		

C. Information Disclosure

105. Information was disclosed through public consultation and more formally by making documents and other materials available in a form and at a location in which they can be easily accessed by stakeholders. This involved making a summary of draft reports available

(in the local language) at public locations/Rural municipalities in the community and providing a mechanism for the receipt of comments and making documents available more widely. In this regard, ADB encourages governments to upload all documents onto their own website. The full IEE report will be disclosed on the ADB and DoR website and made available to the interested parties upon request.

106. Monitoring is one of the components of EMP. Monitoring of physical, biological and socio-economic parameters of the environment of this project will be carried out. The outcomes of the monitoring activities will be maintained in a database. The results of monitoring will also be disclosed in the form of charts, figures, graphs, and samples, etc., to the local people, school students and other interested stakeholders. In the process of compliance monitoring of the project construction, local people and construction workers will be consulted. The monitoring reports will also be disclosed on the ADB website.

107. The Implementing Agency (PCU-DoLIDAR) will extend and expand the consultation and disclosure process during the implementation (construction) of the project. The feedback of the affected people, stakeholders and the public has been incorporated in the detailed project design for implementation during construction.

108. Several meetings and focus group discussions (FGDs) were held with stakeholders and affected people to keep them abreast of the project and to get feedback and incorporated in in the Detailed Design. DoLIDAR will also make copies of the IEE report and any other project reports for interested people available in the Nepali language.

D. Public Consultation and Communication Plan for future

109. This IEE and other relevant project documents will be made available at public locations in the project affected municipality/Rural municipalities and posted on the websites of executing agency and ADB. The consultation process will be continued and expanded during the project implementation to ensure stakeholders participate fully in project execution, as well as to implement comprehensive information, education, and communication plan.

110. The public consultation and disclosure program with all interested and affected parties will remain a continuous process throughout the project implementation, and shall include the following:

(i) Consultations during construction phase

(a) Public meetings with affected communities to discuss and plan work programs and allow issues to be raised and addressed once construction has started; and

(b) Smaller-scale meetings to discuss and plan construction work with individual communities to reduce disturbance and other impacts, and to provide a mechanism through which stakeholders can participate in project monitoring and evaluation.

(ii) Project disclosure

(a) Public information campaigns (via newspaper, flyers, and media) to explain the project to the wider population of the project area and prepare them for disruptions they may experience once construction is underway;

(b) Public disclosure meetings at key project stages to inform the public of progress and future plans, and to provide copies of summary documents in local language;

(c) Formal disclosure of completed project reports by making copies available at convenient locations in the project area, and informing the public of their availability; and

(d) Providing a mechanism through which comments can be made.

111. For the benefit of the community, relevant information from the IEE will be translated in the local language and made available at (i) Offices of executing and implementing agencies, (ii) Division offices, (iii) Consultant teams' offices; and (iv) Contractor's campsites. It will be ensured that the hard copies of IEE are kept at places which are conveniently accessible to people, as a means to disclose the document and at the same time creating wider public awareness. An electronic version of the IEE Report will be placed in the official website of executing and implementing agencies and the ADB website after approval of the IEE by ADB.

112. Consultations were held along all sub-projects. Local community welcomed the decision of road widening and improvement proposal They perceived several benefits like faster and cheaper connectivity, improved accessibility to better infrastructure facilities, reduction in migration, increased economic activities and appreciation in value of land and many others. But at the same time they apprehended that the risk of accident, air and noise pollution will increase due to high traffic density after widening. Main demand and suggestions made by the participants are;

- People are ready for voluntary land donaction for the road construction
- Preference to locals in employment and petty contracts during construction
- Active role of local bodies in road development activities
- Labour availability in the project area or requirement of outside labor;
- Local disturbances due to project construction work;
- Improvement in vertical profile of the roads
- Provision of side drains, culverts, safety measures, avenue plantation
- Bus Shelters, parking and lighting markets/built-up areas
- Water sprinkling in built-up areas during construction.
- Signage and speed restriction near schools and active animal crossings

VII. ENVIRONMENTAL MANAGEMENT PLAN

A. Environmental Management Plan

113. The Environmental Management Plan (EMP) contains the agreement between DOR and ADB detailing the implementation of mitigation measures, monitoring program, cost estimates, and institutional arrangement to ensure that no significant adverse impacts results from the project intervention.

114. The basic objectives of the EMP are to:

- establish the roles and responsibilities of all parties involved in the project's environmental management;
- ensure implementation of recommended actions aimed at environmental management and its enhancement; and
- ensure that the environment and its surrounding areas are protected and developed to meet the needs of the local communities including other stakeholders and safeguard and the interests of the common people.

115. A detailed EMP is prepared and presented in **Appendix B** and will form part of the biding documents. The costs for the mitigation measures other than the compensatory plantation are dealt under the engineering (civil works) and resettlement (compensation) estimate.

116. To be more effective during implementation the EMP will be attached to the tender documents. As part of the environmental management, the procedures for workers' health and safety; public safety and reducing inconvenience and disposal of construction wastes, etc., are also included.

117. A Site Specific EMP (SEMP) is to be prepared by the contractor based on the generic EMP provided in the IEE. The SEMP will perform a risk assessment of all mitigation options and will propose site specific mitigation options that would be appropriate and commensurate with the actual impact. The contractor shall submit SEMP for Engineer's endorsement. The Contractor will not be able to start the construction works before the approval of SEMP from the Engineer.

B. Environmental Management Cost

118. The detailed project reports already incorporated environmental mitigation measures based on good engineering practices to include: shifting of electric poles, bioengineering works, rehabilitation and reconstruction of irrigation canals, provision of breastwalls in potential and existing landslide areas, and proper drainage management to protect the road and roadside slope from adverse effect of accumulated water. During the transect survey, the adequacy of these measures were validated. However, certain measures were not included like dust control, irrigation-cross drains, compensatory tree plantation, and air and water quality monitoring. The following Table presents the costs of these measures which were eventually integrated in the civil works and bidding documents.

Table 30: Estimated Additional Environment Management Cost Identified During Transect Survey and Added to the Civil Works

S. No.	District	Name of Road	Design Length (Km.)	Project Cost (NRs in Cr.)	Environmental Management Cost (USD)		
					Mitigation Measures	Monitoring	Total
1.	**Panchthar**	Phidim-Nagin - Sidin - Prangbung - Falot Road (Phidim - Ludintar Sector)	23.56	634,459,464.01	**32,453**	**1,800**	**34,243**
2.		Samdin - Chokmangu - Nawamidada - Faktep Ghurbisepanchami Road (Samdin - Nawamidada Sector)	14.85	424,656,375.65	**51,681**	**1,800**	**53,481**
3.	**Ilam**	Nepaltar - Shantidada - Gagrebhangyang - Mangalbare - Dhuseni - Gajurmukhi - Ebhang - Chaturemoad Aadipur - Larumwa - Gharti Dobhan - Chapeti - Beldagi Damak Road (Ebhang - Chaturemoad Sector)	13.28	379,499,182.74	**25,961**	**6,750**	**32,711**
4.		Manglbare-Punphung-Ekatappa-Sikari Bhangyang – Phakphok - Ra.Ma.Bi. Khmwang – Thingepur – Aamchok-Jungetar-Phuyatappa-Rabi Road section	9.51	251,824,508.84	**17,003**	**53,775**	**70,778**
5.	**Jhapa**	Amaldangi-Samayagadh-Basbari-Solmari Road	11.51	181,854,111.88	**3,172**	**900**	**4,072**
6.		Charpane-Chaitubari-Matigada-Sadhukuti-Ghodamara-Rajgadh Road	15.48	246,595,996.26	**14,026**	**2,700**	**16,726**
7.		Kharsangbari-Jalthal-Manglabare-Bahundhoka-	6.52	84,154,448.07	**3,172**	**900**	**4,072**

S. No.	District	Name of Road	Design Length (Km.)	Project Cost (NRs in Cr.)	Environmental Management Cost (USD)		
					Mitigation Measures	Monitoring	Total
		Adhikari Chowk Road17					
8.		Padajungi- Gohawari-Laldhwandra-Jharkaha-Balubathan-Chapramari Road	10.00	182,493,555.49	**13,588**	**3,600**	**17,188**
9.	Morang	Laxmimarga- Dangihat-Banol-Babiyabirta-Amahi Road	28.14	553,213,010.18	**24,753**	**9,165**	**33,918**
10.		Khorsane-Kerabari-Singhadevi Road	13.62	468,826,879.79	**29,453**	**900**	**30,353**
11.	Sunsari	Inaruwa-Satterjhoda-Chitaha-Purbakusha-Biratnagar Road	12.79	220,335,947.95	**4,796**	**0**	**4,796**
12.		Jhumka-Shingiya-Ramdhuni-Prakashpur-Shukrabare-Madhuban-Paschimkusaha-laukahi Road	18.76	328,220,987.06	**28,913**	**3,600**	**32,513**
13.	Dhankuta	Mudhesanischare-Dadagaun-Chanuwa Road	10.34	344,017,914.76	**104,866**	**3,600**	**108,466**
14.	Dolakha	Nayapul - Pawati - Dadakharka Road	12.08	366,632,053.83	**20,298**	**3,600**	**23,898**
15.	Sindhuli	Dudhauli - Lakhima Road	13.01	325,919,729	**55,096**	**8,100**	**63,196**
16.		Tallo Ranibas - Harsahi Road	12.78	254,809,015.70	**54,301**	**20,025**	**74,326**
17.	Chitwan	Phisling-Toalang-Baspur-Orlang-Mayatar-Terse-Upradang Gadi-Shaktikor Bazar Road	38.49	1,047,496,729.1	**14,214**	**4,050**	**18,264**
18.	Sindhupalchok	Barhabise-Maneshwor-Ghumthang-Listi-Bhairabkunda Road	12.38	353,228,918.2	**140,369**	**2,700**	**143,069**
19.	Kaverepalanchok	Dolalghat-Falate-Kolati-Dhadkharka-Pokharichauri-Guranse Road	18.63	475,741,461.12	**8,461**	**6,525**	**14,986**
20.	Kathmandu	Badbhangyang - Sano Masino - Thulo Masino - Satghumti road	6.40	188,475,422.08	**6,799**	**1,800**	**8,599**
21.	Bhaktapur	Bansbari-Bageswori Purano Health-Post Way - VDC Building Road	4.46	147,948,388	**5,046**	**1,600**	**6,706**
22.	Parbat	Armadi-Banou road	12.80	382,863,799.15	**32,806**	**3,600**	**36,406**
23.		Lunkhu - Mudikuwa Road	13.00	358,159,145.61	**24,375**	**1,800**	**31,175**
24.	Rukum	Shital Pokhari – Jhulkhet –	18.42	590,923,895.57	**131,341**	**1,800**	**133,141**

S. No.	District	Name of Road	Design Length (Km.)	Project Cost (NRs in Cr.)	Environmental Management Cost (USD)		
					Mitigation Measures	Monitoring	Total
		Chunwang Road					
25.		Solabang - Baluwa - Naayegadpul - Jamabagar-Simalchaur-Hukam-Ranmaikot road (Baluwa-Jamabagar- Tribeni Section)	11.63	399,168,901.42	**38,648**	**1,800**	**40,348**
26.	Rolpa	Mijhing - Dhuleodar-Namja – Sirpa - Pang road	6.00	131,983,971.35	**31,740**	**1,800**	**33,540**
27.		Mijhing-Ruininwan Badachaur-Gumchal-Siuni-Gam Road	13.70	354,375,178.12	**5,302**	**345**	**5,647**
		Grand Total	**382.120**	**9,677,878,990**	**929,533**	**149,095**	**1,078,628**

Source: Detail Design Report, RCIP Roads, 2017

C. Environmental Monitoring Programme (EMoP)

119. Environmental monitoring is an essential component of the implementation of IEE recommendation. The environmental monitoring programme (EMoP) is prepared to monitor the implementation performance of the EMP.

120. Environmental monitoring plan is prepared focussing the following objectives:

- To ensure that impacts do not exceed the established legal standards
- To check the implementation of mitigation measures in the manner described in the IEE report
- To monitor implementation of the EMP.
- To provide an early warning of potential environmental damage
- To check whether the proposed mitigation measures have achieved the intended results, and or/ other environmental impacts occurred

121. The monitoring plan will be used for performance monitoring of the project. A monitoring plan defining all parameters to be monitored, with tentative location, project stages for measurements, implementation and institutional responsibility for different environmental components is prepared for all stages of project and presented in **Appendix C.**

D. Cost for Environmental Monitoring

122. Responsibility for undertaking environmental monitoring of proposed road upgrading during – and post construction phase is rested on the shoulders of MoFALD and RCIP-PCU at the policy and proponent level. Cost to be incurred to its undertaking is provisioned in proposed project cost estimate.

E. Institutional Setting and Proposed Implementation Arrangement

a) Project Organisation

123. Ministry of Federal Affairs and Local Development (MoFALD) will be the Executing Agency (EA) and DOLIDAR will be the Implementing Agency (IA) for the project.

124. More specifically, the PCU RCIP will be the key institution for the successful implementation of the project and ensure compliance to ADB safeguards as contemplated in the environmental management and monitoring plans.

125. The PCU will provide both technical advisory and independent audit roles to the Project to ensure the project stays in compliance. The PCU, after reviewing and approving the EMP will review monitoring reports submitted by the SC. On an annual basis, the PCU is authorized to conduct environmental audits of road projects. The overall organisation structure of project is shown in Figure 19.

126. The CSC Environmental Specialist and the PCU Environmental Consultant will prepare road-specific environmental management plans (SEMP) to be implemented by the contaractor. The SEMP wil be based on detailed surveys to be conducted by the CSC and contractor that will s[pecific among others the chainages where specific measures will be implemented e.g. i) forestlands where no tree cutting will be allowed without securing the necessary clearances, ii) community areas where regular dust suppression will be implemented, iii) names and location of rivers and ponds where water quality monitoring will be conducted, iv) quary sites and borrow area locations; v) camp sites, vi) disposal sites for debris and camp wastes; and vii) location of hot mix and batching plants including permits

and clearance. The SEMP will be the principal basis for conducting the site-induction workshop to be led by the CSC-environment specialist.

127. Both the EA and the IE have extensive experience in implementing ADB-financed road projects. The Project Coordination Unit (PCU) will be maintained within DoLIDAR and serve as the Project Implementation Unit (PIU). The Project Director will have overall responsibility for all aspects of project implementation and management including procurement, contract administration, progress monitoring, financial management, reporting, land acquisition and resettlement.

b) Capacity Building

128. To enhance the capacity of staff for effective implementation of proposed mitigation measures and monitoring the resultant effect, as well as create awareness amongst workers and public the trainings and awareness programmes will be prepared by the Supervision Consultant-Environmental Specialist in consultation with the GESU/DoR. No later than 2 months from the issuance of notice to proceed, the appointed environment focal person of the Contractor will meet with the SC to review and enhance the EMP. All environment focal person will undergo regular training and workshop organized by the SC and GESU/DoR.

c) Environmental and Social Safeguards Monitoring

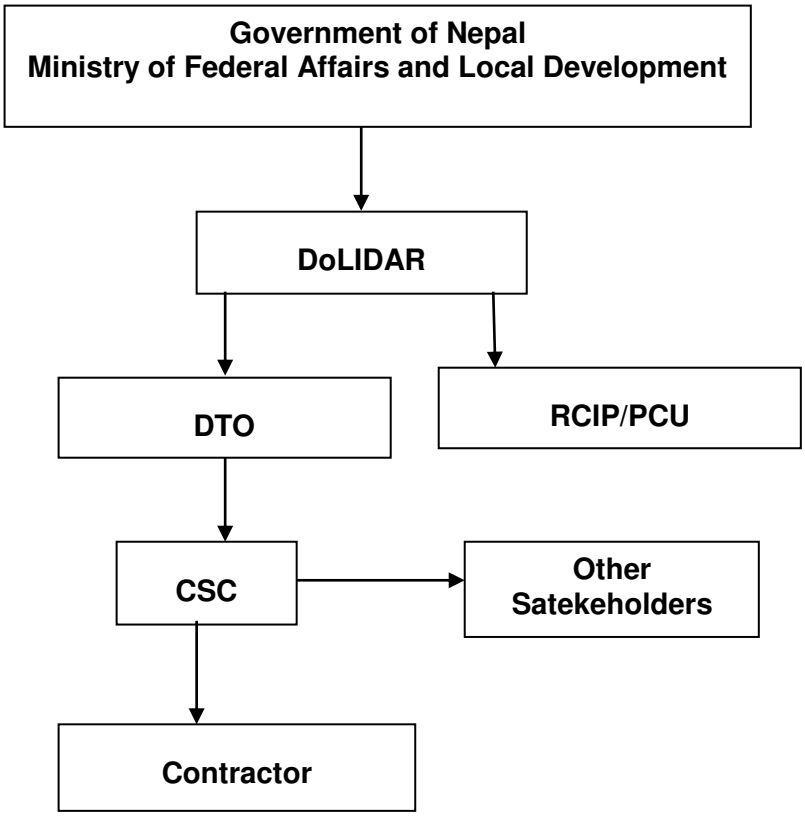
129. It is proposed that DoR's GESU with the support of the supervision consultants is given responsibility for monitoring implementation of the Environmental Management Plan (EMP) in the construction contract, the Resettlement Plan and the poverty reduction programme. The project should support the sustainability of this capacity in DoR by involving GESU in the project implementation. It is proposed that the project provides support for transport, field visits and acquiring national environmental and social consultant support.

7.4 Reporting

130. Following reports shall be prepared and submitted for ADB approval and disclosure:

- Environmental Safeguards Matrix for Quarterly Country Program Review
- Environmental Safeguards Monitoring Chapter in the Quarterly Project Progress Report
- Semi-annual Environmental Compliance Monitoring Report (Jan-June in July, and July-Dec in January next year)
- Analytical Project Completion Report on Environmental Performance of the Project

Figure 18: Project Organisation Structure for EMP Implementation



VIII. GRIEVANCE RE-DRESSAL MECHANISM

131. The concern/grievances from local/affected people may come up related to inappropriate implementation of various components of EMP or the overall road upgrading itself. These issues will be addressed through acknowledgement, evaluation and corrective action and response approach. A grievance redress mechanism (GRM) will be established to receive, evaluate, and facilitate the resolution of affected people's concerns, complaints, and grievances about the social and environmental performance of the project. The GRM aims to provide a trusted way to voice and resolve concerns linked to the project, and to be an effective way to address affected people's concerns. The GRM for the project is outlined below, and consists of three levels with time-bound schedules and specific persons to address grievances.

B. First Level GRM

132. The first level and most accessible and immediate contact for the fastest resolve of grievances are the contractors, and design and supervision consultants on site. Prior to construction of any works, the PCU and PIU (Project Manager) will ensure local community meetings are held to notify local residents and businesses of any temporary disturbances, and to inform them of the Project. If a local area committee (LAC) exists in the area, they should also be informed. If any complaints arise, the contractors, consultants, and PIC can immediately resolve the complaint on site. The PIU can also be involved in grievance redress at this stage. The PCU and PIU office phone number will be posted in public areas within the project area and construction sites. Any person with a grievance related to the project works can contact the project to file a complaint. The PIC office will have a safeguards focal person to field and resolve complaints. The safeguards (environment and resettlement) focal person will document the complaint, and immediately address and resolve the issue with the contractor within 1-2 days, if the complaint remains unresolved at the field level. The PCU may seek the assistance of the consultant safeguards specialists (the environmental specialist or social safeguards specialist) to resolve the issue. The PIC safeguards focal person will notify the PIU safeguards focal person that a complaint was received, and whether it was resolved. The PIU safeguards focal person will fully document the following information: (i) name of the person; (ii) date complaint was received; (iii) nature of complaint; (iv) location, and (v) how the complaint was resolved.

C. Second Level GRM

133. Should the grievance remain unresolved; the PIU will forward the complaint to the PCU safeguards focal person. The person filing the grievance will be notified by PIU safeguards focal person that the grievance was forwarded to the PIU safeguards focal person. The PIU will address the grievance. Grievances will be resolved through continuous interactions with affected persons, and the PIU will answer queries and resolve grievances regarding various issues including environmental or social impacts. Corrective measures will be undertaken at the field level by the PIU safeguards focal person within 7 days. He/she will fully document the following information: (i) name of the person; (ii) date complaint was received; (iii) nature of complaint; (iv) location and (v) how the complaint was resolved.

D. Third Level GRM

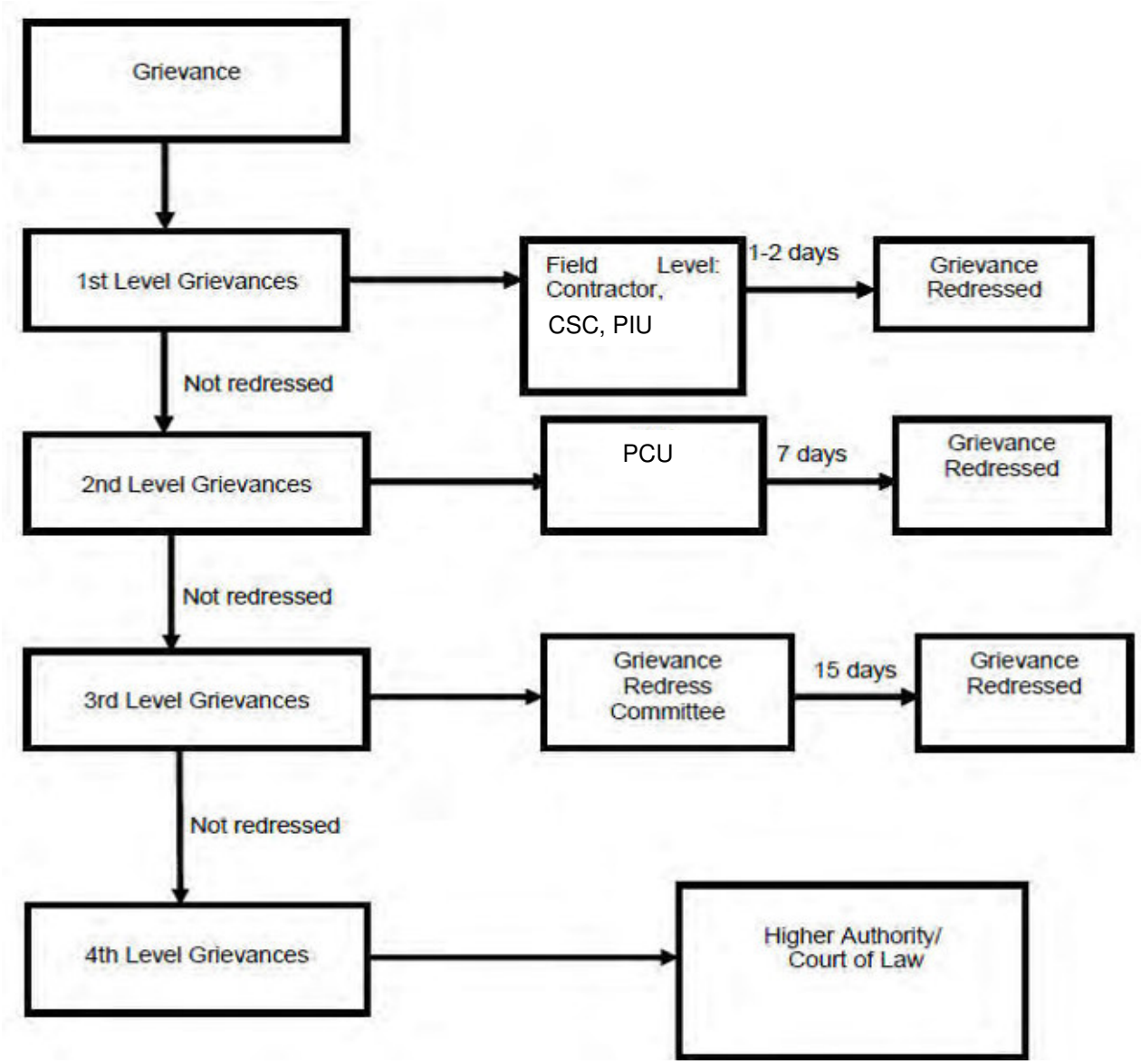
134. Should the grievance remain unresolved, the PIU's project director will activate the third level of the GRM by referring the issue (with written documentation) to a Grievance Redress Committee (GRC) constituted by the DoLIDAR which will, based on review of the grievances, address them in consultation with the PMU, PIU, PCU and affected persons. The GRC will consist of PIU leadership, affected persons, and local area committee, among others—determined to provide impartial, balanced views on any issues. The GRC should consist of at least five persons. A hearing will be called with the GRC, if necessary, where

the affected person can present his/her concern and issues. The process will promote conflict resolution through mediation. The GRC will meet as necessary when there are grievances to be addressed. The GRC will suggest corrective measures at the field level and assign clear responsibilities for implementing its decision within 15 days. The functions of the GRC are as follows: (i) to provide support to affected persons on problems arising from environmental or social disruption, asset acquisition (where required), and eligibility for entitlements, compensation, and assistance; (ii) to record grievances of affected persons, categorize and prioritize them, and provide solutions within 15 days; and (iii) to report to the aggrieved parties developments regarding their grievances and decisions of the GRC. The PIC safeguards focal person will be responsible for processing and placing all papers before the GRC, recording decisions, issuing minutes of the meetings, and taking follow-up action to see that formal orders are issued and the decisions carried out. The GRC will be chaired by DoLIDAR Deputy Director General, CSC Team Leader, PCU-Head, Concerned Contractor and PIU, and jurisdictional Village District Committee (VDC).

E. Fourth Level GRM

135. In the event that a grievance is not addressed by the contractor, CSC, PIU, PCU or GRC, the affected person can seek legal redress of the grievance in the appropriate courts, the fourth level of the GRM, which is the formal legal court system. The GRM however does not prevent affected persons from seeking legal redress at any time. The grievance redress mechanism and procedure is depicted in Figure 8.1.

Figure 19: Grievances Resolution Steps and Processes



Note: PCU-Project Coordination unit, CSC-Construction Supervision Consultant, PIU= Project Implementation Unit

IX. CONCLUSION AND RECOMMENDATION

A. Conclusion

136. The findings of Environment Assessment of RCIP roads indicate that impacts are mostly similar and subprojects are unlikely to cause any adverse environmental impacts. While some of the impacts are negative, there are many bearing benefits to the area. Most of the impacts are likely to occur during construction stage, are temporary in nature, and can be mitigated with minor to negligible residual impacts.

137. The project received immense support from local people, as they perceive that this project will improve the overall connectivity and bring various economic opportunities to the people of the project area.

138. All 27 roads included under RCIP were selected based on ecological and climate change consideration defined under PAM. Accordingly, none of the roads passes through protected areas or encroaches precious ecology (sensitive or protected areas) or any historical or archeologically protected areas. As per selection guidelines, none of the selected road passes through reserved forests either. Few trees cutting though may be involved.

139. Among the project roads there are some roads which are prone to flood due to river, proximity to rivers or due to accumulation of rainwater in and around project road area. Adequate engineering measures like cross drainage structures, slope stabilisation are proposed for the protection of road from the flood.

140. All the 27 roads are aligned with existing village roads and unpaved movement paths. As such, land acquisition is nil or very minimal which is also acquired through donations from villagers.

141. Considering insignificant environmental sensitivity, the project is categorized as category B as per ADB Safeguard Policy Statement 2009.

142. Categorisation is also made under environmental legislation of Nepal, since these rural roads also require environmental clearance in accordance to Nepal Environmenal (Protection) Act and Rules, 1997 amended till date. Clearance from Department of Forest will also be required for cutting of trees.

143. The impacts identified are mostly related to alignment selection, land clearing, borrowing earth, and cutting of trees, shifting of utilities and community structures, establishment of construction camp or material storage areas, transportation of material and operation of hot mix plant. All identified impacts are either eliminated or minimized through design consideration and suitable mitigative measures.

144. Environmental Management plan covering all stages of road construction (design, construction and operation) is prepared with defined responsibility for its implementation. Environmental Monitoring plan is also prepared to ensure effective implementation of EMPs.

145. DOLIDAR has defined institutional setup including specified responsibility for environmental management. Existing capacity of the Department of Local Infrastructure Development and Agricultural Roads (DOLIDAR) and Project Implementation Units (PIUs) for implementing environmental safeguard issues need substantial strengthening. Trained and experienced in-house officials should carry out more training in future periodically.

146. The IEE also indicate that rural road construction works does not warrant further EIA study for subsequent rural road construction works.

B. Key Recommendations

147. Any major changes or any major additional work other than the proposed project activities will require preparation of another environmental assessment. This additional assessment will have to be submitted to DOLIDAR, Concerned Government authorities and ADB for concurrence before civil works commence.

148. The implementation of prescribed mitigation measures will minimize/avoid the adverse impacts. Moreover, the impacts shall be monitored continually by implementing and updating the Environmental Management plan and Environmental Monitoring Plan. These IEE is prepared based on ECoPs and feasibility stage. Subproject specific EMP shall be improved as per the final provisions made under DPRs. The updated EMP if there is any change shall also be sent to ADB for information.

149. As of August 15, 2017 all roadwise IEE reports have been approved by the MoFALD in compliance with the requirements of Environment Protection Act 1996 and Environment Protection Rules, 1997 (with amendments). All forest clearance applications have been filed with the jurisdictional Distric Forest Offices by the PIUs with assistance from the PCU. No tree cutting shall be allowed until the forest clearance is secured. The contractors however, can start land clearing on stretches outside forestlands. Boundaries of the forestlands shall be clearly marked on the ground through the installation of metal or galvanized iron sign boards in consultation with the forest department.

150. DoLIDAR shall ensure that EMP and EMoP is included in Bill of Quantity (BoQ) and forms part of bid document and civil works contract. The contractor will specify the quantity and budget for various activities like rehabilitation of borrow earth pits, first aid and Sanitation facilities at construction camp and temporary office/material storage place. The same shall be revised if necessary during project implementation or if there is any change in the project design. Any such change shall be reported to ADB as well.

Appendix A

Rapid Environmental Assessment (REA) Checklist

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES), for endorsement by Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: NEP: Rural Connectivity Investment Program (RCIP)

Sector Division: South Asia Environment, Natural Resources, and Agriculture Division

Screening Questions	Yes	No	Remarks
A. Project Siting Is the project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site		√	None of the roads is located adjacent or within any archaeologically protected monument or culturally important structures. In cases of few roads, some religious structures like temples are located close to the roads.
▪ Protected Area		√	None of road is located within or near any protected area including respective buffer zones
▪ Wetland		√	No protected or classified wet land is located close to any roads. However, few village ponds are located close to some of the roads
▪ Mangrove		√	None of the roads is located in coastal areas.

Screening Questions	Yes	No	Remarks
▪ Estuarine		√	No estuarine is located in the project area.
▪ Buffer zone of protected area		√	No such area is located in the project vicinity.
▪ Special area for protecting biodiversity		√	No such area is located in the project vicinity.
B. Potential Environmental Impacts Will the Project cause…			
▪ Encroachment on historical/cultural areas; disfiguration of landscape by road embankments, cuts, fills, and quarries?		√	No encroachment on historical or cultural areas is expected by any of the roads. Project activity involves upgrading of unpaved rural roads to paved road. The roads are aligned as per the existing unpaved road alignment. The embankment height raised based on high flood level. The aggregate will be sourced only from existing quarries. Borrow earth will be sourced from barren land or authorised places with provision of borrow area rehabilitation.
▪ Encroachment on precious ecology (e.g. sensitive or protected areas)?		√	None of the roads passes through or close to any protected areas (wild life sanctuaries, or national park or other ecologically important sites). Only cutting of few trees is involved. Attempts have been made to minimising the cutting of trees while finalising the road alignments.
▪ Alteration of surface water hydrology of waterways crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site?		√	Several roads will pass across rivers and streams. No new bridges will be constructed under the project, however pipe culverts will be constructed across streams (kholas) and irrigation field crossings. Village ponds are also located close to few roads in the terai area. Adequate provisions are proposed for bank stabilisation and prevention of silt runoff to avoid sedimentation in these water bodies during construction and operation phases.
▪ Deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?		√	None of the construction camps are proposed close to any water body. No harmful chemical are likely to be used for road construction. Septic tank is proposed for sewage disposal at each construction camp. Adequate provision is proposed for prevention of silt runoff during construction.

Screening Questions	Yes	No	Remarks
▪ Increased local air pollution due to rock crushing, cutting and filling works, and chemicals from asphalt processing?	√		Localised air pollution is expected. Dust separation measures like spraying of water on unpaved haulage routes are proposed to minimise the dust generation. Asphalt mixing plant will be located away from habitat area with adequate stack height for emission dispersion.
▪ Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation during project construction and operation?	√		Workers may get exposed to dust and noise during construction activities. However the exposure levels are likely to be short and insignificant. Workers will be provided requisite PPEs to minimise such exposure and associated harmful occupational health effects. Traffic on these rural road is expected to be low and as such no occupational health hazard is anticipated during operation phase.
▪ Noise and vibration due to blasting and other civil works?		√	No blasting is involved. No significant noise generation as most road construction activities will be relying on manual labor.
▪ dislocation or involuntary resettlement of people?		√	No involuntary resettlement of people is involved.
▪ Dislocation and compulsory resettlement of people living in right-of-way?		√	No displacement of people is involved.
▪ Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		√	No such impact is anticipated. .
▪ Other social concerns relating to inconveniences in living conditions in the project areas that may trigger cases of upper respiratory problems and stress?		√	None. Villagers are very supportive for the construction of these roads as they believe that these roads will provide them better connectivity and will contribute in poverty alleviation.
▪ Hazardous driving conditions where construction interferes with pre-existing roads?		√	None. Measures will be taken to avoid any hazardous driving condition.
▪ Poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases (such as STI's and HIV/AIDS) from workers to local populations?		√	Provision is made for the disposal of sewage through septic tanks and solid waste through composting or controlled land burial, is planned. As such camp size will be small (about 50 workers) and no such transmission of diseases is expected. Periodic health check-up may be organised to this. Awareness will be created amongst the workers about hygiene and health protection.

Screening Questions	Yes	No	Remarks
▪ Creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents?		√	No such condition is anticipated. All borrow areas will be either be covered or converted to ponds based on agreements with the landowner. Campsite drainage system will be designed to allow natural flow and avoid pond formation
▪ Accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials?	√		Being rural road, traffic volume is expected low and probability of accident is minimal. Adequate traffic management measures will be taken to prevent hazardous traffic conditions during construction phase. Adequate signage, speed control measures will be taken close to sensitive locations such as schools, temple or hospitals.
▪ Increased noise and air pollution resulting from traffic volume?	√		Air and noise pollution may increase during construction phase. But the same is likely to be confined within few meters of either side of the road. Dust separation measures such as spraying of water and distribution of PPE to workers will be adopted. Impulsive but intermittent noise level increase may occur during operation phase. Air pollution level rather will reduced on paved road compared to unpaved road conditions.
▪ Increased risk of water pollution from oil, grease and fuel spills, and other materials from vehicles using the road?	√		This possibility is minimal but can not be ruled out. Adequate signage and crash barriers near water body will be proposed to prevent any such incident.
▪ Social conflicts if workers from other regions or countries are hired?		√	Most of the workers will be hired locally.
▪ Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		√	Most of the workers will be hired locally. Average road length is 14 kilometers and it is expected that a single construction camp will be established for each civil works construction package composed of several roads. Size of construction camp is expected host between 30-50 workers with the bulk of the manual labor to be provided by the host communities. This size is unlikely to cause any significant burden on social infrastructure and services.

Screening Questions	Yes	No	Remarks
▪ Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		√	The construction material (aggregate from approved quarries, borrow earth, Bitumen) will be sourced from nearby sources/approved sources. No explosive or chemicals are likely to be used. Bitumen waste if any generated during construction will either recycled or disposed in a controlled manner.
▪ Community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning.		√	No such impacts are anticipated. Safe access is provided to all villagers using the road. Adequate signage as well as guides is posted at work place.

A Checklist for Preliminary Climate Risk Screening

Country/Project Title: NEP: Rural Connectivity Investment Project

Sector: Agriculture

Subsector: Rural Roads

Division/Department: Environment, Natural Resources, and Agriculture Division

Screening Questions		Score	Remarks[1]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	1	The project districts that are at risk from flooding are Jhapa, Morang, and Sunsari. Districts along the main frontal and boundary thrusts and on the south Tibetan Detachment System geological formations are prone to landslides which includes Sindhuli, Chitwon, Kavrepalanchok, Parbat, Rukum, and Rolpa.
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters level, (e.g., sea-peak river flow, reliable water level, peak wind speed etc)?	1	1:10, 1:25, and 1:50 flood return periods were considered for side drains, pipe culverts, and bridges, respectively.
Materials and Maintenance	Would weather, current and likely future climate conditions(e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g.	0	Construction material selection are guided by existing DOLIDAR Rural Road Standards and Guidelines.

	construction material)?		
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?	1	More frequent maintenance cost of roads particularly located in landslide prone areas in Sindhuli, Chitwon, Kavrepalanchok, Parbat, Rukum, and Rolpa.
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as high risk project.

Result of Initial Screening (Low, Medium, High): MEDIUM

Other Comments:_____

_____

Prepared by: Lee Ming Tai

[1] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

Appendix B

STANDARD ENVIRONMENTAL MANAGEMENT PLAN FOR RURAL ROAD*

Project Activities	MITIGATION MEASURES	Location	Time Frame	Cost	Responsible for Implementation	Responsible for Monitoring
A. Pre Construction Phase						
Finalization of alignment	• Consult with local people to finalize the alignment especially to avoid landslide area, to decide location for culverts and other drainage structures. • Avoid excessive cut and fill and road should be aligned to follow natural topography. • In case of hilly/mountainous area, alignment selection should follow provisions of Environment Friendly Road Construction (NRRS 2055) "Hill Road Manual") and should refer to geological survey data to identify landslide prone area, and settlement/loose rock areas. • In flood prone region/areas, refer to hydrological data to finalize provision for culvert drainage structures especially for alignment that intersects/crosses ground and surface water flow. • Avoid the requirement of forestland for road construction. In case unavoidable, minimise it to extent possible by exploring alternative options. • In case, requirement of forestland is unavoidable, determine the legal status of forestland and initiate actions to seek permits for diversion of forestland for non forest uses (road construction). • Forest clearance is to be obtained in accordance with the provisions of Ministry of Forest and Soil Conservation and all conditions related with the clearance has to be implemented. • In case alignment has trees, which are known to be nesting/breeding places for migratory birds, contact the Department of National Park and Wildlife Conservation for seeking permits and details about non-breeding seasons. In any case, no tree shall be cut in such stretches and construction works are to be strictly scheduled for non-breeding/nesting season and all permit conditions are to be complied. • Avoid or minimize tree felling, acquisition of agricultural land, shifting of shrines/temples, disturbance to community ponds, community resources, burial grounds, etc. to the extent possible through evolving alternate alignment options.	All through the alignment of proposed rural road	Prior to commencing any construction works	Part of Project Cost	PCU	MoFALD
*This is a Standard Environmental Management Plan for the construction of rural roads projects under the RCIP-Nepal. This standard EMP and the Environmental Checklist will be included among contract documents. The contractor must be aware of his responsibilities indicated in this EMP and must ensure that the necessary budget for applicable and appropriate mitigating measures is incorporated in the contractor's cost. The contractor should show also the indicative costs, if possible.						

Project Activities	MITIGATION MEASURES	Location	Time Frame	Cost	Responsible for Implementation	Responsible for Monitoring
Land Transfer	Land acquisition, resettlement and rehabilitation, poverty alleviation programs for affected people and all other related issues are addressed in Social Impacts and Resettlement & Rehabilitation report.	All through the alignment of proposed rural road (as applicable)	Pre construction Phase	Encumbrance- free land to be made available by the Government of Nepal	DOLIDAR and DTO	MoFALD
B. Construction Phase						
Land clearing operations	• The road land width requiring clearing shall be clearly demarcated on ground. • During land clearing operations, topsoil shall be collected, preserved, and reused as a base for turfing of embankment slopes or development of barren areas along roadside. • Trees falling within roadway width and other vegetative cover are to be removed. • Small temples, shrines if any is within the road land width, the same may be shifted to adjacent areas in consultation with local community leaders. • During clearing operations, any treasure trove, slabs with epigraphical evidence or edicts, sculptural or any material found and appear to have historical importance, it should be brought to the notice of Department of Archaeology, and instructions of this Department, if any, must be followed. • All public utilities like power transmission cables, telephone cables, water/sewerage lines, drains, tube wells etc falling within road land width shall be inventoried, and arrange for relocation /shifting to adjacent areas in consultation with the respective agencies/authorities. • Establish and maintain interaction with local community to ensure that no social resentment sets in due to operations. • Contractors shall comply with the DOLIDAR's Guidelines for Protecting Physical Cultural Properties	All through the alignment of proposed rural road (as applicable)	Pre construction Phase	Encumbrance- free land to be made available to the contractor by DOLIDAR Relocation of utilities are to be undertaken by respective departments and costs are to be reimbursed	All facilities are to be planned and implemented by PIU and/or contractor as per theconditions of civil works under approval by the CSC	PCU
Establishment of temporary office and storage area	• The temporary office and storage area for construction works shall be located away from human settlement areas (minimum 500 m) and forest areas (minimum 1 km). • The office and storage areas shall preferably be located on barren/waste lands and conversion of agricultural/cultivable lands for office and storage areas shall not be allowed under any circumstances. • All fuel oil/lubricants loading/unloading and storage areas shall be paved (impermeable), and have separate storm water collection	As determined by contractor under approval of PIU	Pre construction and Construction Phase	To be included in contractor's cost	All facilities are to be planned and implemented by contractor under approval by CSC	PCU

Project Activities	MITIGATION MEASURES	Location	Time Frame	Cost	Responsible for Implementation	Responsible for Monitoring
	system with facility for separation of oil/lubricants prior to discharge. • The temporary office and storage area shall be provided with adequate water supply, sanitation, septic tank/soak pit of adequate capacity so that it functions properly for the entire duration of its use. • After completion of construction works, the site shall be restored to its previous state by undertaking clean up operations.					
Construction CampSites	• The Contractor shall comply with the DOLIDAR's Labor Camp Guidelines • The construction campsites shall be located away from any local human settlement areas and preferably located on lands, which are barren/waste lands. • The camps shall be located, at a minimum, 5 km from forest areas to deter trespassing of construction labour. • The campsites shall be provided with adequate water supply, sanitation and all requisite infrastructure facilities. This would minimize dependence on outside resources, presently being used by local populace and minimize undesirable social friction thereof. • The camps shall have septic tank/soak pit of adequate capacity so that it can function properly for the entire duration of its use. • Construction camps shall be provided with kerosene/LPG to avoid dependence on firewood for cooking to the extent possible. • After completion of construction works, location of campsites shall be restored to its previous state by undertaking clean up operations.	As determined by contractor under approval of PIU	Pre constructio n and Constructi on Phase	To be included in contractor's cost	All facilities are to be planned and implemented by contractor under approval by CSC	PCU
Mobilization of construction materials - Stone aggregates, earth and construction water	• Stone aggregatesshall be sourced only from licensed existing quarries. • A list of such existing quarries is available from responsible department/ authority for mining related works in each state. In case new quarries are to be opened, quarry license/permits are to be obtained from this department/authority. • In case, only stone crushing plants are to be installed near work sites, required permits are to be obtained and all conditions of permits are to be complied. • Ensure stone quarries and crushing units have pollution control system; occupational safety procedures/practices in place and regular inspection shall be carried to ensure compliance. This shall be a pre-condition for sourcing of materials from quarries/crushing plants. • Earth borrow areas identified during DPR stage shall be revisited to assess its environmental sensitivity and ensure it is not an ecologically sensitive areas. Permits are to be obtained from authorities and all permit conditions are complied. • The borrow areas are to be demarcated with signboards and	As determined by contractor under approval of CSC and PIU	Pre constructio n and Constructi on Phase	To be included in contractor's cost	All facilities are to be planned and implemented by contractor under approval by CSC	PMU

Project Activities	MITIGATION MEASURES	Location	Time Frame	Cost	Responsible for Implementation	Responsible for Monitoring
	operational areas are to be access controlled. • Topsoil from borrow areas (first 30cm) are to be preserved and used for redevelopment of borrow areas or as a base for turfing along embankment slopes. • The borrow areas as an option may be converted into ponds wherever possible, which can be used for storage of rainwater. • Conversion of agricultural lands for borrowing earth is to be discouraged to the use possible unless warranted by local conditions. In such cases, written consent shall be obtained from the landowners. • All borrow area shall comply with the DOLIDAR's Borrow Pit Management Guidelines.					
Mobilization of construction materials - Stone aggregates, earth and construction water *(contd……)*	• Water for construction works shall NOT be drawn from sources, which serve routine needs of local people. • In case water is sourced from existing private tube wells, well owner shall be informed about the quantity and duration for which water drawls will be carried out and possible implications. Written consent for use of groundwater shall be obtained. • In case new tube wells are to be constructed, required concurrence from the CSC • In any case, care shall be taken not to source all requirements from one single source and no two sources (in case of tube wells) shall be less than 500 m from each other.					
Transportation of construction materials	• Existing tracks/roads are to be used for hauling of materials to extent possible. • The alignment of haul roads (in case of new ones) shall be finalized to avoid agricultural lands to the extent possible. In unavoidable circumstances, suitable compensation shall be paid to people, whose land will be temporarily acquired for the duration of operations. The compensation shall cover for loss of income for the duration of acquisition and land restoration. • Prior to alignment of new haul roads, topsoil shall be preserved or at least shall be used for any other useful purposes like using in turfing of embankment rather than allowing its loss by construction activities. • Dust suppression along transportation links is to be ensured by deploying water tankers with sprinkling system are to be deployed along haul roads. • The vehicles deployed for material transportation shall be spillage proof to avoid or minimize the spillage of the material during transportation. Transportation links are to be inspected daily to clear accidental spillage, if any.	As determined by contractor under approval of CSC and DTO	Pre construction and Construction Phase	To be included in contractor's cost	All facilities are to be planned and implemented by contractor under approval by PIU /PIC	PIU

Project Activities	MITIGATION MEASURES	Location	Time Frame	Cost	Responsible for Implementation	Responsible for Monitoring
	• Precaution shall be taken to avoid inconvenience to the local community due to movement of materials.					
Diversion of traffic	• Frame appropriate traffic diversion schemes (in specific stretches as per progress of construction work) and implemented to avoid inconvenience due to construction works to present road users. The traffic diversion signs should be bold and clearly visible particularly at night. • Diversion schemes are required to ensure smooth traffic flow, minimize accidents to road users during construction works.	All through the alignment of proposed rural road	Construction Phase	To be included in contractor's cost	Diversion schemes shall be prepared by Contractor and approved	PIU
Cut and fill	• Finalisation of alignment plan and profile shall consider options to minimise excessive cuts or fills. The design shall as per the relevant DOLIDAR Rural Road manual. • The cut and fill quantities required for profile correction shall be balanced to the extent possible, to avoid dependence on earth from borrow areas. • In both cases of cut and fill, top soil shall be preserved and reused for turfing of embankment slopes or redevelopment of borrow areas or any other areas in the vicinity of roads. • Under no circumstances, topsoil shall be allowed to be used as a fill material in road construction activities.	All through the alignment of proposed rural road	Construction Phase	To be included in contractor's cost	The alignment plan and profile is to be reviewed by contractor, and approvals are to be obtained from CSC, if any revisions are to be effected	PCU
Preparation of embankment and road base	• The road construction works will raise, extend and enlarge existing roadway/tracks all along the alignment. Therefore, mitigation measures to contain erosion and drainage problems are essential. • The engineering measures for countering soil erosion, slope protection, drainage wherever required shall be considered and implemented as per relevant DOLIDAR Rural Road Guidelines provisions. • Measures like selection of less erodable material for embankment construction, compaction, adequate embankment slopes and turfing shall be considered as per provisions and Technical Specifications for construction of Rural Roads, DOLIDAR.	All through the alignment of proposed rural road (in stretches wherever applicable)	Construction Phase	To be included in contractor's cost	The alignment plan and profile is to be reviewed by contractor, and approvals are to be obtained from CSC, if any revisions are to be effected	PMU
Cross Drainage Structures	• The road construction will also require construction of several cross drainage structures, across streams/rivers flowing across the road. • Refer to hydrological studies to ensure that construction of drainage structures is not likely to alter drainage pattern, and discharge capacities of drainage structures are designed to facilitate smooth passage of water and heading up or flooding is avoided even in flood season. • Schedule the construction works to dry season so that impacts on water quality of stream/river is minimise or avoided.	At all locations of CD structures along the rural roads	Construction Phase	To be included in contractor's cost	The planning, and construction/ upgradation of existing/new cross drainage structures roads are responsibilities of contractor under	PMU

Project Activities	MITIGATION MEASURES	Location	Time Frame	Cost	Responsible for Implementation	Responsible for Monitoring
	• Precaution shall be exercised to prevent oil/lubricant/ hydrocarbon contamination of channel bed during construction works. Spillage, if any, shall be immediately cleared with utmost caution to leave no traces. • Ensure all construction wastes are removed from work site and stream /river beds are to be cleaned up (at least 50 m on both upstream and downstream sides of water courses) after completion of construction but prior to onset of monsoon.				approval by CSC Environmental officer and other team members of PIU will monitor and ensure appropriate implementation	
Tree Planting	• Tree planting operations shall be commenced immediately after completion of embankment compaction. • Tree plantation along the road shall be undertaken as per permit conditions issued by the Ministry of Forest and Soil Conservation, prior to tree felling. • The species shall be suitable for local climate and available. The concerned District Forest Officer can be consulted for selection of species and technical guidance, if required. • Proper care shall be taken to increase survival rate of saplings like regular watering, pruning, provision of tree guards, manure for better nourishment, etc. including timely replacement of perished saplings.	All through the alignment of proposed rural road (in stretches wherever applicable)	Construction Phase	To be included in project cost	The tree plantation work can be entrusted to District Forest Office under the supervision of PIU	PMU
Hot Mix Plants and Laying of bitumen	• Hot mix plants shall be at least 500 m away from human settlements and preferably located on leeward side of most dominant wind direction. • Consent/permits to establish and operate are to be obtained from concerned authority and all permit conditions are to be implemented/complied. • The hot mix plants shall be set up on barren/waste lands and conversion of agricultural/cultivable lands for this purpose shall not be allowed under any circumstances. • All operational areas like storage, handling, loading, unloading areas shall be paved, and have separate storm water collection system with facility for separation of oil/lubricants prior to discharge. • The storm water from storage area shall not be directly discharged into any, nearby water courses/drains. • The hot mix pants shall be provided with adequate water supply, sanitation, septic tank/soak pit of adequate capacity so that it functions properly for the entire duration of its use. • After completion of construction works, the site shall be restored to its previous state by undertaking clean up operations. • Hot mix plants shall have required measures for control of dust, air,	As determined by contractor under approval of PIU	Construction Phase	To be included in contractor's cost	All facilities are to be planned and implemented by contractor under approval by CSC	PCU

Project Activities	MITIGATION MEASURES	Location	Time Frame	Cost	Responsible for Implementation	Responsible for Monitoring
	and noise pollution as per regulatory limits of Ministry of Population and Environment. • Appropriate traffic diversion schemes shall be implemented during bitumen paving is under progress and all works shall be planned and swiftly completed to avoid inconvenience to road users.					
Clean up of construction work Sites and Disposal of waste	• All operational areas under road construction works like work sites, office/storage area, work force camps, and borrow areas, shall be cleaned up and restored to its previous state soon after operations are complete. • All construction waste shall be disposed in approved areas. Local district authorities shall be consulted to determine disposal site and implement any conditions imposed while issuing permits. • Contractors shall comply with the DOLIDAR's Spoil Mass Disposal Management Guideline including the preparation of Disposal Plan	Along all the alignment	Prior claiming the final payment	To be included in contractor's cost	Contractor with the approve plan from CSC	PCU
Equipment/ vehicles deployed for Construction works	• All diesel run equipment/vehicles/ deployed for construction activities shall be regularly maintained for smooth operation, a measure contributing to air quality and noise. • Vehicles/equipment shall be periodically subjected for emission tests and shall have valid Department of Transport and Management NO POLLUTION CERTIFICATE. Revalidation of certificates shall be done annually. • All vehicles deployed for material movement shall be spill proof to the extent possible. In any case, all material movement routes shall be inspected daily twice to clear off any accidental spills.	As determined by contractor	Constructi on Phase	To be included in contractor's cost	All facilities are to planned and implemented by contractor under approval by CSC	PCU
Occupational Safety and Health Hazards at Work and camp sites	• All Contractors shall comply with the DOLIDAR's Occupational Health and Safety Guidelines • All personnel at work sites shall be provided with protective gears like helmets, boots, etc. so that injuries to personnel are avoided or minimized. • Children (less than 16 years) and pregnant women shall not be allowed to work under any circumstances. • No personnel shall be allowed to work at site for more than 10 hours per day (8-hour makes one work shift). • Workforce, likely to be exposed to noise levels beyond regulatory stipulated limits, shall be provided with protective gears like hear plugs etc and regularly rotated. • Dust suppression measures like sprinkling of water shall be ensured at all operations areas. • The construction camps shall have health care facilities for adults, pregnant women and children. • All construction personnel shall be subjected to routine vaccinations	As determined by contractor	Constructi on Phase	To be included in contractor's cost	All facilities are to planned and implemented by contractor under approval by CSC	PCU

Project Activities	MITIGATION MEASURES	Location	Time Frame	Cost	Responsible for Implementation	Responsible for Monitoring
	and other preventive/healthcare measures. • The work and campsites shall have suitable facilities for handling any emergency situation like fire, explosion, etc. • All areas intended for storage of hazardous materials shall be quarantined and provided with adequate facilities to combat emergency situations. All required permits for storage of inflammable/hazardous materials are to be obtained. • The personnel in charge of such areas shall be properly trained, licensed and with sufficient experience. • The operational areas shall be access controlled and entry shall be allowed only under authorization. • The construction camps shall have in-house community/common entertainment facilities. Dependence of local entertainment outlets by construction camps should be discouraged/ prohibited to the extent possible.					

Appendix C

Environmental Monitoring Plan

I. ENVIRONMENTAL MONITORING DURING DESIGN AND PRE-CONSTRUCTION STAGE

Monitoring Responsibility: PIU with Support from CSC-ES

Monitoring Frequency: Once prior to start of construction

Road Name /District Name: ……

Road Length: ……..

Report No.: ……

S. NO.	Environmental Attributes	Mitigation Measures	Location	Additional Monitoring Indicator if applicable	Compliance status	Corrective action proposed in case of delay
1.	Finalization of alignment	• Ensure Road-Specific Environmental Checklist and Community Participation Framework Documents are prepared • Ensure the IEE Report has been approved by the MoFALD • In case, requirement of forestland is unavoidable, determine the legal status of forestland and ensure the process of seeking Forest Clearance has been initiated by the PCU • Forest clearance is to be obtained in accordance with the provisions of Ministry of Forest and Soil Conservation and all conditions related with the clearance has to be implemented • Consult with local people to finalize the alignment especially to avoid landslide area, to decide location for culverts and other drainage structures. • In case of hilly/mountainous area, alignment selection should follow provisions of Environment Friendly Road Construction (NRRS 2055) “Hill Road Manual” and should refer to geological survey data to identify landslide prone area, and settlement/loose rock areas.	All through the alignment of each rural road	Approval of IEE Report Approval of Forest Clearance Compliance to Conditions of Forest Clearance if applicable		

		• Avoid excessive cut and fill and road should be aligned to follow natural topography. • In case alignment has trees, which are known to be nesting/breeding places for migratory birds, contact the Department of National Park and Wildlife Conservation for seeking permits and details about non-breeding seasons. In any case, no tree shall be cut in such stretches and construction works are to be strictly scheduled for non-breeding/nesting season and all permit conditions are to be complied. • Avoid or minimize tree felling, acquisition of agricultural land, shifting of shrines/temples, disturbance to community ponds, community resources, burial grounds, etc. to the extent possible through evolving alternate alignment options. • Subproject shall not disturb any cultural heritage designated by the government or by the international agencies, such as UNESCO, and shall avoid any monuments of cultural or historical importance. • Subproject will not pass through any designated wild life sanctuaries, national park, notified eco-sensitive areas or area of international significance such as protective wet land designated under Wetland Convention, and reserve forest area.. • Alignment finalization considering availability of right of way and in consultation with local people. • ROW may be reduced in built up area or constricted areas to minimize land acquisition as per DOLIDAR Guidelines. • Adjust alignment to the extent feasible to avoid tree cutting, shifting of utilities or community structure. • The road shall follow natural topography to avoid excessive cut and fill.				
3.	Land transfer	Confirm if the Land acquisition, resettlement and rehabilitation, poverty alleviation programs for affected people and all other related issues are addressed in Social Impacts and Resettlement & Rehabilitation report.	All through the alignment of each rural road	Confirm the status of land transfer (% of total)		
4.	Biological environment - Tree planting	• All efforts shall be taken to avoid tree cutting wherever possible. • Requisite permission from forest department shall be obtained for cutting of roadside trees.	Throughout the project section of the road	Confirm issuance of Foret Clearance		

		• Provision of Compensatory Afforestation shall be made on 1:25.ratio basis. • Permission shall be taken for diversion of any forest land if involved. Provision shall be made for additional compensatory tree plantation.				
5.	Planning for land clearing	• The road land width shall be clearly demarcated on the ground. • The utility and community structure shifting shall be planned in consultations and concurrence of the community. • Tree felling shall be limited to those, which could not be saved even by design measures. The tree shall be cut with a prior permission of Forest department. • The vegetable cover shall be removed and disposed in consultation with community. • All public utilities shifting shall be planned with prior concurrence of respective agencies/authority and to the adjacent location approved by them	All through the Rural roads excepting in stretches of habitations	Tree cutting permission from Forests Department Concurrence from community for utility, community structure, and vegetation cover removal		
6.	Shifting on Common Properties Resources	• All efforts are made to minimize shifting of common utilities and community structures. • The community structures/utilities, which can not be saved, will be shifted to adjacent area with the concurrence and in consultation with community.	As determined by contractor under approval of PIU and CSC	Assess compliance based on DOLIDAR's Guidelines for Protection of PCR		
7.	Cut and Fill and Embankment Construction design and planning	• The alignment design shall consider options to minimize excessive cuts and fills. • The cut and fill quantities shall be used for embankment to minimize barrow earth requirement. • The design shall be as per relevant DOLIDAR Guideline provisions for cut and fill, slope protection and drainage. • Adequate provision shall be made for cross drainage structure for maintaining natural drainage pattern in the subproject area and preventing soil erosion. • Side drain for channelizing water to nearby natural drain in water stagnation /logging prone area. • The top soil of the cut and fill area shall be used for embankment slope	All through the alignment of each rural road			

		protection • Embankment will be designed above High Flood Level wherever, area is prone to flood.				
8.	Hydrology and Drainage	• Provision of adequate cross drainage structure shall be made to ensure smooth passage of water and maintaining natural drainage pattern of the area. The discharge capacity of the CD structure shall be designed accordingly. • Provision of adequate side drainage shall be made in water stagnant/logging areas. • The construction work near water body shall be planned preferably in dry season so that water quality of the water channel is not affected due to siltation and rain water runoff. • Elaborate drainage system shall be provided to drain the storm water from the roadway and embankment to ensure minimum disturbance to natural drainage of surface and subsurface water of the area. • Provision of additional cross drainage structure shall be made in the areas where nearby land is sloping towards road alignment on both the sides. • Provision of concrete road construction in habitat area with drainage of both side of the road shall be made as per the design provision and with adequate slope to prevent any water logging. • Road level shall be fixed above HFL. Embankment slope stabilization measures shall be planned. Stabilization measures may include vegetative treatment, stone pitching, retaining wall where feasible, and bioengineering.	Near all drainage crossing , kholas and river crossings etc.			
9.	Establishment of Construction Camp, temporary office and storage area	• Construction camp sites shall be located away from any local human settlements (minimum 0.5 km away) and preferably located on lands, which are not productive barren/waste lands presently. • Similarly temporary office and storage areas shall be located away from human settlement areas (minimum 500 m). • The construction camps, office and storage areas shall have provision of adequate water supply, sanitation and all requisite infrastructure facilities. • The construction camps shall be located at a minimum 0.5 km from forest land/areas to deter the construction labour in trespassing. Similarly, temporary office and storage areas shall be located at a minimum 0.5 km	As determined by contractor under approval of PIC/PIU/ (ref- Labelled: WASTE OIL; and hazardous sign be displayed at oil handling areas and sold off to authorized re-	Location of Construction camp with planning of requisite facilities and making provision of such facilities prior to start of construction. Compliance to DOLIDAR's Guidelines for Water Management from Labor		

		from forest land/areas. • The construction camps, office and storage areas shall have provision of septic tank/soak pit of adequate capacity so that it can function properly for the entire duration of its use. • All construction camps shall have provision of rationing facilities particularly for kerosene/LPG so that dependence on firewood for cooking is avoided completely to the extent possible. • The construction camps, office and storage areas shall have provision of health care facilities for adults, pregnant women and children. • Personal Protective Equipments (PPEs) like helmet, boots, earplugs for workers, first aid and fire fighting equipments shall be available at construction sites before start of construction. An emergency plan shall be prepared to fight with any emergency like fire. • Provision shall be made for domestic solid waste disposal in a control manner. The recyclable waste shall be sold off and non-saleable and biodegradable waste shall be disposed through secured land filling. • Provision of paved area for unloading and storage of fuel oil, lubricant oil, away from storm water drainage.	refiners).	Camp Availability of consent to establish from pollution control board for setting up the camp.		
10.	Traffic Movement	• The contractor will prepare appropriate traffic diversion scheme approved by respective PIU. This shall be implemented prior to start of construction to avoid any inconvenience to the present road users. This shall be implemented in other stretches of the road as per the progress of the construction work. • The diversion plan should ensure smooth flow of traffic, minimize accidents to road users during construction works. • Adequate signboards shall be placed much ahead of diversion site to caution the road users. The road signs should be bold and retro reflective in nature for good visibility in day and night both.	As proposed under DPR and determined by contractor and approved by PIC/PIU			
11.	Occupational Health and Safety	• Speed breakers (Rumble strips) as per IRC: 99-1988 shall be provided at sharp corves design and bends where the curve design speed is less than 40 km per hour in plain and rolling terrain. • Speed breakers shall also be provided at regular intervals (150-200 m) through habitation area. • The speed breakers shall be provided and directional sign boards installed	Throughout the project section at the location determined by contractor and approved by CSC			

		at sites where reverse horizontal curves are closely spaced and speed reduction is required. • Provision shall be made for Hazard markers at each end of all box culverts, river crossing causeways and similar CD structures • Shoulder side slopes shall not be steeper than 2h: 1V unless stone pitching of the slopes is provided. • Cement concrete pavement and V-shaped drain shall be constructed to the full width of the available roadway within densely populated habitation and as per feasibility. • Provision shall be made for Directional sight board shall be installed on all sharp curves and bends • At a main road, intersection or crossing "STOP" sign and 'T-intersection' warning sign shall be installed on the village road. • It is proposed to approach railways for adequate safety at unmanned railway crossing where applicable. Adequate clearly visible sign shall be provided on both side of the railway crossing				
12.	Grievance Redress	• Obtaining information from Village level Grievance redress committee, PIU as applicable	Each Sample road once.			

NOTE: Each report must enclose Photograph to the maximum possible action points, even if work is in progress.

II. ENVIRONMENTAL MONITORING DURING CONSTRUCTION STAGE

Monitoring Responsibility: PIU with support from CSC (also serves as self-monitoring report of the Conractor)

Monitoring Frequency: (First Report after third month of start of construction or 25% construction finished. Second report after nineth month of construction or 75% construction).

Project Details:……..

Road Stretch Name : …….

Monitoring Report Quarter No. ……..

S. NO.	Environmental Attributes	Mitigation Measures	Location	Additional Monitoring Indicator if applicable	Compliance status	Corrective action proposed in case of delay
1.	Sourcing and transportation of construction material (aggregates , earth)	**Borrow Earth:** • The borrow earth shall be obtained from identified locations and with prior permission for landowner and clear understanding for its rehabilitation. The DOLIDAR's Guideline for Burrow Pit Management guideline should be used for selection of borrow pits and amount that can be borrowed. • Borrowing earth from agricultural land shall be minimized to the extent possible. Further, no earth shall be borrowed from already low-lying areas. • A 15 cm topsoil will be stripped off from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1:2 (Vertical: Horizontal). • Borrowing of earth will not be done continuously through out the stretch. • Ridges of not less than 8m widths will be left at intervals not exceeding 300m. • Small drains will be cut through the ridges, if necessary, to facilitate	At Borrow sites and quarries (if required) location.	Compliance to IRC guidelines and stated criteria, Permission from land owners, Rehabilitation of borrow areas Availability of valid consent of quarries		

		drainage. • The slope of the edges will be maintained not steeper than 1:4 (vertical: Horizontal). • The depth of borrow pits will not be more than 30 cm after stripping the 15 cm topsoil aside. • The borrow area shall be rehabilitated as per the understanding arrived with the land-owner. The re-habilitation plan may include the following: • Borrow pits shall be backfilled with rejected construction wastes and will be given a vegetative cover. If this is not possible, then excavation sloped will be smoothed and depression will be filled in such a way that it looks more or less like the original ground surface. • Borrow areas might be used for aquaculture in case landowner wants such development. **Aggregate :** • The stone aggregate shall be sourced from existing licensed quarries and the later should follow the DOLIDAR's Guidelines for Quarry Area Management • Copies of consent/ approval / rehabilitation plan for use of existing source will be submitted to PIU. • Topsoil to be stockpiled and protected for use at the rehabilitation stage **Transportation of Construction Material:** • Existing tracks / roads are to be used for hauling of materials to the extent possible. • Prior to construction of roads, topsoil shall be preserved or at least shall be used for any other useful purposes like using in turfing of embankment rather than allowing its loss by construction activities. • The vehicles deployed for material transportation shall be spillage proof to avoid or minimize the spillage of the material during transportation. In any case, the transportation links are to be inspected at least twice daily to clear accidental spillage, if any.				
	Loss of Productive Soil,	• It shall be ensured that the land taken on lease for access road,	Thought out the			

2.	erosion and land use change	construction camp and temporary office of the storage facilities is restored back to its original land use before handing it over back to land owner. • The top soil from the productive land (borrow areas, road widening areas etc.) shall be preserved and reused for plantation purposes. • It shall also be used as top cover of embankment slope for growing vegetation to protect soil erosion. • Cut and fill shall be planned as per "Work Norms for Agricultural and Rural Roads (1998)" and "Technical Specification for Agricultural and Rural Roads (1998)" provisions. • All steep cuts shall be flattened and benched. • Shrubs shall be planted in loose soil area. • Recommended practice for treatment of embankment slopes for erosion control shall be taken into consideration as instructed by the CSC. • Soil erosion shall be visually checked on slopes and embankment areas. In case soil erosion is found, suitable measures shall be taken to control the soil erosion	road section			
3.	Compaction and Contamination of Soil	• To prevent soil compaction in the adjoining productive lands beyond the ROW, the movement of construction vehicles, machinery and equipment shall be restricted to the designated haulage route. • The productive land shall be reclaimed after construction activity. • Septic tank or mobile toilets fitted with anaerobic treatment facility shall be provided at construction camp/temporary office/storage areas. • Domestic solid waste at construction camp shall be segregated into biodegradable and non-biodegradable waste. • The non-biodegradable and recyclable waste shall be sold off. • Fuel and lubricants shall be stored at the predefined storage location. • The storage area shall be paved with gentle slope to a corner and connected with a chamber to collect any spills of the oils. • All efforts shall be made to minimise the waste generation.	Throughout the project section of the roads			

		Unavoidable waste shall be stored at the designated place prior to disposal. • To avoid soil contamination at the wash-down and re-fuelling areas, “oil interceptors” shall be provided. Oil and grease spill and oil soaked materials are to be collected and stored in labelled containers (Labelled: WASTE OIL; and hazardous sign be displayed) and sold off to authorized re-refiners.				
4.	Construction Debris and waste	• All excavated materials from roadway, shoulders, verges, drains, cross drainage will be used for backfilling embankments, filling pits, and landscaping. • Unusable debris material should be suitably disposed off at pre-designated disposal locations, with approval of the concerned authority. • The bituminous wastes shall be disposed in secure manner at designated landfill sites only in an environmentally accepted manner. • For removal of debris, wastes and its disposal guidelines provided by the CSC should be followed. • Unproductive/wastelands shall be selected with the consent of the land owner and local authority. The dumping site should be of adequate capacity. It should be located at least 500 m away from the residential areas. Dumping sites should be away from water bodies to prevent any contamination of these bodies.	Throughout the project section of the road			
5.	Air and Noise Quality	• Vehicles delivering loose and fine materials like sand and aggregates shall be covered. • Dust suppression measures like water sprinkling, shall be applied in all dust prone locations such as unpaved haulage roads, earthworks, stockpiles and asphalt mixing areas. • Mixing plants and asphalt (hot mix) plants shall be located at least 0.5 km away and in downwind direction of the human settlements. • Material storage areas shall also be located downwind of the habitation area. • Hot mix plant shall be fitted with stack of adequate height (30 m) or as may be prescribed by local authority to ensure enough dispersion of exit gases.	Near all drainage crossing , nalas and river crossings etc.			

		• Consent to establish and operate shall be obtained from VDC and comply with all consent conditions. • Diesel Generating (DG) sets shall also be fitted with stack of adequate height. Low sulphur diesel shall be used in DG sets and other construction machineries. Construction vehicles and machineries shall be periodically maintained. • The requisite PPE (helmet, mask, boot, hand gloves, earplugs) shall be provided to the construction workers. • Workers' exposure to noise will be restricted to less than 8 hours a day. Workers duty shall be regulated accordingly. • Contractor shall comply with the DOLIDAR's OH&S Gudelines.				
7.	Ground Water and Surface Water Quality and Availability	• The contractor shall arrange for water required during construction in such a way that the water availability and supply to nearby communities remains unaffected. • Water intensive activities shall not be undertaken during summer period to the extent feasible. • Provision shall be made to link side drains with the nearby ponds for facilitating water harvesting if feasible • Where ponds are not available, the water harvesting pits shall be constructed as per the requirement and rainfall intensity. • Preventive measures like slop stabilisation, etc shall be taken for prevention of siltation in water bodies.	Throughout the project section of the road			
8.	Occupational Health and Safety	• Verification of implementation of provision made at planning stage. • Each worker is provided with requisite PPE • Directional sight board shall be installed on all sharp curves and bends • At a main road, intersection or crossing "STOP" sign and 'T-intersection' warning sign shall be installed on the village road.	Throughout the project section at the location determined by contractor and approved by PIU			
9.	Grievance Redress	Obtaining information from Village level Grievance redress committee, PIU as applicable	Each Sample road once.			

NOTE: Each report must enclose Photograph to the maximum possible action points, even if work is in progress.

III. ENVIRONMENTAL MONITORING DURING OPERATION STAGE

Monitoring Responsibility: PIU with Support from PIC

Monitoring Frequency: (On completion of construction and after one month of first and second year of maintenance period) construction

Project Details :…….

Road Stretch Name: …….

Monitoring Report No.: ……..

SL. NO.	Environmental Attributes	Mitigation Measures	Location	Additional Monitoring Indicator if applicable	Compliance status	Corrective action proposed in case of delay
1.	Air and Noise Quality	• Awareness sign board shall be provided for slow driving near the habitat areas to minimize dust generation due vehicle movement. • Speed limitation and honking restrictions may be enforced near sensitive locations.	Throughout the project section at the location determined by contractor and approved by PIU			
2.	Site restoration	• All construction camp/temporary office/material storage areas are to be restored to its original conditions. • The borrow areas rehabilitation will be ensured as per the agreed plan with the landowner. • Obtained clearance from PIU and CSC before handling over the site to DOLIDAR.	Throughout the road stretch	Survivability report, land owner concurrence of land reversal		
	Hydrology and Drainage	• Regular removal/cleaning of deposited silt shall be done from drainage channels and outlet points before the monsoon season. • Rejuvenation of the drainage system by removing encroachments/ congestions shall be regularly conducted	Throughout the project section at the location determined by contractor and approved by PIU and CSC			
3.	Occupational Health and Safety	• Directional sight board shall be installed on all sharp curves and bends • At a main road, intersection or crossing “STOP” sign and ‘T-intersection’ warning sign shall be installed on the village road.	Throughout the project section at the location determined by contractor and approved by PIU and CSC			

4.	Grievance Redress	Obtaining information from Village level Grievance redress committee, PIU as applicable	Each Sample road once.			

NOTE: Each report must enclose Photograph to the maximum possible action points, even if work is in progress.

Appendix D

NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS) FOR NEPAL

Parameters	Units	Averaging Time	WHO Guideline	Concentration in Ambient Air, maximum	Test Method
TSP (Total Suspended Particulates)	µg/m^3	Annual	120-230	-	HVS 24 hour sampling(one weak sample on 2 road side station
		24-hours*		230	
PM10	µg/m^3	Annual	70	-	Light Volume Sampling
		24-hours*		120	
Sulphur Dioxide	µg/m^3	Annual	125	50	Diffusive sampling based on weekly average
		24-hours**		70	
Nitrogen Dioxide	µg/m^3	Annual	150	40	Diffusive sampling based on weekly average
		24-hours**		80	
Carbon Monoxide	µg/m^3	8 hours**	100000	10,000	To be determined before 2005
		15 minute		100,000	Indicative sampler
Lead	µg/m^3	Annual	0.5-1.0*	0.5	Atomic absorption spectrometry analysis of PM_{10} samples
		24-hours		-	
Benzene	µg/m^3	Annual	-	20****	Diffusive sampling based on weekly average
		24-hours		-	

Notes:

*24 hourly values shall be met 95% of the time in a year. 18 days per calendar year the standard may be exceeded but not on two consecutive days,

**24 hourly standards for NO_2 and SO_2 and 8 hours standard for CO are not to be controlled before MOPE has recommended appropriate test methodologies. This will be done before 2005,

***If representativeness can be proven, yearly averages can be calculated from PM_{10} samples from selected weekdays from each month of the Year,

****To be re-evaluated by 2005.

Source: Nepal Gazette B.S. 2060/4/19 (4 August, 2003)

Appendix E

Ambient Noise Level Limits (in Leq dB (A), Nepal)

Environmental Setting	Typical Range of Ldn, dBA	Average Ldn, dBA
High Traffic Area	64-86	74.36
Old Residential Area	59-73	66.28
New Residential Area	48-69	62.00
Commercial Cum Residential Area	69-75	72.75
Commercial Cum Tourist Area	59-76	69.25

Source: Nepal Health Research Council, 2003

Guideline values for community noise in specific environments

Specific environment	Critical health effect(s)	LAeq [dB]	Time base [hours]	LAmax fast [dB]
Outdoor living area	Serious annoyance, daytime and evening Moderate annoyance, daytime and evening	55 50	16 16	- -
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	
Inside bedrooms	Sleep disturbance, night-time	30	8	45
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60
School class rooms and pre-schools, indoors	Speech intelligibility, disturbance of information extraction, message communication	35	during class	-
Pre-school Bedrooms, indoors	Sleep disturbance	30	sleeping -time	45
School, playground outdoor	Annoyance (external source)	55	during play	-
Hospital, ward rooms, indoors	Sleep disturbance, night-time Sleep disturbance, daytime and evenings	30 30	8 16	40 -
Hospitals, treatment rooms, indoors	Interference with rest and recovery	#1		
Industrial, commercial, shopping and traffic areas, indoors and Outdoors	Hearing impairment	70	24	110
Ceremonies, festivals and entertainment events	Hearing impairment (patrons:<5 times/year)	100	4	110
Public addresses, indoors and outdoors	Hearing impairment	85	1	110
Music through headphones/ Earphones	Hearing impairment (free-field value)	85 #4	1	110

Specific environment	Critical health effect(s)	LAeq [dB]	Time base [hours]	LAmax fast [dB]
Impulse sounds from toys, fireworks and firearms	Hearing impairment (adults) Hearing impairment (children)	- -	- -	140 #2 120 #2
Outdoors in parkland and conservation areas	Disruption of tranquillity	#3		

Source: WHO, 1999

Appendix F

Nepal`s Drinking Water Quality Standards & Water Quality for Irrigation

Group	Parameter	Unit	Maximum Concentration Limits
	Turbidity	NTU	5 (10)**
	pH		6.5-8.5*
	Color	TCU	5 (15)**
	Taste & Odor		Would not be objectionable
	Total Dissolved Solids	mg/l	1000
	Electrical Conductivity	µc/cm	1500
	Iron	mg/l	0.3 (3)**
Physical	Manganese	mg/l	0.2
	Arsenic	mg/l	0.05
	Cadmium	mg/l	0.003
	Chromium	mg/l	0.05
	Cyanide	mg/l	0.07
	Fluoride	mg/l	0.5-1.5*
	Lead	mg/l	0.01
	Ammonia	mg/l	1.5
	Chloride	mg/l	250
	Sulphate	mg/l	250
	Nitrate	mg/l	50
	Copper	mg/l	1
Chemical	Total Hardness	mg/l	500
	Calcium	mg/l	200
	Zinc	mg/l	3
	Mercury	mg/l	0.001
	Aluminum	mg/l	0.2
	Residual Chlorine	mg/l	0.1-0.2*
Micro Germs	E-Coli	PN/100ml	0
	Total Coli form	MPN/100ml	95 % in sample

Notes:

* These standards indicate the maximum and minimum limits.

** Figures in parenthesis are upper range of the standards recommended.

Source: Ministry of Physical Planning and Works (Nepal Gazette (B.S. 2063/03/12)

Nepal Water Quality Guidelines for the Protection of Aquatic Ecosystem

S.N.	Parameter name		Target Water Quality Range	Chronic Effect Value	Acute Effect Value
1.	Aluminium (mg/l)		At pH <6.5: 5	10	100
			At pH >6.5:10	20	150
2.	Ammonia (µg/L)		< 7	< 15	< 100
3.	Arsenic (µg/L)		< 10	< 20	< 130
4.	Atrazine (µg/L)		< 10	< 19	< 100
5.	Cadmium				
	Soft water	(60 mg/l $CaCO_3$)	< 0.15	0.3	3
	Medium	(60 – 119 mg/l)	< 0.25	0.5	6
	Hard water	120 – 180 mg/l	< 0.35	0.7	10
	Very Hard	> 180 mg/l	< 0.40	0.8	13
6.	Chlorine (Residual) µg/L		< 0.2	0.35	5
7.	Chromium (VI) µg/L		7	10	200
8.	Chromium (III) µg/L		< 12	24	340
9.	Copper µg/L				
	Soft water	(60 mg/l $CaCO_3$)	< 0.3	0.53	1.6
	Medium	(60 – 119 mg/l)	< 0.8	1.5	4.6
	Hard water	120 – 180 mg/l	< 1.2	2.4	7.5
	Very Hard	> 180 mg/l	< 1.40	2.8	12
10	Cyanide µg/l		1	4	110
11.	Dissolved Oxygen (% saturation)		80 – 120	> 60	> 40
12.	Endosulphan (µg/L)		< 0.01	0.02	0.2
13.	Fluoride (µg/L)		< 750	1500	2540
14.	Iron		The iron concentration should not be allowed to vary by more than 10% of the background dissolved iron concentration for a particular site or case, at a specific time.		
15.	Lead µg/L				
	Soft water	(60 mg/l $CaCO_3$)	< 0.2	0.5	4
	Medium	(60 – 119 mg/l)	< 0.5	1.0	7
	Hard water	120 – 180 mg/l	< 1.0	2.0	13
	Very Hard	> 180 mg/l	< 1.2	2.4	16
16.	Manganese (µg/L)		< 180	370	1300
17.	Mercury (µg/L)		< 0.04	0.08	1.7

S.N.	Parameter name	Target Water Quality Range	Chronic Effect Value	Acute Effect Value
18.	Nitrogen (inorganic)	Inorganic nitrogen concentrations should not be changed by more than 15 % from that of the water body under local unimpacted conditions at any time of the year; The trophic status of the water body should not increase above its present level, though a decrease in trophic status is permissible (see Effects); The amplitude and frequency of natural cycles in inorganic nitrogen concentrations should not be changed.		
19.	pH			
	All aquatic ecosystems	pH values should not be allowed to vary from the range of the background pH values for a specific site and time of day, by > 0.5 of a pH unit, orby > 5 %, and should be assessed by whichever estimate is more conservative.		
20.	Phenols (µg/l)	<30	60	500
21.	Phosphorus (inorganic) All surface waters	Inorganic phosphorus concentrations should not be changed by > 15% from that of the water body under local, unimpacted conditions at any time of the year;		
		The trophic status of the water body should not increase above its present level, though a decrease in trophic status is permissible (see Effects);		
		The amplitude and frequency of natural cycles in inorganic phosphorus concentrations should not be changed.		
22.	Selenium (µg/l)	< 2	5	30
23.	Temperature (All aquatic ecosystems)	Water temperature should not be allowed to vary from the background average daily water temperature considered to be normal for that specific site and time of day, by > 2 oC, or by > 10 %, whichever estimate is the more conservative.		
24.	Total Dissolved Solids (All inland waters)	• TDS concentrations should not be changed by > 15 % from the normal cycles of the water body under un impacted conditions at any time of the year; • The amplitude and frequency of natural cycles in TDS concentrations should not be changed.		
25.	Total Suspended Solids (All inland waters)	Any increase in TSS concentrations must be limited to < 10 % of the background TSS concentrations at a specific site and time.		
26.	Zinc (µg/l)	< 2	3.6	36

Source: Department of Irrigation, Ground Water Project (Nepal Gazette (Number 10, B.S., 2065-03-02))

Appendix G

GUIDELINES FOR BORROW AND QUARRY AREAS MANAGEMENT

Selection Criteria of Borrow Pit Sites:

1. Pits shall not be located in natural and design drainage areas /water bodies
2. Pit should be avoided in land close to embankment (i.e. should be more than 1.5 m) and irrigated agricultural land.
3. In case of agricultural land depth of pit shall not exceed 45 cm.
4. In case of riverside, pit should be located at more than 15 m from toe of bank
5. Avoid borrow pit in grazing land, land within 0.8 km of settlement, protected areas, forests, unstable site-hills, wetlands, stream and seepage areas, areas supporting rare plant/animal species
6. The clearing of trees and other vegetation shall be discourage

Potential Environmental Impact

- Disruption of natural landscape and vegetation
- Disturbance to natural drainage resulting ponding, water logging and water pollution.

Borrow Pit Operation / Restoration

7. In Terai borrow pit areas shall be restored with adequate slope and cross drain at regular interval to facilitate drainage.
8. Stripped material shall be stored so as to not disrupt natural drainage
9. The ponding of surface water shall be prevented through adequate drainage.
10. Site shall be left in a stable condition without steep slopes.
11. Exposed area shall be planted with suitable vegetation

Design & Estimate of Borrow Pit

- Using site selection and restoration criteria and the consultant shall specify borrow pit location in drawing (plan) and specification.
- In case of additional pits required during construction the contractor shall use the site selection and restoration criteria to select new pits with approval of the Engineer.
- The cost of compliance with above requirement shall be included in Contractor's rate for supplying of materials.
- The cost of mitigation measures and restoration plan will be prepared separately under EMP item.

Parameters and indicators for supervision/Monitoring:

- The Engineer shall ensure that the bowwow pits are operated and closed according to design.
- Implementation of erosion control work - no evidence of water ponding, no increased visual turbidity in surface water
- Natural contour and vegetation are restored.
- Engineer's report on compliance of restoration work.

Appendix H

Guidelines for protecting Physical Cultural Resources

Avoiding Impacts on Cultural and Historical Properties

Cultural heritage are sites, structures, and remains of archaeological, historical, religious, cultural, and aesthetic value. It is important to assess site to understand the significance of a site and to provide due protection according to its aesthetic, historic, scientific, and social value.

- Preventive Measures:

- Specify in the works contracts all required steps, notifications and preservative actions in case new/undiscovered archaeological or other culturally interesting items are encountered during excavation works.

The clauses will specify whom to inform and how to proceed with works after the respective approval.

- Align the road such that acquisition of sites known for cultural heritage is avoided at good distance (to prevent possible damage by road-induced emissions like air pollutants, vibrations and noise).

- Mitigative Measures:

- The contractor is responsible for strictly instructing workers to stay away from and respect local cultural assets, to avoid any direct harm to those items or to hurt the traditional feelings of local people.

- Avoid any actions that bear the risk to destroy the sites or alter theirscientific or aesthetic character.

- In case of accidental damages, the Contractor will be obliged to inform immediately the archaeological department who will then decide further actions.

- In case of accidental damages, the Contractor will be obliged to carry out immediate corrective and repair measures to satisfy the local population and, as applicable, the representative of the archaeological department.

Chance Find Procedures

As subprojects will be located across 16 districts in Nepal, possibility of encountering cultural sites during construction may not be ruled out. If such physical cultural resources defined as “movable or immovable objects, sites, structures or groups of structures having archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance is found during construction, this has to be immediately informed to the local authority as per the law of the land.

All findings belong to the Government of Nepal. The department of Archeology will determine the final destination of any artifact that is salvaged during the construction process. Construction activity will immediately halt and will not resume until authorized by the competent authority (Chief District Officer and Department of Archeology).

The Contractor will train all workers, especially those working on earth movements and excavations, on recognition of artifacts most likely to be found in the area. The Department of Archeology, or any other recognized Historical or Archaeological Institute can be requested to provide this training.

AGRICULTURE ROAD RAPID ENVIRONMENTAL TRANSECT CHECKLIST

PROJECT IDENTIFICATION

Road Name:	Phidim-Nagin-Yangnam-Sidin-Prangbung-Falot Road
Road ID :	1
District Name:	Pachthar District.
VDCs Affected/Benefitted:	Phidim Municipality Phalelung Gaunpalika
Total Length of Road (km):	23.56 km
Salient Road Improvement Features:	Minimum Carriage Width: 3.75m Shoulder Width: 0.75m Road Width: 5.25m Formation Width including side drains: 6.25m

CLIMATIC CONDITIONS

Temperature-	High: 15ºC Low: 32ºC
Rainfall Rainy Season	1861 mm/year From : June To: August

(Source: Hydrological Estimations in Nepal, DHM, 2004)

LOCATION OF THE ROAD AND GENERIC DESCRIPTION OF ENVIRONMENT

No:	Type of Ecosystem	Yes	No	Explanation
1.	Type of Terrain (Plain/ Undulating/ Hilly/ Mountainous etc.) (Explain the topography of the area and how many km of the road are located in the hilly area)	√		Altitude (Rocky terrain of the Lesser Himalaya) Minimum: 2052 masl Maximum: 814 masl.
2.	Forest Area and Other natural habitats (Explain whether the road passes through forest areas or located along the forest areas and distance from shoulder to the forest area)?	√		Salleri Community Forest: 10+360-10+450
3.	Inhabited Area	√		Dominated inhabited area

LHS	RHS
11+700-17+000	
17+800-19+500	
21+400-21+800	
24+000-28+100	
30+800-31+300	
32+100-33+200	

<table>
<tr><th>No:</th><th>Type of Ecosystem</th><th>Yes</th><th>No</th><th>Explanation</th></tr>
<tr><td>4.</td><td>Agricultural Land</td><td>√</td><td></td><td>The proposed road is dominated by agriculture land. Dominant agriculture area are;
<table>
<tr><th>LHS</th><th>RHS</th></tr>
<tr><td colspan="2">10+000-10+950</td></tr>
<tr><td colspan="2">11+200-11+550</td></tr>
<tr><td colspan="2">11+750-12+435</td></tr>
<tr><td colspan="2">12+850-13+175</td></tr>
<tr><td colspan="2">13+400-13+890</td></tr>
<tr><td colspan="2">14+232-14+665</td></tr>
<tr><td colspan="2">15+000-15+400</td></tr>
<tr><td colspan="2">15+640-16+000</td></tr>
<tr><td colspan="2">16+800-19+546</td></tr>
<tr><td colspan="2">17+250-17+700</td></tr>
<tr><td colspan="2">20+150-21+300</td></tr>
<tr><td colspan="2">22+600+23+700</td></tr>
<tr><td colspan="2">29+400-30+00</td></tr>
<tr><td colspan="2">31+550-32+000</td></tr>
</table></td></tr>
<tr><td>5.</td><td>Barren Land</td><td></td><td>√</td><td></td></tr>
</table>

SPECIFIC DESCRIPTION OF THE ROAD ENVIRONMENT

No.	Parameter/ Component	Yes	No	Explanation
1.	Are there any areas with landslide or erosion problems along the road? (If yes, indicate the location whether Right or Left side and the chainage)	√		13+650 10 m long LHS 29+450 20 m long both side 30+300 30 m long both side
2.	Are there any Tanks/streams /rivers etc. along/crossing the road or any lakes/swamps beside the road? (If yes, list them indicating the location Right/ Left or crossing and the chainage)	√		Water spring 13+290 19+150 29+850 31+200 River 27+100 Muwa Khola
3.	Is the area along the project road prone to flooding or any problems of water stagnation and other drainage issues? (If yes, mention chainage, flood level and frequency)		√	None

No.	Parameter/ Component	Yes	No	Explanation
4.	Are there any trees with a dbh of 30 cm or more within the existing ROW (within two fences on either sides) or 3.125 meter from the edge of the carriageway on either side? (If yes attach list of trees indicating the location (Right or Left side)and the chainage)	√		
5.	Along the road and within 100 m of the road shoulder, are there any Faunal habitat areas, Faunal breeding ground, bird migration area, or other similar areas? (If yes, specify details of habitat with chainage)		√	During the field reconnaissance, such areas were not observed along the study corridor.
6.	Along the road and within 100m of the road shoulder is there any evidence of Flora and Fauna species that are classified as endangered / threatened species?		√	During the field reconnaissance, such areas were not observed along the study corridor.
7.	Are there any utility structures[13] within 6.25 road width? (If yes, attach list with chainage)	√		
8.	Are there any religious, cultural or community structures/buildings[14] within 50 m on either side from the centre line of the road alignment? (If yes attach list with chainage)	√		

[13] Water tap, hand pump, electric pole, telephone pole, pipe lines and other similar structures
[14] Religious/cultural/historical monuments, school, health centre, public toilet and other similar structures

PUBLIC CONSULTATION

No.	Consultation Activities	Yes	No	Remarks
1.	Consultation with local community was conducted before finalizing the alignment. (Attach list of people met and dates)	√		Public was consulted during field reconnaissance carried out for preparation of the Environmental Checklist. *Please refer to the annex 1 for the list of public consulted and their views*
2.	Any suggestion received in finalizing the alignment and road related environmental issues	√		Public specified the spoil disposal shouldn't hamper their agriculture land and growing agriculture products. They also want proper cross drainage system and irrigation canal should not be disturbed during June-July season (agriculture period).
3.	If suggestions received, were they incorporated into the design?	√		The environment checklist will be forwarded to design team for further improved road side and cross drainage system consideration.

SITE FINDINGS, ADEQUACY OF PROPOSED ENGINEERING MEASURES IN THE DPR, AND RECOMMENDED MEASURES

S. No.	ENVIRONMENT PROTECTION MEASURES	ADEQUATE (Y/N) or NO NEED	IF NOT ADEQUATE OF NO NEED, DESCRIBE
1	Provision of spoil mass transportation up to nearby tipping sites	N, no details provided	"Contractor will identify the tipping sites and secure necessary permissions before tipping" clause in the EMP
2	Shifting of Electric poles, water supply pipelines etc from roadway to safe sites	Y	
3	Bioengineering works along with small slope protection civil structures	Y	Gabion wall has been proposed in EMP. Total USD 2,979.96 has been proposed for slope stabilization.
4	Rehabilitation and reconstruction of irrigation canals	Y	
5	Inlet and outlet protection works of cross drainages, culverts to mitigate the damage to cultivated land, private property etc	Y	
6	Provision of breast walls in potential and existing landslide	Y	

	area		
7	Proper drainage management to protect the road and roadside slope from adverse effect of accumulated water	Y	
ADDITIONAL ENVIRONMENTAL MITIGATION MEASURES			
	Dust Control	No provision	"Control of dust from materials transport and storage) "Contractor will water supress dust 2x a day in the settlement areas when construction is on-going" clause in the EMP" Estimated cost: #of discrete settlement areasx2 sprinkling/day x 30 days with exposed road surfacexNR1,500/water truck pass. Total USD 11,467.12 has been proposed in EMP.
	Preservation of topsoil	No provision	"Top soil removed from the construction of new road section shall be stored and re-used as base for turfing"

ATTACHMENTS

List of utility structures located within the study area (within exiting ROW or within 2m corridor of either sides of the road from the edge of the carriageway if the ROW is not clear) indicating location and side of the road (Right Hand Side (RHS) or Left Hand Side (LHS)) as required under D.7.

Chainage	Utility structure	LHS	RHS	Remarks
10+500-13+400	Irrigational canal			1000m will be affected
17+100-19+000	Irrigational canal			900 m will be affected
21+400-21+700	Irrigational canal			300 m will be affected
11+400	Tap		√	
15+590	Tap	√		
18+000	Tap	√		
21+500	Tap	√		
21+680	Tap	√		
11+690	School	√		Lies 6 m away from the cl at the edge of the road. It needs protection.
21+300	School	√		It won't be affected but need protection

Chainage	Utility structure	LHS	RHS	Remarks
24+010	School	√		Need Protection
15+480	Health Post		√	It won't be affected but need protection
19+710	Pratikchyala	√		It won't be affected.
29+800	Water intake		√	
31+200	Water intake		√	
12+730	EP	√		
12+390	EP		√	
13+150	EP	√		
13+700	EP		√	
15+500	EP		√	
15+600	EP		√	
15+725	EP		√	
17+550	EP	√		
26+120	EP		√	
26+400	EP		√	
26+485	EP		√	
26+583	EP		√	
27+900	EP		√	

I. List of community structures indicating location and the side of the road (RHS or LHS) as required under D.8.

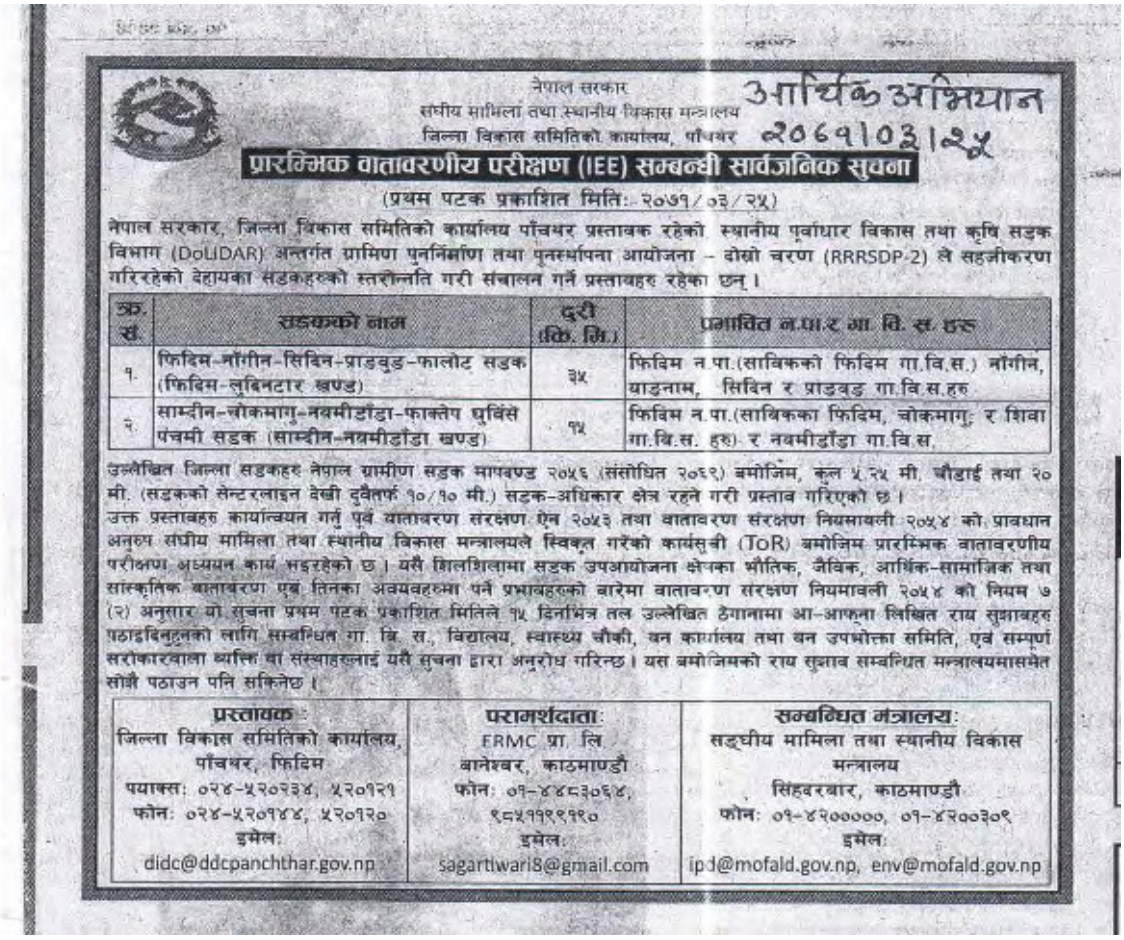
Chainage	Location	Right	Left	Remark
18+700	Gurung Siddhi das baba than	√		Doesn't lie within the formation width but local people want some protection for the betterment of this cultural heritage site.
19+150	Devithan	√		The devithan lies 3 m away from the CI without the building structure with 4 big salla trees. It needs protection.
27+170	Devithan			The Devithan lies beneath the road (6m). The Devithan is without the building structure and need to shift to proper place.

Photographs of the project area showing at least 02 m on either side from centre line of road alignment are attached as Annex 3.

List of trees with 30cm DBH or more located within study area (within FORMATION WIDTH if not cleared) as required in D.4.

Chainage	**LHS**			**RHS**		
	Common Name	**Botanical name**	**No. of trees**	**Common Name**	**Botanical name**	**No. of trees**
10+450-10+650 Salleri Community Forest				Salla	*Pinus roxburghii*	**10**
Total						**10**

Annex 1: Public Notices, Deeds of Inquiry, Recommendation Letter, and List of People Consulted



नेपाल सरकार
संघीय मामिला तथा स्थानीय विकास मन्त्रालय
जिल्ला विकास समितिको कार्यालय, पाँचथर

आर्थिक अभियान
२०६१।०३।२५

प्रारम्भिक वातावरणीय परीक्षण (IEE) सम्बन्धी सार्वजनिक सूचना

(प्रथम पटक प्रकाशित मिति:- २०७१/०३/२५)

नेपाल सरकार, जिल्ला विकास समितिको कार्यालय पाँचथर प्रस्तावक रहेको स्थानीय पूर्वाधार विकास तथा कृषि सडक विभाग (DoLIDAR) अन्तर्गत ग्रामिण पुनर्निर्माण तथा पुनर्स्थापना आयोजना – दोस्रो चरण (RRRSDP-2) ले सहजीकरण गरिरहेको देहायका सडकहरुको स्तरोन्नति गरी संचालन गर्ने प्रस्तावहरु रहेका छन् ।

क्र. सं.	सडकको नाम	दुरी (कि. मि.)	प्रभावित न.पा.र गा. वि. स. हरु
१.	फिदिम-नाँगीन-सिदिन-प्राङवुङ-फालोट सडक (फिदिम-लुबिनटार खण्ड)	३५	फिदिम न.पा.(साविकको फिदिम गा.वि.स.) नाँगीन, याङनाम, सिदिन र प्राङवुङ गा.वि.स.हरु
२.	साम्दीन-चोकमागु-नवमीडाँडा-फाक्तेप धुविंसे पंचमी सडक (साम्दीन-नवमीडाँडा खण्ड)	१५	फिदिम न.पा.(साविकका फिदिम, चोकमागु र शिवा गा.वि.स. हरु) र नवमीडाँडा गा.वि.स.

उल्लेखित जिल्ला सडकहरु नेपाल ग्रामीण सडक मापदण्ड २०५६ (संसोधित २०६२) बमोजिम, कुल ५.२५ मी. चौडाई तथा २० मी. (सडकको सेन्टरलाइन देखी दुवैतर्फ १०/१० मी.) सडक-अधिकार क्षेत्र रहने गरी प्रस्ताव गरिएको छ ।

उक्त प्रस्तावहरु कार्यान्वयन गर्नु पूर्व वातावरण संरक्षण ऐन २०५३ तथा वातावरण संरक्षण नियमावली २०५४ को प्रावधान अनुरुप संघीय मामिला तथा स्थानीय विकास मन्त्रालयले स्विकृत गरेको कार्यसुची (ToR) बमोजिम प्रारम्भिक वातावरणीय परीक्षण अध्ययन कार्य भइरहेको छ । यसै शिलशिलामा सडक उपआयोजना क्षेत्रका भौतिक, जैविक, आर्थिक-सामाजिक तथा सांस्कृतिक वातावरण एवं तिनका अवयवहरुमा पर्ने प्रभावहरुको बारेमा वातावरण संरक्षण नियमावली २०५४ को नियम ७ (२) अनुसार यो सूचना प्रथम पटक प्रकाशित मितिले १५ दिनभित्र तल उल्लेखित ठेगानामा आ-आफ्ना लिखित राय सुझावहरु पठाइदिनुहुनको लागि सम्बन्धित गा. वि. स., विद्यालय, स्वास्थ्य चौकी, वन कार्यालय तथा वन उपभोक्ता समिति, एवं सम्पूर्ण सरोकारवाला व्यक्ति वा संस्थाहरुलाई यसै सूचना द्वारा अनुरोध गरिन्छ । यस बमोजिमको राय सुझाव सम्बन्धित मन्त्रालयमासमेत सोझै पठाउन पनि सकिनेछ ।

प्रस्तावक:	परामर्शदाता:	सम्बन्धित मन्त्रालय:
जिल्ला विकास समितिको कार्यालय, पाँचथर, फिदिम फ्याक्स: ०२४-५२०२३४, ५२०१२१ फोन: ०२४-५२०१४४, ५२०१२० इमेल: didc@ddcpanchthar.gov.np	ERMC प्रा. लि. बानेश्वर, काठमाण्डौ फोन: ०१-४४८३०६४, ९८५११९९१९० इमेल: sagartiwari8@gmail.com	सङ्घीय मामिला तथा स्थानीय विकास मन्त्रालय सिंहदरबार, काठमाण्डौ फोन: ०१-४२०००००, ०१-४२००३०९ इमेल: ipd@mofald.gov.np, env@mofald.gov.np

Annex III: Deed of Inquiry (MUCHULKA)

फिदिम नगरपालिका कार्यालय

Phidim Municipality Office

Ref. No.: 606

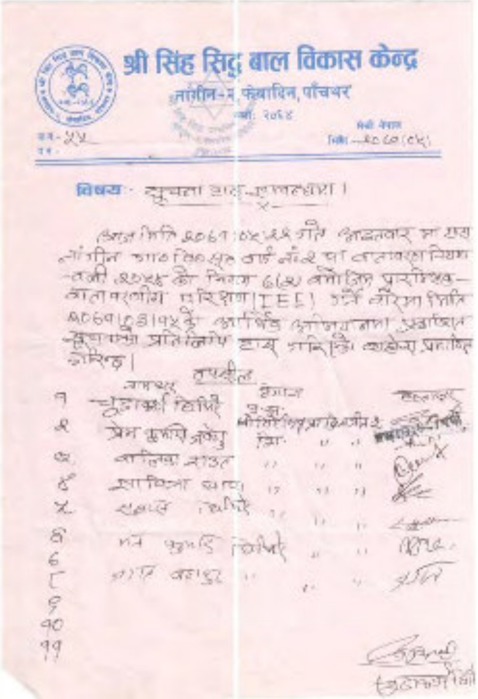
Reg. No: 069/062

Date: 2069/5/22

विषय/Subject: टाँस मुचुल्का सम्बन्धमा ।

श्री जिल्ला विकास समितिको कार्यालय

पाँचथर - फिदिम ।



श्री सिंह सिद्ध बाल विकास केन्द्र

विषय: सूचना टाँस मुचुल्का ।

तपसील

गाउँ विकास समितिको कार्यालय

विषय : सूचना टाँस गरी मुचुल्का पठाइएको बारे ।

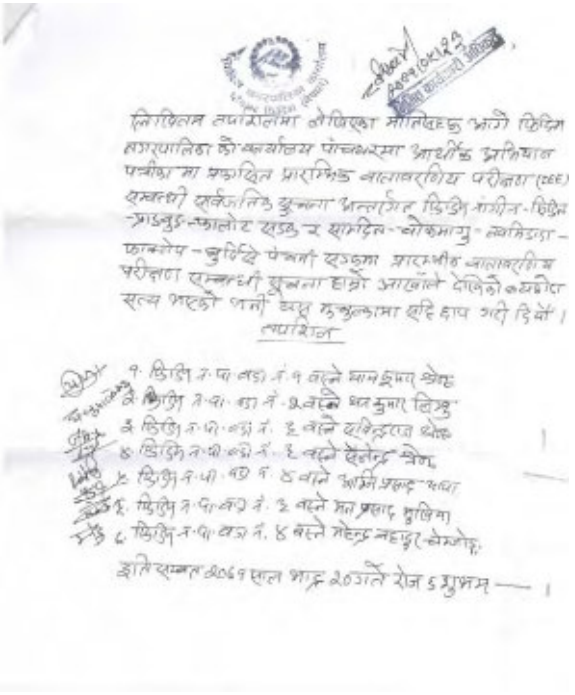
श्री जिल्ला विकास समितिको कार्यालय,

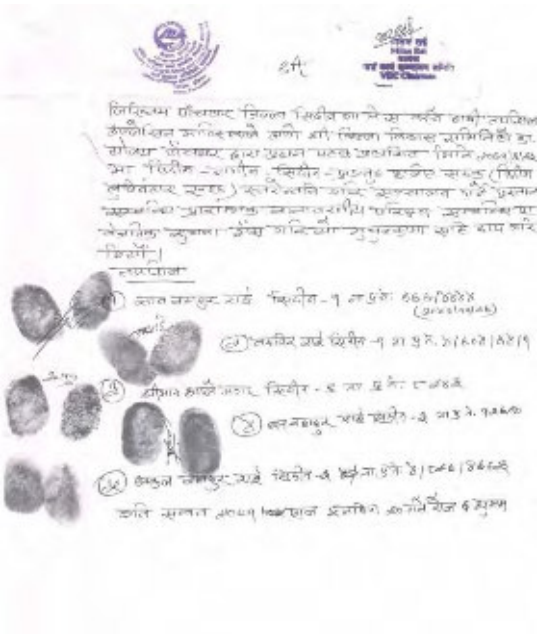
फिदिम, पाँचथर ।

तपसिल

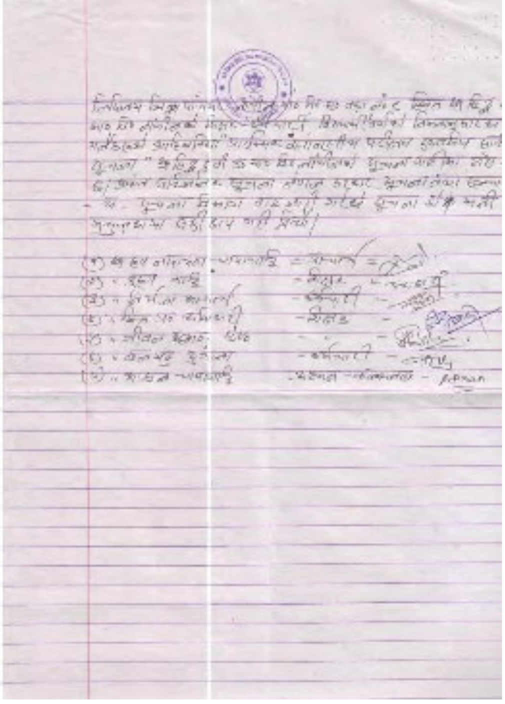
क.सं.	नाम, थर	ठेगाना	सही-छाप	कैफियत
१	[illegible]	[illegible]	[illegible]	
२	[illegible]	[illegible]	[illegible]	
३	[illegible]	[illegible]	[illegible]	
४	[illegible]	[illegible]	[illegible]	
५	[illegible]	[illegible]	[illegible]	

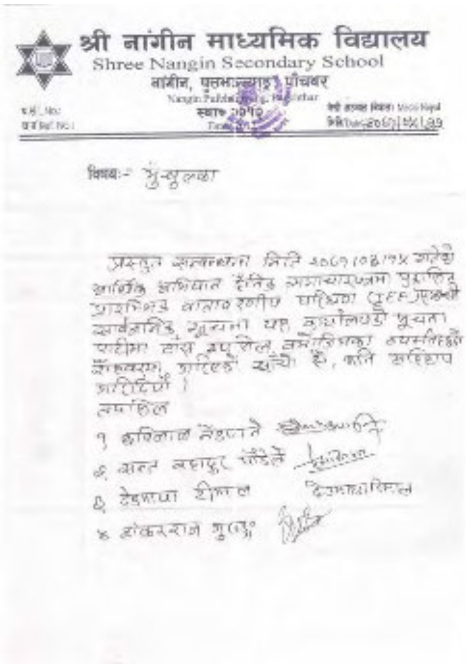
जिल्ला हुलाक कार्यालय





जिल्ला हुलाक कार्यालय





श्री नांगीन माध्यमिक विद्यालय
Shree Nangin Secondary School
नांगीन, पाँचथर

विषय:- मुचुल्का

जिल्ला वन कार्यालय
पाँचथर

आज मिति २०७१ साल [illegible] महिना [illegible] गते [illegible] का दिन हामी तपसिल बमोजिमका मानिसहरुको रोहबरमा आगे जिल्ला विकास समितिको कार्यालय, फिदिम, पाँचथरको प.सं. [illegible] ... मिति [illegible] को पत्रानुसारको सूचना यस [illegible] गा.वि.स.को कार्यालय, [illegible], पाँचथरको सूचना-पाटीमा टाँस गरिसकेको हुँदा यस मुचुल्कामा सही-छाप गरि दियौं ।

तपसिल

क.सं.	नाम, थर	ठेगाना	सही-छाप	कैफियत
१	[illegible]	[illegible]	[illegible]	
२	[illegible]	—	[illegible]	
३	[illegible]	—	[illegible]	
४	[illegible]	—	[illegible]	
५	[illegible]	—	[illegible]	

गाउँ विकास समितिको कार्यालय

पाँचथर

प.सं.: ०७१/०७२

च.नं. ६८

मेची अञ्चल

मिति: २०७१/०५/११

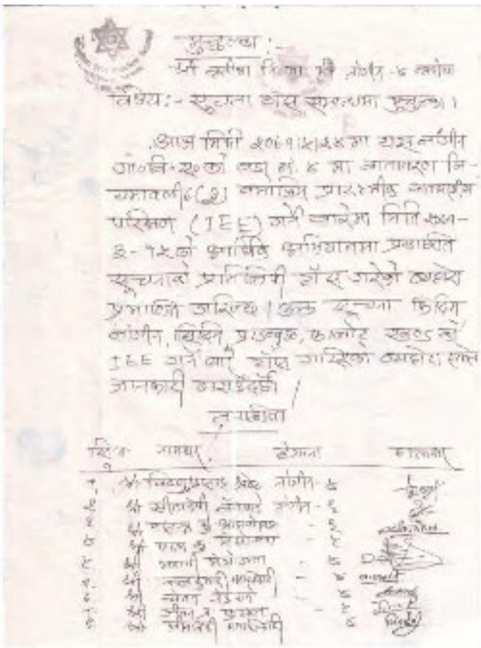
विषय: सूचना टाँस गरी मुचुल्का पठाइएको बारे।

श्री जिल्ला विकास समितिको कार्यालय,

फिदिम, पाँचथर।

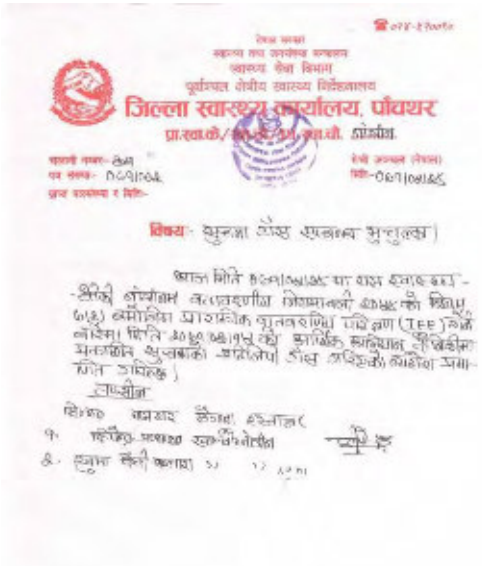
उपर्युक्त सम्बन्धमा तहाँको प.सं. ०७१/०७२, च.नं. २६९ र मिति २०७१/०५/२० को पत्र प्राप्त भई व्यहोरा अवगत भयो।

तत् सम्बन्धमा उक्त पत्रानुसारको सूचना यस कार्यालयको सूचना-पाटीमा टाँस गरी सोको मुचुल्का आवश्यक कार्यार्थको लागि यसै पत्रसाथ संलग्न राखी पठाइएको व्यहोरा अनुरोध छ।



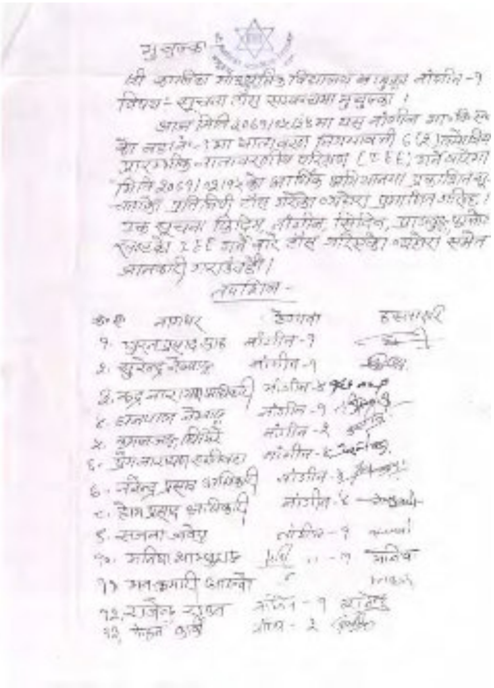
मुचुल्का

विषय:- सूचना टाँस सम्बन्धमा मुचुल्का।



जिल्ला स्वास्थ्य कार्यालय, पाँचथर

विषय:- सूचना टाँस सम्बन्धमा मुचुल्का।



मुचुल्का

श्री सिंह वाहिनी माध्यमिक विद्यालय

सिदिन-३ ओखन्वा, पाँचथर

स्था: २०२०

पत्र संख्या :-
चलानी नम्बर:-

मेची अञ्चल

मिति 2069/04/13

विषय:- सूचना टाँस गरिएको बारे।

प्रस्तुत सम्बन्धमा यस सिदिन फलोट मोड (बर्से) अन्तर्गतको (सिदिन-लुदिन्गरा) सडक बारे सम्बन्धित मिति 2069/03/24 मा आर्थिक अभियान दैनिक पत्रिकामा प्रकाशित सूचना यस विद्यालयको सूचना पाटीमा टाँस गरिएको व्यहोरा जानकारी गराइन्छ।

भवदीय

नाम, हस्ते [illegible]

नाम, हस्ते [illegible]

[illegible]

श्री विहिदिन निम्न माध्यमिक विद्यालय

सिदिन-९, पाँचथर

पत्र संख्या 2069/062
चलानी नम्बर: 6

कोड नं.:-0२00३५000८
मेची अञ्चल (नेपाल)
मिति 2069/04/13

विषय: सूचना टाँस गरिएको सम्बन्धमा।

प्रस्तुत विषयमा सिदिन नाघिने, सिदिन, प्राङ्बुङ फलोट सडकको सिदिन-लुदिन्गरा सडकखण्डको प्रारम्भिक वातावरणीय परीक्षण सम्बन्धित मिति 2069/03/24 को आर्थिक अभियान पत्रिकामा प्रकाशित सूचनाको प्रतिलिपि यस विद्यालयको सूचना पाटीमा टाँस गरिएको व्यहोरा अनुरोध छ।

Jaya Prasad ...
Head Teacher

ANNEX 2: PHOTOGRAPHS

Photograph 1. Start point (10+000 chainage). Note the private jungle at left hand side.

Photograph 2. Salleri Community forest from ch 10+350-10+450. Note the forest stretch only at right hand side.

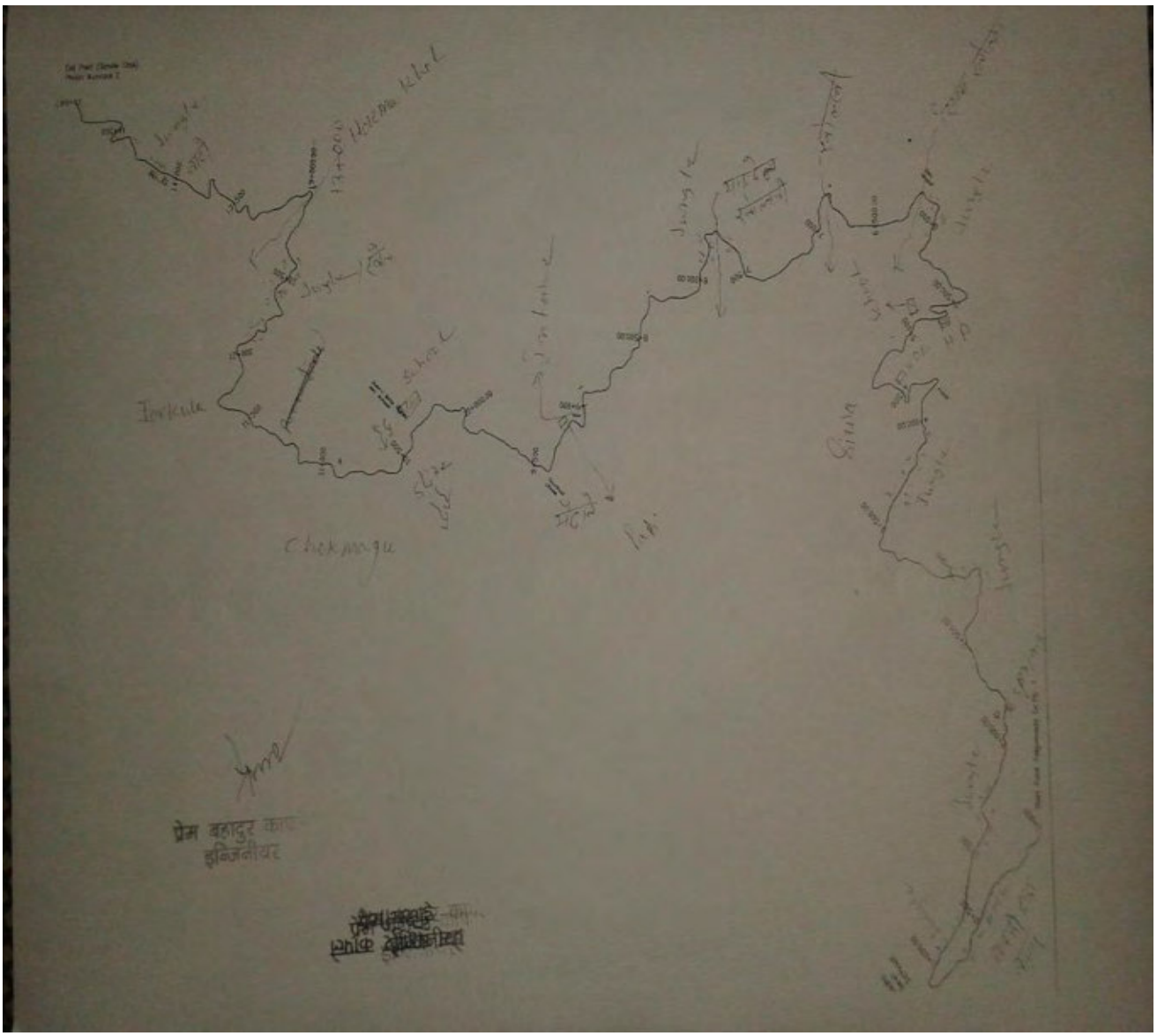
Photograph 3. Existing road condition of the proposed road at ch 10+500.

Photograph 4. Typical settlement along the proposed road. Note the existing road is widened.

		
Photograph 5. School at ch 11+690 that doesnot lie within the formation width. Note the school need protection.		Photograph 5. Irrigation canal at 11+800. Note the irrigation canal passes through the settlement nearby so proper reconstruction is needed.
		
Photograph 6: Typical alignment of the road at ch 12+500.		Photograph 7. Water intake (well) at ch 13+175. It lies 4 m away from the edge of the carriageway and need protection.
		
Photograph 8: Typical alignment of the proposed road.		Photograph 9: typical settlemet pattern at Sidin. Note the road is widened at this settlement

		section.
		
Photograph 10. Critical erosion prone area at ch 29+500. Note the erosion is on both side and need slope protection.		Photograph 11: Muwa Khola is passing through the proposed road at ch 29+755.
		
Photograph 12:Erosion prone area .at ch 30+300 . Note the erosion at both side and need protection.		Photograph 11: Disease in Alichi is major agricultural problem in the area

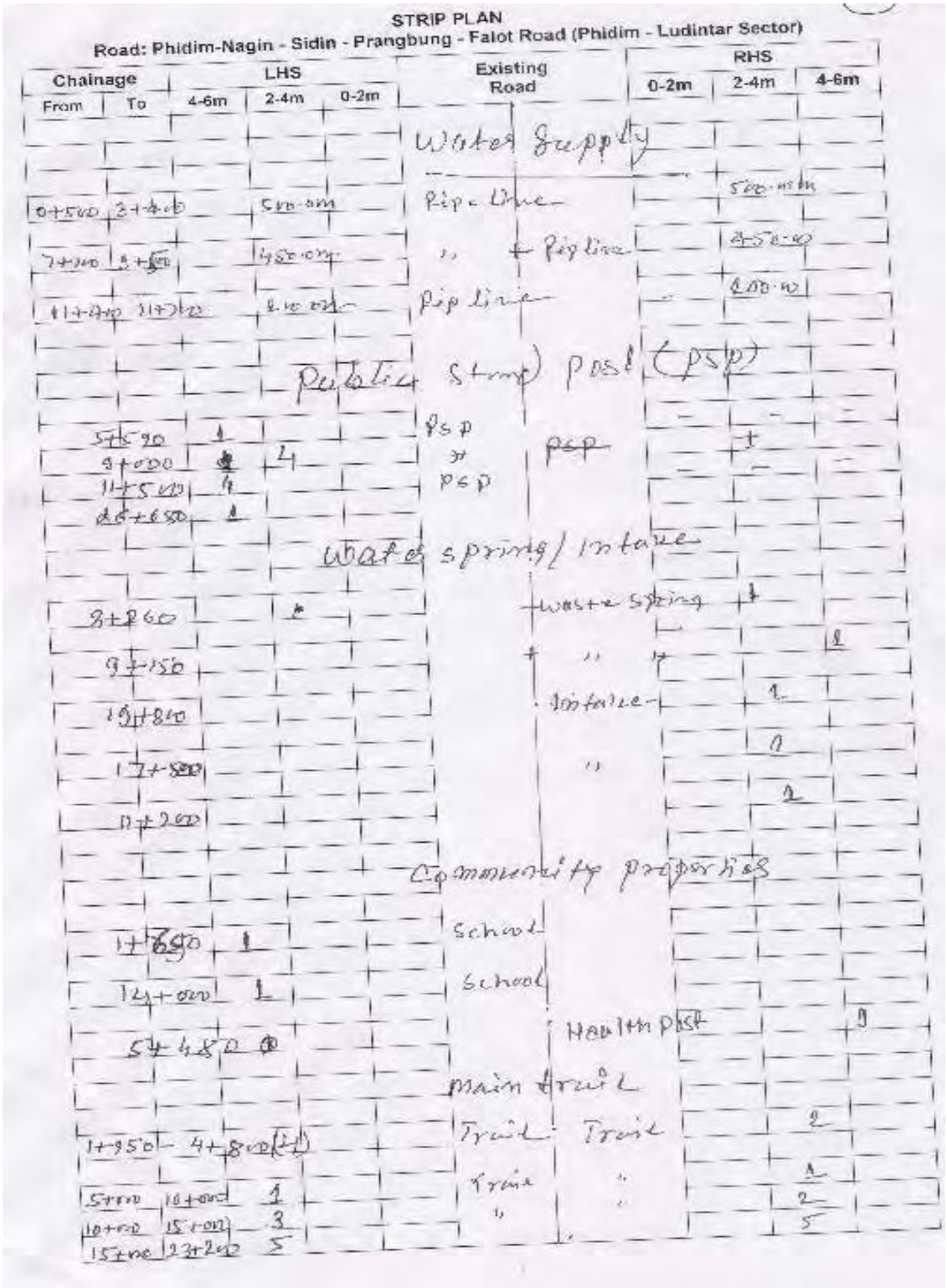
ANNEX 2: TRANSECT STRIP MAP

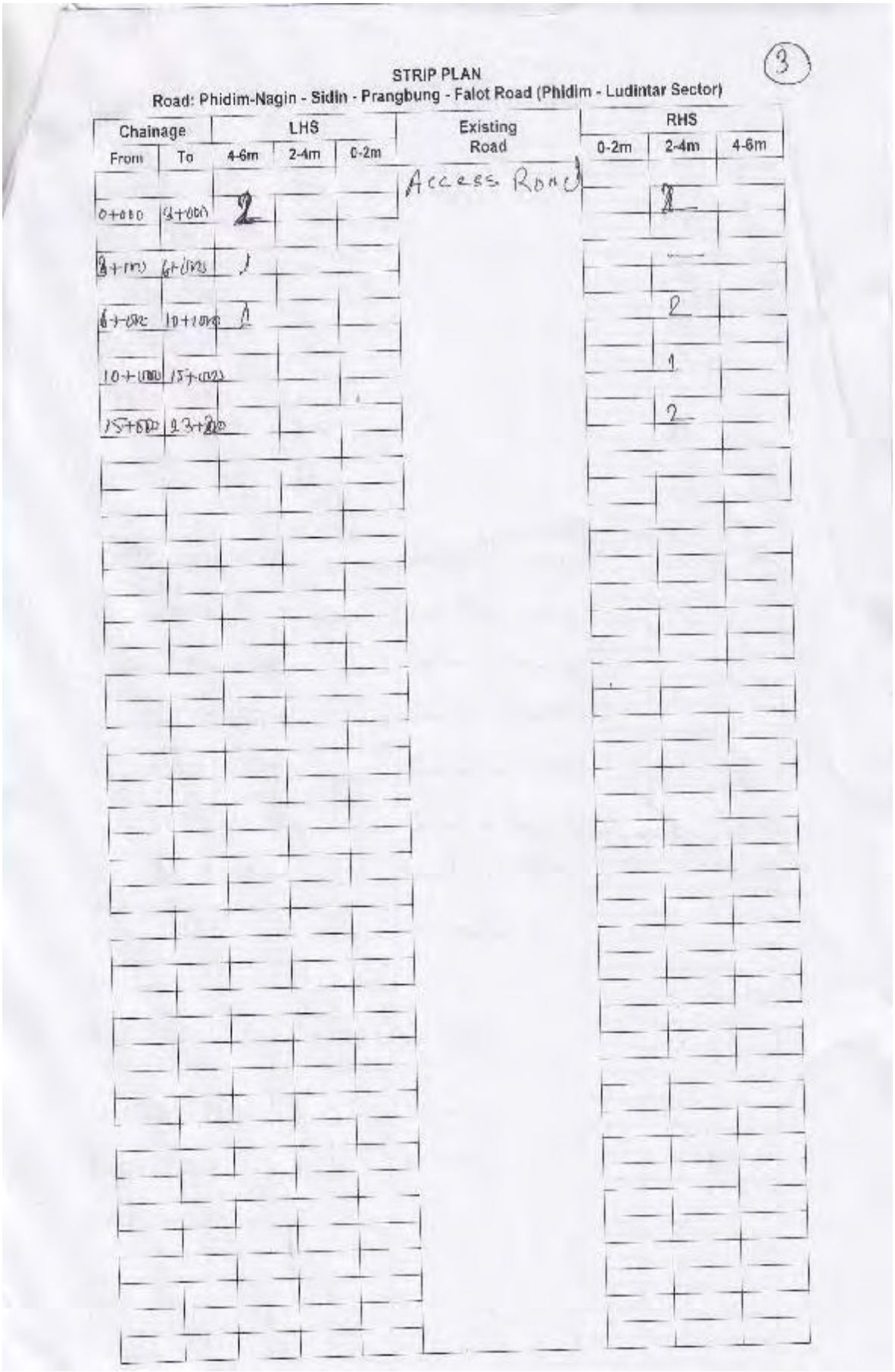


STRIP PLAN

Road: Phidim-Nagin - Sidin - Prangbung - Falot Road (Phidim - Ludintar Sector)

Chainage From	Chainage To	LHS 4-6m	LHS 2-4m	LHS 0-2m	Existing Road	RHS 0-2m	RHS 2-4m	RHS 4-6m
0+000	6+500		50.0		Single	Single	20	
2+140	3+240		5		"	"	20	
5+500	6+300		4		"	"	5	
10+750	11+200		25				8	
12+000	13+800		36				38	
17+400	17+500		10				120	
							8	
17+850	17+950		5					
19+500	20+450		25				20	
							80	
21+200	21+700		65					
							90	
					Existing	Irrigation Canal/	Crossing	
0+050	0+350	75.0m			Canal + crossing		30.0m	
	1+200	50.0m			Canal + crossing			
	3+000	50.0m			Canal + Crossing			
	3+450	250m			Canal + crossing			
	3+800	75.0m			Canal + crossing		20.0m	
	6+800	60.0m			Canal + crossing		30.0m	
	19+755	15.0m			Canal + crossing		30.0m	
	17+150				crossing			
					Electric Pole			
2+730	3+740		2		E Pole		1	
5+550	7+550		2		E. Pole		3	
16+720	17+900		5					


STRIP PLAN
Road: Phidim-Nagin - Sidin - Prangbung - Falot Road (Phidim - Ludintar Sector)
Chainage
From
To
LHS
4-6m
2-4m
0-2m
Existing Road
RHS
0-2m
2-4m
4-6m
Water Supply
Pipe Line
Pipe line
Public Stand Post (PSP)
PSP
Water spring/ Intake
Waste spring
Intake
Community properties
School
School
Health post
Main Trail
Trail
Trail



STRIP PLAN

Road: Phidim-Nagin - Sidin - Prangbung - Falot Road (Phidim - Ludintar Sector)

Chainage		LHS			Existing Road	RHS		
From	To	4-6m	2-4m	0-2m		0-2m	2-4m	4-6m
0+000	4+000	2			Access Road		2	
4+000	6+000	1						
6+000	10+000	1					2	
10+000	13+000						1	
13+000	23+200						2	

ANNEX 3: Environmental issue mention in Detailed Project report

16.1 Alignment

The proposed road has planned to be designed considering the impact on environment. Proposed road alignment follows existing pathway to the maximum extent so that huge land acquisition is not necessary for construction of the project road. Proposed road, when completed, will be an addition to the aesthetics of this rural area.

16.2 Environmental Sensitive Area (National Park, Wild Life Sanctuary, Protected /Reserve Forest, Wet land etc.)

The alignment will be finalized avoiding the environmental sensitive areas such as National Park, Wild Life Sanctuary, Protected /Reserve Forest, Wet land etc. It is also necessary to maintain the minimum distance of 500 m of the project road from environmental sensitive area.

16.3 Construction Camp

Construction camps will be established away from forest area/water body. The minimum facilities such as water supply, sanitation, storm water drainage, solid waste management and first aid box will be provided during the construction period of the project. Necessary provision for rehabilitation or restoration after the completion of construction phase will be done.

16.4 Permit / Clearance required prior to commending of civil work

- No objection Certificate- This will be taken by PIU from SPCB (State Pollution Control Board).
- Forest Department- If the project road passing thorough forest land and acquisition of the same is involved and it will be taken by PIU from Forest Department
- Consent to establish (CFE) and Consent to Operate (CFO) - This is required for Plant Hot Mix Plant, WMM Plant, Batching Plant required for the project and the same will be taken by the Contractor from SPCB.
- Lease from Mines & Geology- This will be taken by the Contractor for new Stone Quarry required for the project.

16.5 Borrow area

The filling soil will have to be procured from borrow pit. Borrow area will be so excavated that the lands can reused as agricultural field. The depth of borrow pit shall not exceed 450 mm (150 mm top soil included). The top soil shall be stripped and stacked and shall be spread back on the land. As far as possible the borrow pits shall not be dug close to the road embankment. The Redevelopment of borrow area

will be done before closure of the same and it will be as per agreement between landowner and the Contractor.

16.6 Erosion Control

Turfing of the embankment slopes and earthen shoulder to prevent erosion of slopes of the embankment, rain cuts and erosion of shoulder is being suggested.

16.7 Drainage

Suitable cross drainage structures have been provided on the basis of hydrological survey of the area. So, there will be no obstruction to the natural drainage of the area. Rainwater may flow longitudinally along the road, scouring weak surfaces and forming a gully along the road. In such cases, drains are provided to guide the rainwater to the nearest cross drainage structure or gully Road side drainage is also duly considered in a manner so that surface water is led to the low points and is drained through the CD structures.

AGRICULTURE ROAD RAPID ENVIRONMENTAL TRANSECT CHECKLIST

PROJECT IDENTIFICATION

Road Name:	Charpane-Chatubari-Matigada-Sadhukuti-Khodamara-Rajgadh
Road ID :	6
District Name:	Jhapa District.
VDCs Affected/Benefitted:	Birtamod (Charpane VDC) Dangibari Chackchaki Rajgadh
Total Length of Road (km):	15.484
Salient Road Improvement Features:	Minimum Carriage Width: 3.75m Shoulder Width: 0.75m Road Width: 5.25m Formation Width including side drains: 6.25m

CLIMATIC CONDITIONS

Temperature-	High: 5.7ºC Low: 40ºC
Rainfall Rainy Season	271.75 mm/year From : June To: August

(Source:)

LOCATION OF THE ROAD AND GENERIC DESCRIPTION OF ENVIRONMENT

No:	Type of Ecosystem	Yes	No	Explanation
1.	Type of Terrain (Plain/ Undulating/ Hilly/ Mountainous etc.) (Explain the topography of the area and how many km of the road are located in the hilly area)	√		Altitude (sub-tropical): Minimum: 122 masl Maximum: 85 masl.
2.	Forest Area and Other natural habitats (Explain whether the road passes through forest areas or located along the forest areas and distance from shoulder to the forest area)?	√		Baradarsi community forest : 7+557-7+990
3.	Inhabited Area	√		From the start to end scattered settlements are observed. For e.g. Major settlements sections are: LHS | RHS 0+000 – 0+700 3+864-4+164 8+662+9+000 15+400+15+487
4.	Agricultural Land	√		Dominant land use is agricultural: LHS | RHS 1+340-2+160

No:	Type of Ecosystem	Yes	No	Explanation
				6+350-6+500 8+700-9+200 13+000-13+200
5.	Barren Land	√		1+200-1+250

SPECIFIC DESCRIPTION OF THE ROAD ENVIRONMENT

No.	Parameter/ Component	Yes	No	Explanation
1.	Are there any areas with landslide or erosion problems along the road? (If yes, indicate the location whether Right or Left side and the chainage)		√	
2.	Are there any Tanks/streams /rivers etc. along/crossing the road or any lakes/swamps beside the road? (If yes, list them indicating the location Right/ Left or crossing and the chainage)	√		Bhaila Dhunga Khola at Ch 5+400
3.	Is the area along the project road prone to flooding or any problems of water stagnation and other drainage issues? (If yes, mention chainage, flood level and frequency)		√	None
4.	Are there any trees with a dbh of 30 cm or more within the existing ROW (within two fences on either sides) or 3.125 meter from the edge of the carriageway on either side? (If yes attach list of trees indicating the location (Right or Left side)and the chainage)		√	At Baradarsi Community Forest
5.	Along the road and within 100 m of the road shoulder, are there any Faunal habitat areas, Faunal breeding ground, bird migration area, or other similar areas? (If yes, specify details of habitat with chainage)		√	During the field survey, such areas were not observed along the study corridor.

No.	Parameter/ Component	Yes	No	Explanation
6.	Along the road and within 100m of the road shoulder is there any evidence of Flora and Fauna species that are classified as endangered / threatened species?		√	During the field survey, such areas were not observed along the study corridor.
7.	Are there any utility structures[15] within 6.25 road width? (If yes, attach list with chainage)	√		
8.	Are there any religious, cultural or community structures/buildings[16] within 50 m on either side from the centre line of the road alignment? (If yes attach list with chainage)	√		

PUBLIC CONSULTATION

No.	Consultation Activities	Yes	No	Remarks
1.	Consultation with local community was conducted before finalizing the alignment. (Attach list of people met and dates)	√		Public was consulted during field reconnaissance carried out for preparation of the Environmental Checklist. *Please refer to the annex 1 for the list of public consulted and their views*
2.	Any suggestion received in finalizing the alignment and road related environmental issues	√		Public specified the need of improved road side and cross drainage system and alignment for bends.
3.	If suggestions received, were they incorporated into the design?	√		The environment checklist will be forwarded to design team for further improved road side and cross drainage system consideration.

[15] Water tap, hand pump, electric pole, telephone pole, pipe lines and other similar structures
[16] Religious/cultural/historical monuments, school, health centre, public toilet and other similar structures

SITE FINDINGS, ADEQUACY OF PROPOSED ENGINEERING MEASURES IN THE DPR, AND RECOMMENDED MEASURES

S. No.	ENVIRONMENT PROTECTION MEASURES	ADEQUATE (Y/N) or NO NEED	IF NOT ADEQUATE OF NO NEED, DESCRIBE
1	Provision of spoil mass transportation up to nearby tipping sites	N, no details provided	"Contractor will identify the tipping sites and secure necessary permissions before tipping" clause in the EMP
2	Shifting of Electric poles, water supply pipelines etc from roadway to safe sites	Y	
3	Bioengineering works along with small slope protection civil structures	N	
4	Rehabilitation and reconstruction of irrigation canals	N	
5	Inlet and outlet protection works of cross drainages, culverts to mitigate the damage to cultivated land, private property etc	Y	
6	Provision of breast walls in potential and existing landslide area	Y	
7	Proper drainage management to protect the road and roadside slope from adverse effect of accumulated water	Y	
ADDITIONAL ENVIRONMENTAL MITIGATION MEASURES			
	Dust Control	No provision	"Control of dust from materials transport and storage) "Contractor will water supress dust 2x a day in the settlement areas when construction is on-going" clause in the EMP" Estimated cost: #of discrete settlement areasx2 sprinkling/day x 30 days with exposed road surfacexNR1,500/water truck pass is USD 7536.37
	Preservation of topsoil	No provision	"Top soil removed from the construction of new road section shall be stored and re-used as base for turfing"

ATTACHMENTS

List of utility structures located within the study area (within exiting ROW or within 2m corridor of either sides of the road from the edge of the carriageway if the ROW is not clear) indicating location and side of the road (Right Hand Side (RHS) or Left Hand Side (LHS)) as required under D.7.

Chainage	Utility structure	LHS	RHS	Remarks
1+800	School ground	√		It doesnot lie within the formation width but need protection.
1+900	School	√		It doesnot lie within the formation width but need protection.
2+800	Pratikchyala		√	It doesnot lie within the formation width.
4+100	School		√	
4+500	Ita bhatta	√		
6+300	Pratikchyalay		√	
7+200	Pratikchyalaya		√	
7+934	Pratikchyalaya		√	
8+000	Pratikchyalaya		√	
9+100	School		√	
14+200	Pratikchyalaya		√	
14+200	School		√	
9+750	Tap		√	
13+800	Water Nahar crossing			
0+00	EP	√		2 electric poles
0+800	EP	√		
0+850	EP	√		
0+900	EP	√		
4+700	EP		√	
4+750	EP		√	
4+950	EP		√	
5+00	EP		√	
5+550	EP	√		
5+750	EP	√		
6+650-6+200	EP		√	4 electric poles

Chainage	Utility structure	LHS	RHS	Remarks
6+700	EP	√		
7+700	EP	√		
8+300	EP	√		
8+300	EP		√	
8+350	EP	√		
8+400	EP	√		
8+600	EP		√	
8+800	EP		√	
8850	EP		√	
8900	EP		√	
9000	EP		√	
9050	EP		√	
9100	EP		√	
9150	EP		√	
9200	EP		√	
9600	EP		√	
9950	EP	√		
10+300	EP	√		
11500	EP		√	
13+000	EP		√	
13+100	EP			
13+150	EP			
13+200	EP			
13+250	EP			
13+300	EP			
13+350	EP			
13+500	EP			
15+800-16+000	EP	√		
15+800-16+000	EP		√	
16+050	EP	√		
16+100	EP		√	
16+150	EP		√	
16+200	EP		√	
Total				

II. List of community structures indicating location and the side of the road (RHS or LHS) as required under D.8.

Chainage	Location	Right	Left
5+800	Temple	√	
10+000	Temple	√	

11+400	Temple	√	
12+200	Temple	√	

Photographs of the project area showing at least 02 m on either side from centre line of road alignment are attached as Annex 3.

List of trees with 30cm DBH or more located within study area (within FORMATION WIDTH if not cleared) as required in D.4.

Chainage	**LHS**			**RHS**		
	Common Name	**Botanical name**	**No. of trees**	**Common Name**	**Botanical name**	**No. of trees**
7+638	Chilaune	*Schima wallichii*	**2**			
7+640	Kadam	*Anthrocephalus chinensis*	**1**	Sal	*Shorea robusta*	**5**
7+700				Simal	*Bombex ceiba*	**2**
			3			**7**

Annex 1: Public Notices, Deeds of Inquiry, Recommendation Letter, and List of People Consulted

नेपाल सरकार
संघीय मामिला तथा स्थानीय विकास मन्त्रालय
जिल्ला विकास समितिको कार्यालय, झापा

प्रारम्भिक वातावरणीय परीक्षण (IEE) सम्बन्धी सार्वजनिक सुचना

(प्रथम पटक प्रकाशित मिति: २०७१ ०७ १२)

जिल्ला विकास समिति, झापा प्रस्तावक रहेको, स्थानीय पूर्वाधार विकास तथा कृषि सडक विभाग (DoLIDAR) अन्तर्गत ग्रामीण पुनर्निर्माण तथा पुनर्स्थापना आयोजना (RRRSDP) को आयोजना समन्वय इकाई (PCU) ले सहजीकरण गरिरहेको देहायका सडकहरुको स्तरोन्नती गरी संचालन गर्ने प्रस्तावहरु रहेका छन् ।

क्र.सं.	सडकको नाम	लम्बाई (कि.मि.)	प्रभावित गा. वि. स. हरू
१	साधुटार-मदनपुर-लक्ष्मिपुर सडक	१६	खुदुनाबारी, र अर्जुनधारा
२	चारपाने -चैतुबारी-मतिगाडा-साधुकुटी घोडामारा-राजगढ सडक	१५.४१	चारपाने, डाँगीबारी, चकचकी, र राजगढ
३	अमलडागी-समयगढ-बाँसबारी-सोलमारी सडक	१२	तोपगाछी
४	खर्साङ्गबारी-जलथल-मंगलबारे-बाउन्नढो का-अधिकारीचोक सडक	६	हल्दीबारी, र जलथल

उल्लेखित जिल्ला सडकहरु नेपाल ग्रामीण सडक मापदण्ड, २०५६ (संसोधित २०६९) बमोजिम कुल ६.७५ मी. चौडाई (नाली बाहेक) तथा २० मी. (सडकको केन्द्रबिन्दु देखि दुबैतर्फ १० १० मी.) सडक अधिकार क्षेत्र रहने गरी प्रस्ताव गरिएको छ । उक्त प्रस्तावहरु कार्यान्वयन गर्नु पूर्व वातावरण संरक्षण ऐन, २०५३ तथा वातावरण संरक्षण नियमावली, २०५४ को प्रावधान अनुरुप संघीय मामिला तथा स्थानीय विकास मन्त्रालयले स्विकृत गरेको कार्यसुची (ToR) बमोजिम प्रारम्भिक वातावरणीय परीक्षण अध्ययन कार्य भइरहेको छ । यसै शिलशिलामा सडक उपआयोजना क्षेत्रका भौतिक, जैविक, आर्थिक-सामाजिक तथा सांस्कृतिक वातावरण एवं तीनका अवयवहरुमा पर्ने प्रभावहरुको बारेमा वातावरण संरक्षण नियमावली, २०५४ को नियम ७ (२) अनुसार यो सुचना प्रथम पटक प्रकाशित मितिले १५ दिनभित्र तल उल्लेखित ठेगानामा आ-आफ्ना लिखित राय सुझावहरु पठाइदिनुहुनको लागि सम्बन्धित गा. वि. स., विद्यालय, स्वास्थ्य चौकी, वन कार्यालय तथा वन उपभोक्ता समिति एवं सम्पूर्ण सरोकारवाला व्यक्ति वा संस्थाहरुलाई यसै सुचनाद्वारा अनुरोध गरिन्छ । यस बमोजिमको राय सुझाव सम्बन्धित मन्त्रालयमा समेत सोझै पठाउन सकिनेछ ।

प्रस्तावक	परामर्शदाता	सम्बन्धित मन्त्रालय
जिल्ला विकास समितिको कार्यालय, झापा फोन: ०२३-४५५१६५, ४५६३२१ फयाक्स: ०२३-४५६३९४ इमेल : info@ddcjhapa.gov.np	ERMC प्रा. लि. बानेश्वर, काठमाण्डौ फोन: ०१-४४८३०६४, ९८५१११९११० इमेल: sagartiwari8@gmail.com	सङ्घीय मामिला तथा स्थानीय विकास मन्त्रालय, सिंह दरबार, काठमाण्डौ फोन: ०१-४२००००० , ०१-४२००३०९ इमेल: ipd@mofald.gov.np, env@mofald.gov.np

Annex I: DEED OF INQUIRY (MUCHULKA)

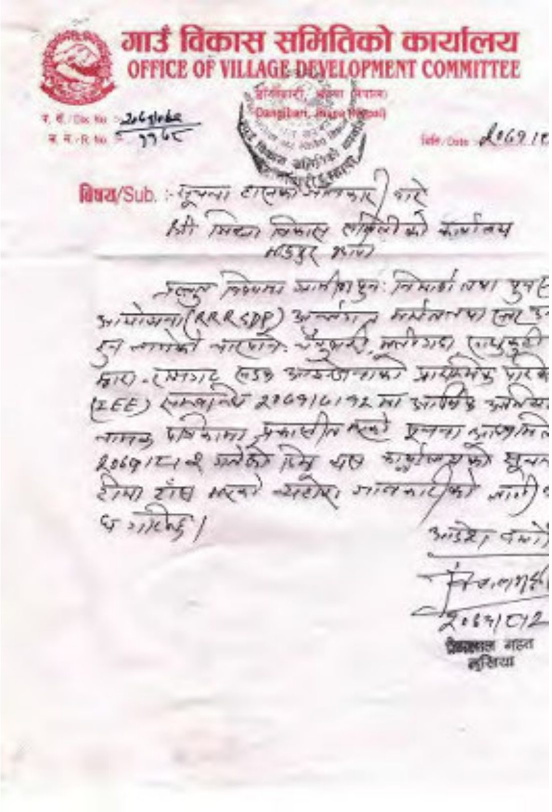
बिर्तामोड नगरपालिका कार्यालय

BIRTAMODE MUNICIPALITY OFFICE

बिर्तामोड, झापा (नेपाल)

BIRTAMODE, JHAPA (NEPAL)

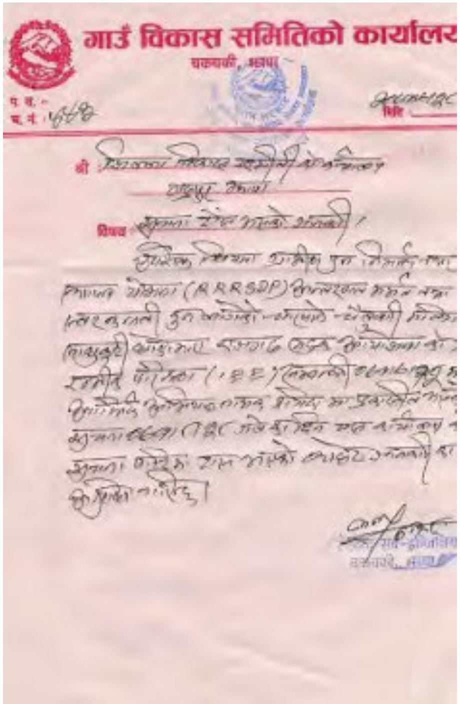
(RRRSDP) ... (IEE)



गाउँ विकास समितिको कार्यालय

OFFICE OF VILLAGE DEVELOPMENT COMMITTEE

विषय/Sub.



गाउँ विकास समितिको कार्यालय

गाउँ विकास समितिको कार्यालय

OFFICE OF VILLAGE DEVELOPMENT COMMITTEE

RAJGADH, JHAPA (NEPAL)

विषय/Sub.

हुलाक कार्यालय, (झापा)

(चन्द्रगढी, झापा)

पत्र संख्या :-

चलानी नं. :- १६

मिति :- २०६९/

विषय :- सूचना टाँस सम्बन्धमा ।

उपरोक्त विषयमा यस झापा जिल्ला अन्तर्गत चारपाने, चैतुवारी, मतिगाडा, साधुकुटी, घोडामारा हुँदै राजगढ जोड्ने सडक निर्माण गर्ने ग्रामीण पुन निर्माण तथा पुनःस्थापना (RRRSDP) अन्तर्गत हुने सडक आयोजनाको प्रारम्भिक वातावरणीय परिक्षण (I.E.E.) सम्बन्धी अभियान दैनिक मिति २०६९- मा प्रकाशित सूचना मिति २०६९-०८-२ गते देखि यस कार्यालयको सूचना पाटीमा टाँस गरिएको जानकारी

नेपाल सरकार

सूचना तथा संचार मन्त्रालय

हुलाक सेवा विभाग

हुलाक कार्यालय, (झापा)

(डाँगीबारी)

पत्र संख्या :-

चलानी नं. :- ५

मिति :- २०६९/६

विषय :- सूचना टाँस सम्बन्धमा

प्रस्तुत विषयमा यस डाँगीबारी

झापा जिल्ला चारपाने, चैतुवारी मतिगाडा

कुटी, घोडामारा राजगढ जोड्ने सडक निर्माण

ग्रामीण पुन निर्माण पुन स्थापना RRRSDP

सडक उक्त सडक आयोजनाको

प्रारम्भिक वातावरणीय परिक्षण (IEE) सम्बन्धी अभियान

दैनिक मिति २०६९/६/१२ मा प्रकाशित सूचना

मिति २०६९/८/२ गते यस कार्यालयको सूचना

पाटीमा टाँस गरिएको जानकारी गरिन्छ ।

डाँगीबारी

नेपाल सरकार

सूचना तथा संचार मन्त्रालय

हुलाक सेवा विभाग

राजगढ इलाका हुलाक कार्यालय, (झापा)

(प्रशासन)

पत्र संख्या :- ०६९/६९

चलानी नं. :- २६

मिति :- २०६९/८/२

विषय :- सूचना टाँसको जानकारी गरिएको ।

श्री जिल्ला विकास समितिको कार्यालय भद्रपुर, झापा

प्रस्तुत विषयमा ग्रामीण पुन निर्माण तथा पुनः स्थापना आयोजना (RRRSDP) अन्तर्गत पर्ने तथा सडक पुन लागेको चारपाने-मतिगाडा-साधुकुटी-घोडामारा-राजगढ सडक आयोजनाको प्रारम्भिक (IEE) सम्बन्धित २०६९ मा आर्थिक अभियान दैनिक पत्रिकामा प्रकाशित भएको सूचना आज मिति २०६९/८/२ गतेका दिन यस कार्यालयको सूचना पाटीमा टाँस भएको व्यहोरा जानकारीको लागि अनुरोध छ ।

२०६९/८/२

कार्यालय प्रमुख

(अधिकृत)

बिर्तामोड नगरपालिका कार्यालय

BIRTAMODE MUNICIPALITY OFFICE

संयुक्त वडा कार्यालय, वडा नं. २, ३, ४

पत्र संख्या :- ०६९/०७०

चलानी नं. :- ४३९

मिति :- २०६९/६/१२

विषय :- सूचना टाँस सम्बन्धमा

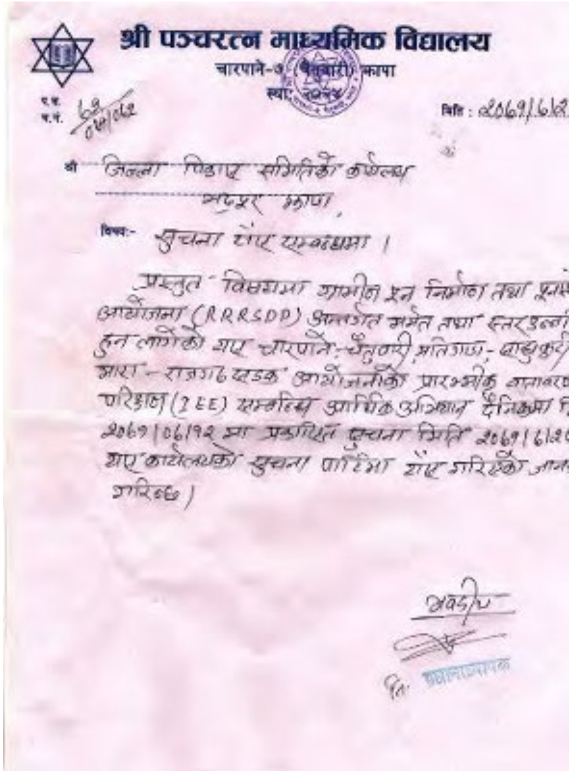
श्री जिल्ला विकास समितिको कार्यालय

भद्रपुर, झापा

प्रस्तुत विषयमा ग्रामीण पुन निर्माण तथा पुनःस्थापना आयोजना (RRRSDP) अन्तर्गत पर्ने स्तरोन्नती हुन लागेको यस -चारपाने - चैतुवारी - मतिगाडा - साधुकुटी - घोडामारा - राजगढ सडक आयोजनाको प्रारम्भिक वातावरणीय परिक्षण (IEE) सम्बन्धी आर्थिक अभियान दैनिक मिति २०६९/०६/१२ मा प्रकाशित सूचना मिति २०६९/०६/२६ गते यस कार्यालयको सूचना पाटीमा टाँस गरिएको जानकारी गरिन्छ ।

भास्कर गुरुङ

वडा सचिव



श्री पञ्चरत्न माध्यमिक विद्यालय

चारपाने-७ (चैनुवारी) झापा

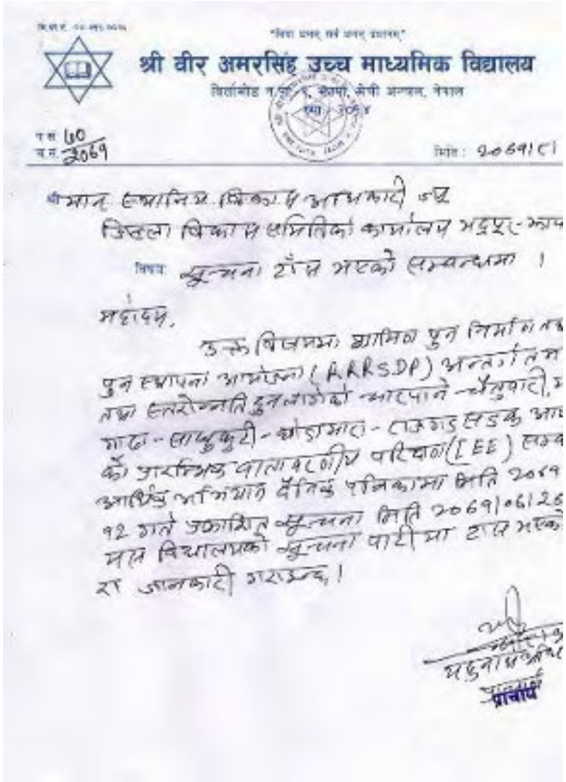
मिति : २०६९/६/१८

श्री जिल्ला विकास समितिको कार्यालय

भद्रपुर झापा

विषय:- सूचना टाँस सम्बन्धमा ।

प्रस्तुत विषयमा ग्रामीण पुन निर्माण तथा पुनर्स्थापना आयोजना (RRRSDP) अन्तर्गत ...



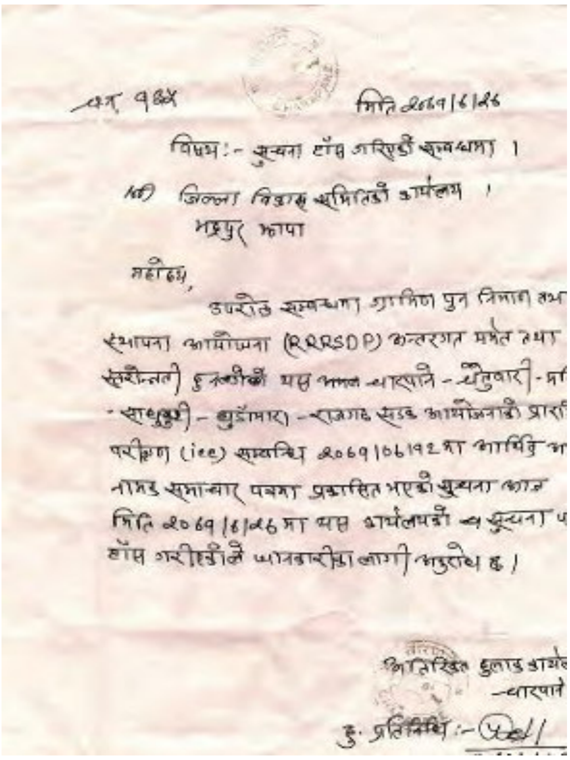
श्री वीर अमरसिंह उच्च माध्यमिक विद्यालय

मिति : २०६९।८।

विषय: सूचना टाँस भएको सम्बन्धमा ।

महोदय,

उक्त विषयमा ग्रामीण पुन निर्माण तथा पुन स्थापना आयोजना (RRRSDP) अन्तर्गत ...



मिति २०६९/६/२६

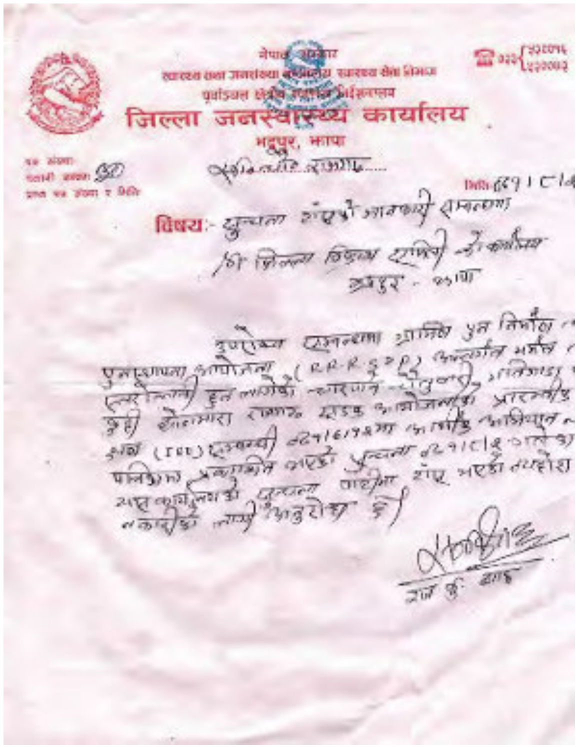
विषय:- सूचना टाँस गरिएको सम्बन्धमा ।

श्री जिल्ला विकास समितिको कार्यालय ।

भद्रपुर झापा

महोदय,

उपरोक्त सम्बन्धमा ग्रामीण पुन निर्माण तथा स्थापना आयोजना (RRRSDP) अन्तरगत ...



नेपाल सरकार

जिल्ला जनस्वास्थ्य कार्यालय

भद्रपुर, झापा

विषय:- सूचना टाँस भएको जानकारी सम्बन्धमा

श्री जिल्ला विकास समितिको कार्यालय

भद्रपुर - झापा

"विद्या धनम् सर्व धनम् प्रधानम्"
"Education is the greatest wealth than others"

श्री घोडामारा निम्न माध्यमिक विद्यालय
Shree Ghodamara Lower Secondary School

चकचकी-७, झापा (नेपाल)
Chakchaki-7, Jhapa (Nepal)
स्था : २०३८/Estd. 2038

प.सं. Lett.No ६४
च.नं. Ref. No. ६९/७०

मिति/Date २०६९/०६/२८

श्री/Shree जिल्ला विकास समितिको कार्यालय
भद्रपुर, झापा

विषय/Subject :- सूचना टाँस सम्बन्धमा ।

प्रस्तुत विषयमा ग्रामीण पुन निर्माण तथा पुन स्थापना आयोजना (RRRSDP) अन्तर्गत मर्मत तथा स्तर उन्नती हुन लागेको यस चारपाने-चौलुङ्गा, मतिगाडा, साधुकुटी, घोडामारा, राजगढ सडक आयोजनाको प्रारम्भिक वातावरणीय परिक्षण (IEE) सम्बन्धि आर्थिक अभियान दैनिकमा मिति २०६९/०६/१२ मा प्रकाशित सूचना मिति २०६९/०६/२८ गते यस कार्यालयको सूचना पाटीमा टाँस गरिएको व्यहोरा जानकारी गराउँदछु ।

भवदीय
प्र० अ०
प्रधानाध्यापक

॥ श्री हरि: ॥

श्री गौरीशङ्कर शिवालय गायत्रीस्वरूपाश्रम गुरुकूल
डाँगीबारी-८, कडमबगैंचा
साधुकुटी, झापा

प.सं.
च.नं.

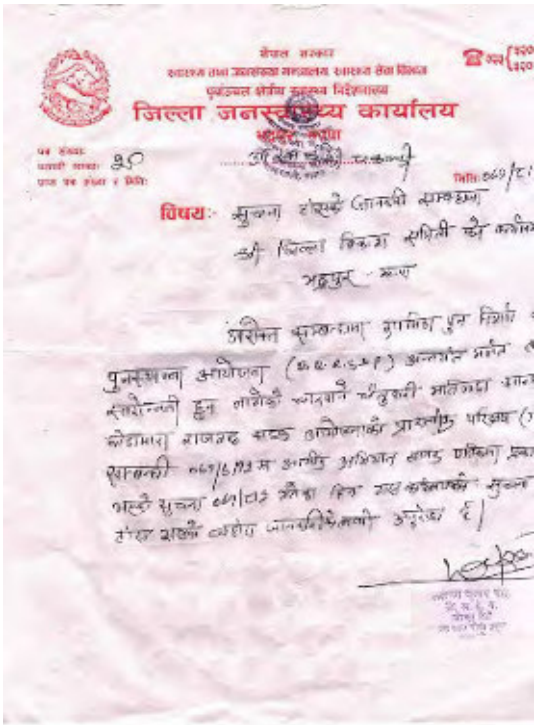
मिति: २०६९/०६/

श्री जिल्ला विकास समितिको कार्यालय
भद्रपुर, झापा

विषय : सुचना टाँस सम्बन्धमा

प्रस्तुत विषयमा ग्रामीण पुन निर्माण तथा पुनःस्थापना आयोजना (RRRSDP) अन्तर्गत मर्मत तथा स्तर उन्नती हुन लागेको यस चारपाने चौलुङ्गा मतिगडा साधुकुटी घोडामारा सडक आयोजनाको प्रारम्भिक वातावरणीय प्रतिवेदन (IEE) सम्बन्धित आर्थिक अभियान दैनिकमा मिति २०६९/०६/१२ मा प्रकाशित सुचना मिति २०६९/६/२६ गते यस कार्यालयको सुचना पाटीमा टाँस गरिएको व्यहोरा अनुरोध गर्दछु ।

सचिव



ANNEX 2: PHOTOGRAPHS

Photograph 1. Start point (0+000 chainage). Note the 3-legged widen junction at starting point.

Photograph 2. Existing alignment and settlement area at Charpane Bazar. Note the widen road at this section of the settlement.

		
Photograph 3. Brick factory at ch 4+500. Note the brick factory doesnot lie within the formation width.		Photograph 4. Baradarsi Community forest from ch 7+557- 7+990. Note many tress existing there are less than 30 dbh.
		
Photograph 6. End point of the proposed road. Note the widening of the road at this settlement area.broadening of road.		

ANNEX 2: TRANSECT STRIP MAP

Chainage : 0+000 to 16+100

STRIP PLAN

Name of the Road:- Charpale- Chaitubari-Motigada-Rajgadh Road

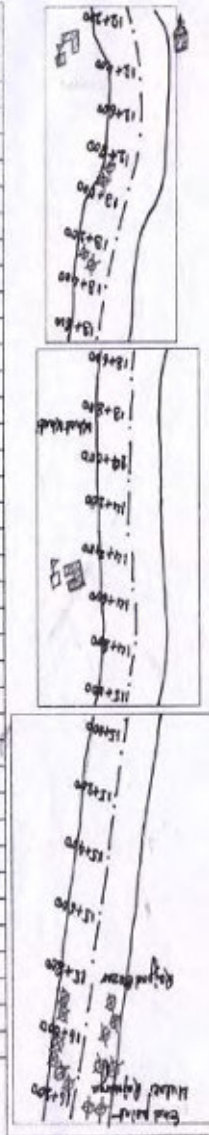
Chainage		LHS				STRIP PLAN	RHS			
From	To	> 6m	4-6m	2-4m	0-2m		> 6m	4-6m	2-4m	0-2m
0+000	0+100		2 electric pole with transmitter							
0+100	0+200									
0+200	0+300		1 electric pole							
0+300	0+400		3 electric pole							
0+400	0+500									
0+500	0+600		1 electric pole							
0+600	0+700							1 electric pole		
0+700	0+800									
0+800	0+900									
0+900	1+000									
1+000	1+100									
1+100	1+200									
1+200	1+300									
1+300	1+400		1 electric pole				Boarding School	1 electric pole		
1+400	1+500								Compound wall 8m B/W	
1+500	1+600			chautara 10m length & school compound wall 20m length single brick wall+ 1 electric pole						
1+600	1+700		1 electric pole							
1+700	1+800									
1+800	1+900		IDF Nepal compound wall 10m length B/W+ 1 electric pole							
1+900	2+000		3 electric pole							
2+000	2+100		1 electric pole							
2+100	2+200		2 electric pole							
2+200	2+300		2 electric pole					2-Bar Peepal		
2+300	2+400									
2+400	2+500		3 electric pole							
2+500	2+600									
2+600	2+700									
2+700	2+800			Chautara 12m length + Bar & Peepal tree						
2+800	2+900									
2+900	3+000									
3+000	3+100		3 electric pole							
3+100	3+200									

3+200	3+300		3 electric pole		
3+300	3+400		2 electric pole with transmitter		
3+400	3+500		1 wooden electric pole+2 concrete electric pole		
3+500	3+600		2 electric pole		
3+600	3+700		2 electric pole		
3+700	3+800		2 electric pole		
3+800	3+900				
3+900	4+000				
4+000	4+100				
4+100	4+200		1 kadam		
4+200	4+300				
4+300	4+400				
4+400	4+500				
4+500	4+600	Brick factory			
4+600	4+700				
4+700	4+800				
4+800	4+900				
4+900	5+000				
5+000	5+100				
5+100	5+200				
5+200	5+300				
5+300	5+400				
5+400	5+500		1 electric pole		
5+500	5+630		2 electric pole		
5+600	5+700		1 electric pole		
5+700	5+820		2 electric pole		
5+800	5+920		2 electric pole		
5+900	6+020		1 electric pole		
6+000	6+100		1 electric pole		
6+100	6+200				
6+200	6+300				
6+300	6+400				
6+400	6+500				
6+500	6+600				
6+600	6+700		2 electric pole		
6+700	6+800		2 electric pole		
6+800	6+900		1 electric pole		
6+900	7+000				
7+000	7+100				
7+100	7+200			1 Bell tree	
7+200	7+300		3 pole with transmitter		
7+300	7+400				
7+400	7+500			5 kadam trees	

	1 Peepal		
	1 electric pole	1 electric pole	
		2 electric pole	
		6 Kadam tree with 30cm dia.	
	2 electric pole		
	1 electric pole		
		Banighari 5m length	

7+500	7+600								
7+600	7+700								
7+700	7+800		1 electric pole						
7+800	7+900								
7+900	8+000		8 Sal trees						
8+000	8+100								
8+100	8+200			1 Bar tree				1 Peepal tree	
8+200	8+300								
8+300	8+400		2 electric pole				Chautara		
8+400	8+500								
8+500	8+600		1 electric pole *						
8+600	8+700		2 electric pole with transmitter				1 electric pole		
8+700	8+800						1 electric pole		
8+800	8+900						2 electric pole		
8+900	9+000						1 electric pole		
9+000	9+100						1 electric pole		
9+100	9+200						2 electric pole		
9+200	9+300								
9+300	9+400								
9+400	9+500								
9+500	9+600								
9+600	9+700						1 electric pole		
9+700	9+800								
9+800	9+900								
9+900	10+000		1 metal pole			Kanchanjunga boarding			
10+000	10+100		1 metal pole						
10+100	10+200					Temple Ghodamara			
10+200	10+300		1 electric pole						
10+300	10+400								
10+400	10+500								
10+500	10+600								
10+600	10+700								
10+700	10+800								
10+800	10+900								
10+900	11+000								
11+000	11+100								
11+100	11+200								
11+200	11+300								
11+300	11+400								
11+400	11+500								
11+500	11+600								
11+600	11+700								
11+700	11+800								
11+800	11+900								
11+900	12+000								
12+000	12+100								

12+100	12+200						
12+100	12+300	School				Temple	
12+100	12+400						
12+400	12+500						
12+500	12+600						
12+500	12+700						
12+700	12+800						
12+800	12+900						
12+900	13+000					2 electric pole	
13+000	13+100						
13+100	13+200						
13+200	13+300						
13+300	13+400					2 electric pole	
13+400	13+500						
13+500	13+600						
13+600	13+700						
13+700	13+800						
13+800	13+900						
13+900	14+000						
14+000	14+100						
14+100	14+200						
14+200	14+300						
14+300	14+400						
14+400	14+500					School	
14+500	14+600						
14+600	14+700						
14+700	14+800						
14+800	14+900						
14+900	15+000						
15+000	15+100						
15+100	15+200						
15+200	15+300						
15+300	15+400						
15+400	15+500						
15+500	15+600						
15+600	15+700						
15+700	15+800						
15+800	15+900						
15+900	16+000		3 electric pole Rajgad			2 electric pole	
16+000	16+100		2 electric pole			3 electric pole	
16+100	16+100		1 electric pole			2 electric pole with transmitter	



LEGENDS			
Electric pole		Temple	
School		Brick Factory	
Compound Wall		Ply Factory	
Chautara		Trees	

ANNEX 3: Environmental issue mention in Detailed Project report

16.1 Alignment

The proposed road has planned to be designed considering the impact on environment. Proposed road alignment follows existing pathway to the maximum extent so that huge land acquisition is not necessary for construction of the project road. Proposed road, when completed, will be an addition to the aesthetics of this rural area.

16.2 Environmental Sensitive Area (National Park, Wild Life Sanctuary, Protected /Reserve Forest, Wet land etc.)

The alignment will be finalized avoiding the environmental sensitive areas such as National Park, Wild Life Sanctuary, Protected /Reserve Forest, Wet land etc. It is also necessary to maintain the minimum distance of 500 m of the project road from environmental sensitive area.

16.3 Construction Camp

Construction camps will be established away from forest area/water body. The minimum facilities such as water supply, sanitation, storm water drainage, solid waste management and first aid box will be provided during the construction period of the project. Necessary provision for rehabilitation or restoration after the completion of construction phase will be done.

16.4 Permit / Clearance required prior to commending of civil work

- No objection Certificate- This will be taken by PIU from SPCB (State Pollution Control Board).
- Forest Department- If the project road passing thorough forest land and acquisition of the same is involved and it will be taken by PIU from Forest Department
- Consent to establish (CFE) and Consent to Operate (CFO) - This is required for Plant Hot Mix Plant, WMM Plant, Batching Plant required for the project and the same will be taken by the Contractor from SPCB.
- Lease from Mines & Geology- This will be taken by the Contractor for new Stone Quarry required for the project.

16.8 Borrow area

The filling soil will have to be procured from borrow pit. Borrow area will be so excavated that the lands can reused as agricultural field. The depth of borrow pit

shall not exceed 450 mm (150 mm top soil included). The top soil shall be stripped and stacked and shall be spread back on the land. As far as possible the borrow pits shall not be dug close to the road embankment. The Redevelopment of borrow area will be done before closure of the same and it will be as per agreement between landowner and the Contractor.

16.9 Erosion Control

Turfing of the embankment slopes and earthen shoulder to prevent erosion of slopes of the embankment, rain cuts and erosion of shoulder is being suggested.

16.10 Drainage

Suitable cross drainage structures have been provided on the basis of hydrological survey of the area. So, there will be no obstruction to the natural drainage of the area. Rainwater may flow longitudinally along the road, scouring weak surfaces and forming a gully along the road. In such cases, drains are provided to guide the rainwater to the nearest cross drainage structure or gully Road side drainage is also duly considered in a manner so that surface water is led to the low points and is drained through the CD structures.

AGRICULTURE ROAD RAPID ENVIRONMENTAL TRANSECT CHECKLIST

PROJECT IDENTIFICATION

Road Name:	Khorsane-Kerabari-Singhadevi Road
Road ID :	9
District Name:	Morang District.
VDCs Affected/Benefitted:	Kerabari(Now Kerabari Municipality) Bhogateni (Now Letang Bhogateni Municipality) Singhadevi (Now Kerabari Municipality)
Total Length of Road (km):	13.607
Salient Road Improvement Features:	Minimum Carriage Width: 3.75m Shoulder Width: 0.75m Road Width: 5.25m Formation Width including side drains: 6.25m

CLIMATIC CONDITIONS

Temperature-	High: C Low: C
Humidity	High: Low:
Rainfall Rainy Season	1058 mm/year From : July To: September

LOCATION OF THE ROAD AND GENERIC DESCRIPTION OF ENVIRONMENT

No:	Type of Ecosystem	Yes	No	Explanation
1.	Type of Terrain (Plain/ Undulating/ Hilly/ Mountainous etc.) (Explain the topography of the area and how many km of the road are located in the hilly area)	√		Altitude (Lesser Himalaya): Minimum: 338 masl Maximum: 1805 masl.
2.	Forest Area and Other natural habitats (Explain whether the road passes through forest areas or located along the forest areas and distance from shoulder to the forest area)?	√		Forest Shree Bisasho Batisjure Community Forest 15+000-20+000 21+000-22+845 Jaifale Community Forest 23+200-23+400 23+450-24+300 24+550-25+500 26+400-26+427

<table>
<tr><th>No:</th><th>Type of Ecosystem</th><th>Yes</th><th>No</th><th>Explanation</th></tr>
<tr><td>3.</td><td>Inhabited Area</td><td>√</td><td></td><td>From the start to end scattered settlements are observed. For e.g. Major settlements sections are:<table><tr><th>LHS</th><th>RHS</th></tr><tr><td colspan="2">15+200-15+250</td></tr><tr><td colspan="2">15+350-15+400</td></tr><tr><td colspan="2">16+950-17+050</td></tr><tr><td colspan="2">17+300-17+320</td></tr><tr><td colspan="2">22+150-22+250</td></tr><tr><td colspan="2">22+800-23+000</td></tr><tr><td colspan="2">23+300-24+450</td></tr><tr><td colspan="2">26+330-26+400</td></tr></table></td></tr>
<tr><td>4.</td><td>Agricultural Land</td><td>√</td><td></td><td>Dominant land use is agricultural:<table><tr><th>LHS</th><th>RHS</th></tr><tr><td colspan="2">15+000-15+200</td></tr><tr><td colspan="2">15+250-15+300</td></tr><tr><td colspan="2">15+300-15+350</td></tr><tr><td colspan="2">15+400-16+200</td></tr><tr><td colspan="2">16+300-16+950</td></tr><tr><td colspan="2">17+050-17+300</td></tr><tr><td colspan="2">23+000-23+100</td></tr></table></td></tr>
<tr><td>5.</td><td>Barren Land</td><td></td><td>√</td><td>None</td></tr>
</table>

SPECIFIC DESCRIPTION OF THE ROAD ENVIRONMENT

No.	Parameter/ Component	Yes	No	Explanation
1.	Are there any areas with landslide or erosion problems along the road? (If yes, indicate the location whether Right or Left side and the chainage)	√		Road cuttings will expose soil with steep side slope: 20+400-20+700 high gradient alignment
2.	Are there any Tanks/streams /rivers etc. along/crossing the road or any lakes/swamps beside the road? (If yes, list them indicating the location Right/ Left or crossing and the chainage)	√		
3.	Is the area along the project road prone to flooding or any problems of water stagnation and other drainage issues? (If yes, mention chainage, flood level and frequency)		√	None

No.	Parameter/ Component	Yes	No	Explanation
4.	Are there any trees with a dbh of 30 cm or more within the existing ROW (within two fences on either sides) or 3.125 meter from the edge of the carriageway on either side? (If yes attach list of trees indicating the location (Right or Left side)and the chainage)	√		
5.	Along the road and within 100 m of the road shoulder, are there any Faunal habitat areas, Faunal breeding ground, bird migration area, or other similar areas? (If yes, specify details of habitat with chainage)		√	During the field reconnaissance, such areas were not observed along the study corridor.
6.	Along the road and within 100m of the road shoulder is there any evidence of Flora and Fauna species that are classified as endangered / threatened species?		√	During the field reconnaissance, such areas were not observed along the study corridor.
7.	Are there any utility structures[17] within 6.25 road width? (If yes, attach list with chainage)	√		
8.	Are there any religious, cultural or community structures/buildings[18] within 50 m on either side from the centre line of the road alignment? (If yes attach list with chainage)	√		

PUBLIC CONSULTATION

No.	Consultation Activities	Yes	No	Remarks
1.	Consultation with local community was conducted before finalizing the alignment. (Attach list of people met and dates)	√		Public was consulted during field reconnaissance carried out for preparation of the Environmental Checklist. *Please refer to the annex 1 for the list of public consulted and their views*

[17] Water tap, hand pump, electric pole, telephone pole, pipe lines and other similar structures
[18] Religious/cultural/historical monuments, school, health centre, public toilet and other similar structures

No.	Consultation Activities	Yes	No	Remarks
2.	Any suggestion received in finalizing the alignment and road related environmental issues	√		Public specified the need of improved road side and cross drainage system and alignment for bends. People want road to be constructed as soon as possible.
3.	If suggestions received, were they incorporated into the design?	√		The environment checklist will be forwarded to design team for further improved road side and cross drainage system consideration.

SITE FINDINGS, ADEQUACY OF PROPOSED ENGINEERING MEASURES IN THE DPR, AND RECOMMENDED MEASURES

S. No.	ENVIRONMENT PROTECTION MEASURES	ADEQUATE (Y/N) or NO NEED	IF NOT ADEQUATE OF NO NEED, DESCRIBE
1	Provision of spoil mass transportation up to nearby tipping sites	N, no details provided	"Contractor will identify the tipping sites and secure necessary permissions before tipping" clause in the EMP
2	Shifting of Electric poles, water supply pipelines etc from roadway to safe sites	Y	
3	Bioengineering works along with small slope protection civil structures	Only unit cost provided, no location	Bio-engineer/Turfing where substantial cut with steep side slopes:
4	Rehabilitation and reconstruction of irrigation canals	Y	
5	Inlet and outlet protection works of cross drainages, culverts to mitigate the damage to cultivated land, private property etc	Y	
6	Provision of breast walls in potential and existing landslide area	Y	
7	Proper drainage management to protect the road and roadside slope from adverse effect of accumulated water	Y	
ADDITIONAL ENVIRONMENTAL MITIGATION MEASURES			
	Dust Control	No provision	"Control of dust from materials transport and storage) Contractor will water supress dust 2x a day in the settlement areas when

			construction is on-going" has been proposed in EMP.
	Preservation of topsoil	No provision	"Top soil removed from the construction of new road section shall be stored and re-used as base for turfing"

ATTACHMENTS

List of utility structures located within the study area (within exiting ROW or within 2m corridor of either sides of the road from the edge of the carriageway if the ROW is not clear) indicating location and side of the road (Right Hand Side (RHS) or Left Hand Side (LHS)) as required under D.7.

Chainage	Utility structure	LHS	RHS	Remarks
15+380	School	√		15 m away from CL
17+360	Samudahik Bhawan		√	10 m away from the CL
15+400	Tap		√	15 m away from CL
22+900	Church	√		
23+400	Pratikchyalaya		√	10 m away from the CL
25+050	Water tank	√		5 m away from the Cl. The structure doesnot lie within the formation width but need protection.
26+050	Tap		√	
26+300	Tap	√		
22+700	Electric pole		√	
22+790	Electric pole		√	
23+820	Electric pole		√	
23+820-24+730	Electric pole		√	7
2800	Electric pole		√	2
24+870	Electric pole		√	
24+915	Electric pole		√	2
25+450	Electric pole	√		5
26+950	Electric pole	√		5
26+800	Electric pole	√		
27+500	Electric pole	√		
27+500	Transformer	√		
Total				

III. List of community structures indicating location and the side of the road (RHS or LHS) as required under D.8.

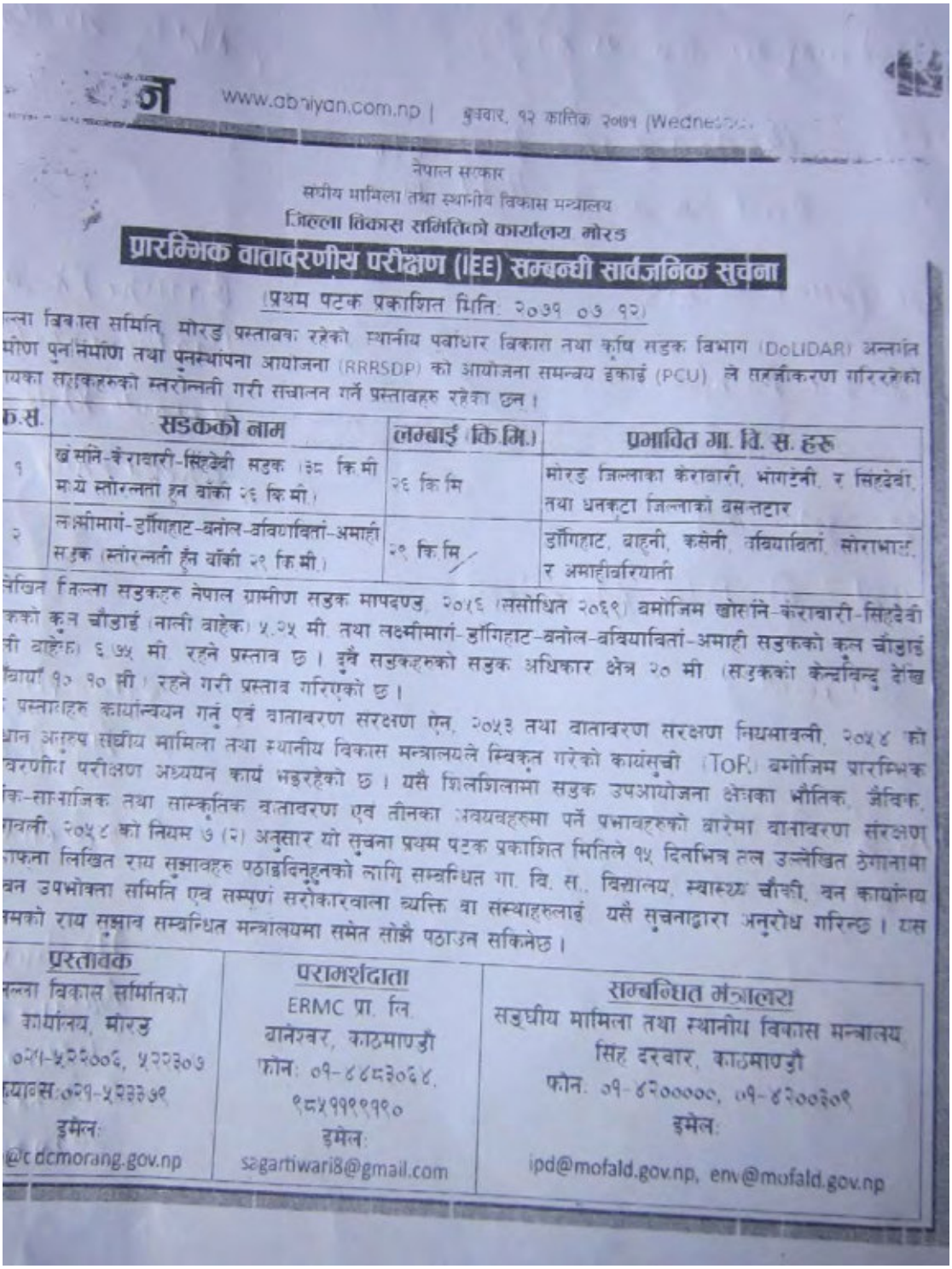
Chainage	Location	Right	Left
22+250	Rai mandir		√

Photographs of the project area showing at least 02 m on either side from centre line of road alignment are attached as Annex 3.

List of trees with 30cm DBH or more located within study area (within FORMATION WIDTH if not cleared) as required in D.4.

Chainage	**LHS**			**RHS**		
	Common Name	**Botanical name**	**No. of trees**	**Common Name**	**Botanical name**	**No. of trees**
15+700-17-700				Chilaune		1
				Dhudi		1
				Baaz		1
				utis		3
				Chilaune		1
22+820 to 23+400	Katus		5	Uttis		8
	Utis		7	Chilaune		5
23+610 to 26+200	Chilaune		5	Chilaune		5
Total						

Annex 1: Public Notices, Deeds of Inquiry, Recommendation Letter, and List of People Consulted



www.abhiyan.com.np | बुधवार, १२ कार्तिक २०७१ (Wednes

नेपाल सरकार
संघीय मामिला तथा स्थानीय विकास मन्त्रालय
जिल्ला विकास समितिको कार्यालय, मोरङ

प्रारम्भिक वातावरणीय परीक्षण (IEE) सम्बन्धी सार्वजनिक सूचना

(प्रथम पटक प्रकाशित मिति: २०७१ ०७ १२)

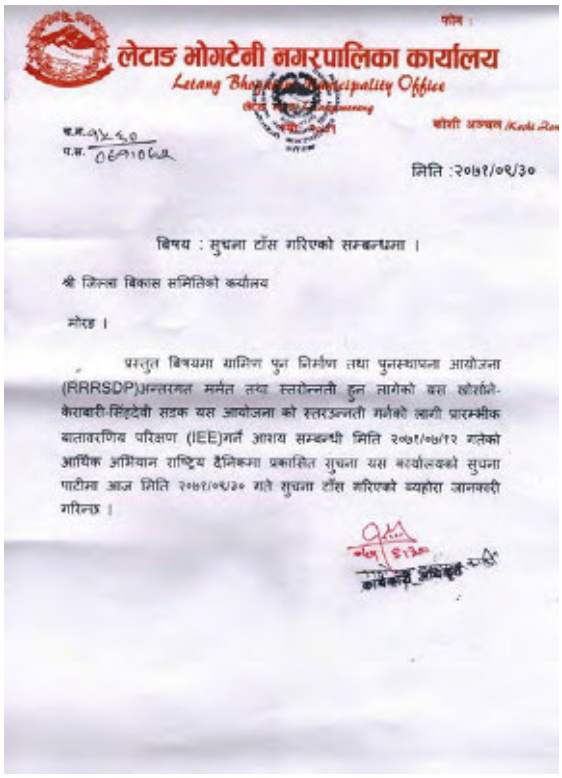
ल्ला विकास समिति, मोरङ प्रस्तावक रहेको स्थानीय पवाधार विकास तथा कृषि सडक विभाग (DoLIDAR) अन्तर्गत मोण पुनर्निर्माण तथा पुनर्स्थापना आयोजना (RRRSDP) को आयोजना समन्वय इकाई (PCU) ले सञ्चालन गरिरहेको ायका सडकहरुको स्तरोन्नती गरी सञ्चालन गर्ने प्रस्तावहरु रहेका छन ।

क.स.	सडकको नाम	लम्बाई (कि.मि.)	प्रभावित गा. वि. स. हरू
१	खोर्सानि-केराबारी-सिंहदेवी सडक (३८ कि.मी मध्ये स्तोरन्नती हुन बाँकी २६ कि.मी.)	२६ कि.मि	मोरङ जिल्लाका केराबारी, भोगटेनी, र सिंहदेवी, तथा धनकुटा जिल्लाको बसन्तपुर
२	लक्ष्मीमार्ग-डुंगिहाट-बनोल-बबियाबिर्ता-अमाही सडक (स्तोरन्नती हुन बाँकी २९ कि.मी.)	२९ कि.मि	डुंगिहाट, बाहनी, कसैनी, बबियाबिर्ता, सोराभार, र अमाहीबरियार्ती

लिखित जिल्ला सडकहरु नेपाल ग्रामीण सडक मापदण्ड, २०६६ (ससोधित २०६९) बमोजिम खोर्सानि-केराबारी-सिंहदेवी कको कुल चौडाई (नाली बाहेक) ५.२५ मी. तथा लक्ष्मीमार्ग-डुंगिहाट-बनोल-बबियाबिर्ता-अमाही सडकको कुल चौडाई ली बाहेक) ६.७५ मी. रहने प्रस्ताव छ । दुवै सडकहरुको सडक अधिकार क्षेत्र २० मी. (सडकको केन्द्रबिन्दु देखि बियाँ १० १० मी.) रहने गरी प्रस्ताव गरिएको छ ।

प्रस्तावहरु कार्यान्वयन गर्नु पर्व वातावरण सरक्षण ऐन, २०५३ तथा वातावरण सरक्षण नियमावली, २०५४ को धान अनुरुप सघीय मामिला तथा स्थानीय विकास मन्त्रालयले स्विकृत गरेको कार्यसूची (ToR) बमोजिम प्रारम्भिक वरणीय परीक्षण अध्ययन कार्य भइरहेको छ । यसै शिलशिलामा सडक उपआयोजना क्षेत्रका भौतिक, जैविक, क-सामाजिक तथा सास्कृतिक वातावरण एवं तीनका अवयवहरुमा पर्ने प्रभावहरुको बारेमा वातावरण संरक्षण ावली, २०५४ को नियम ७ (२) अनुसार यो सूचना प्रथम पटक प्रकाशित मितिले १५ दिनभित्र तल उल्लेखित ठेगानामा ाफना लिखित राय सुझावहरु पठाइदिनुहुनको लागि सम्बन्धित गा. वि. स., विद्यालय, स्वास्थ्य चौकी, वन कार्यालय वन उपभोक्ता समिति एवं सम्पर्क सरोकारवाला व्यक्ति वा संस्थाहरुलाई यसै सूचनाद्वारा अनुरोध गरिन्छ । यस मको राय सुझाव सम्बन्धित मन्त्रालयमा समेत सोझै पठाउन सकिनेछ ।

प्रस्तावक	परामर्शदाता	सम्बन्धित मन्त्रालय
ल्ला विकास समितिको कार्यालय, मोरङ ०२१-५२२००६, ५२२३०७ क्सः०२१-५२३३७९ इमेल: @ddcmorang.gov.np	ERMC प्रा. लि. बानेश्वर, काठमाण्डौ फोन: ०१-४४८३०६४, ९८५१११११९० इमेल: sagartiwari8@gmail.com	सङ्घीय मामिला तथा स्थानीय विकास मन्त्रालय सिंह दरबार, काठमाण्डौ फोन: ०१-४२००००० ०१-४२००३०९ इमेल: ipd@mofald.gov.np, env@mofald.gov.np



लेटाङ भोगटेनी नगरपालिका कार्यालय
Letang Bhogateni Municipality Office

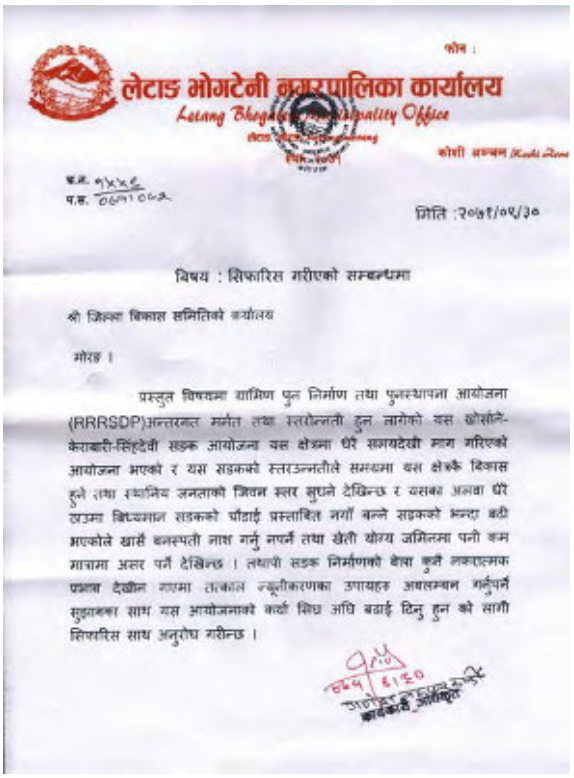
मिति :२०७१/०९/३०

विषय : सुचना टाँस गरिएको सम्बन्धमा ।

श्री जिल्ला विकास समितिको कार्यालय

मोरङ ।

प्रस्तुत विषयमा ग्रामिण पुन निर्माण तथा पुनस्थापना आयोजना (RRRSDP)अन्तरगत मर्मत तथा स्तरोन्नती हुन लागेको बस खोसीले-केराबारी-सिंहदेवी सडक बस आयोजना को स्तरउन्नती गर्नको लागी प्रारम्भीक बातावरणिय परिक्षण (IEE)गर्ने आशय सम्बन्धी मिति २०७१/०७/१२ गतेको आर्थिक अभियान राष्ट्रिय दैनिकमा प्रकाशित सुचना यस कार्यालयको सुचना पाटीमा आज मिति २०७१/०९/३० गते सुचना टाँस गरिएको व्यहोरा जानकारी गरिन्छ ।



लेटाङ भोगटेनी नगरपालिका कार्यालय
Letang Bhogateni Municipality Office

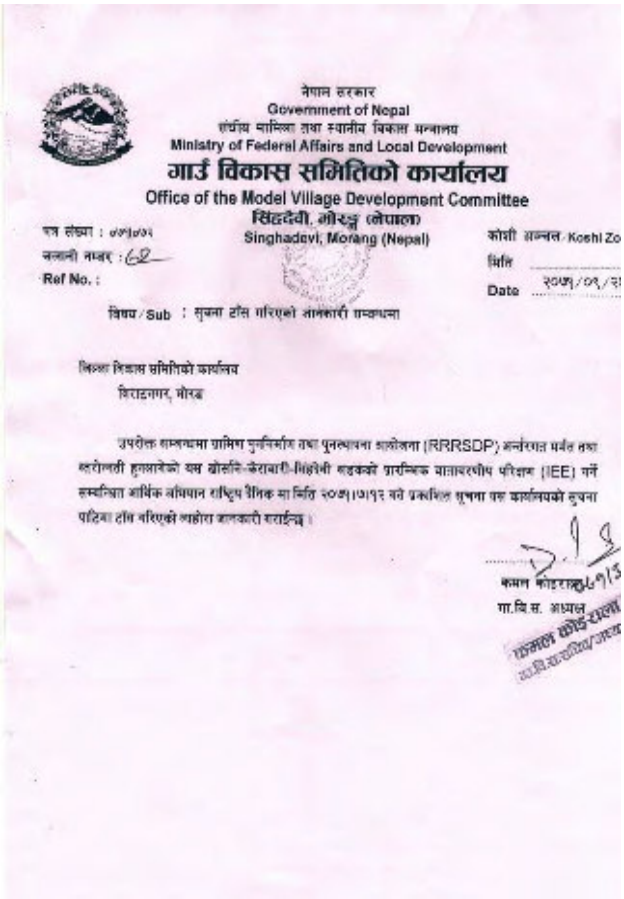
मिति :२०७१/०९/३०

विषय : सिफारिस गरीएको सम्बन्धमा

श्री जिल्ला विकास समितिको कार्यालय

मोरङ ।

प्रस्तुत विषयमा ग्रामिण पुन निर्माण तथा पुनस्थापना आयोजना (RRRSDP)अन्तरगत मर्मत तथा स्तरोन्नती हुन लागेको बस खोसीले-केराबारी-सिंहदेवी सडक आयोजना बस क्षेत्रमा पर्ने सगरदेवी माग गरिएको आयोजना भएको र बस सडकको स्तरउन्नतीले समग्रमा बस क्षेत्रको विकास हुने तथा स्थानिय जनताको जिवन स्तर सुधने देखिन्छ र बसबक अलवा पर्ने छउमा विध्यमान सडकको पौडाई प्रस्तावित नगरी बन्ने सडकको भन्दा बढी भएकोले खासै बनस्पती नाश गर्नु नपर्ने तथा खेती योग्य जमिनमा पनी कम मात्रामा असर पर्ने देखिन्छ । तथापी सडक निर्माणको क्रममा कुनै नकारात्मक प्रभाव देखीन गएमा तत्काल न्यूनीकरणका उपायहरु अवलम्बन गर्नुपर्ने सुझावका साथ यस आयोजनाको कार्य विध अघि बढाई दिनु हुन को लागी सिफारिस साथ अनुरोध गरीन्छ ।



नेपाल सरकार
Government of Nepal
संघीय मामिला तथा स्थानीय विकास मन्त्रालय
Ministry of Federal Affairs and Local Development
गाउँ विकास समितिको कार्यालय
Office of the Model Village Development Committee
सिंहदेवी, मोरङ्ग (नेपाल)
Singhadevi, Morang (Nepal)

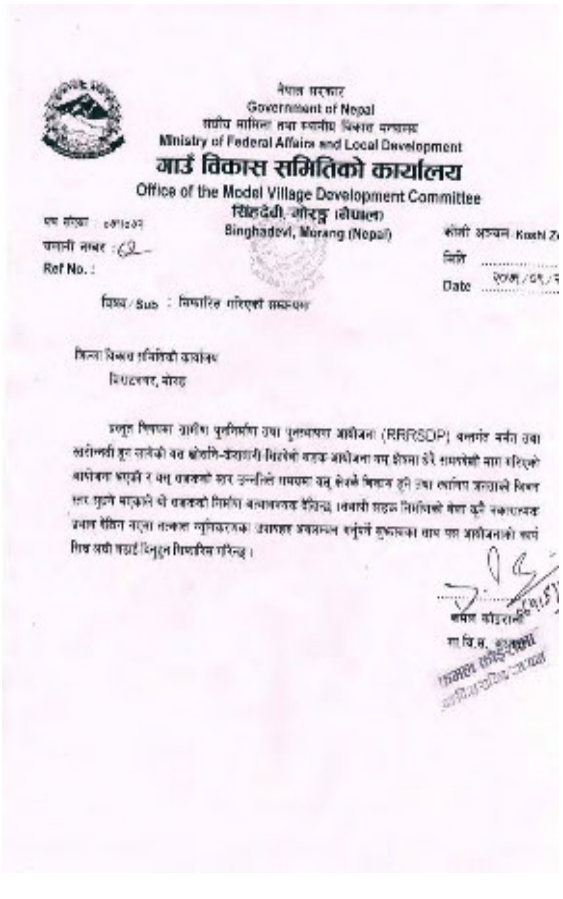
पत्र संख्या : ०७१/७२
चलानी नम्बर : 62
Ref No. :
कोशी अञ्चल /Koshi Zo
मिति
Date २०७१/०९/३

विषय / Sub : सुचना टाँस गरिएको जानकारी सम्बन्धमा

जिल्ला विकास समितिको कार्यालय
विराटनगर, मोरङ

उपरोक्त सम्बन्धमा ग्रामिण पुनर्निर्माण तथा पुनस्थापना आयोजना (RRRSDP) अन्तरगत मर्मत तथा स्तरोन्नती हुनलागेको बस खोसिले-केराबारी-सिंहदेवी सडकको प्रारम्भिक बातावरणीय परिक्षण (IEE) गर्ने सम्बन्धित आर्थिक अभियान राष्ट्रिय दैनिक मा मिति २०७१।७।१२ गते प्रकाशित सूचना यस कार्यालयको सुचना पाटिमा टाँस गरिएको व्यहोरा जानकारी गराईन्छ ।

कमल कोइराला
गा.वि.स. अध्यक्ष



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मिति
Date २०७१/०९/३

विषय / Sub : सिफारिस गरिएको सम्बन्धमा

जिल्ला विकास समितिको कार्यालय
विराटनगर, मोरङ

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कमल कोइराला
गा.वि.स. अध्यक्ष

नेपाल सरकार
Government of Nepal
संघीय मामिला तथा स्थानीय विकास मन्त्रालय
Ministry of Federal Affairs and Local Development

गाउँ विकास समितिको कार्यालय

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पत्र संख्या : ०७१/०७२
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कोशी अञ्चल Koshi Zone
मिति / Date २०७१/०९/...

विषय / Sub : सिफारिस गरिएको सम्बन्धमा

जिल्ला विकास समितिको कार्यालय
विराटनगर, मोरङ

प्रस्तुत विषयमा ग्रामीण पुनर्निर्माण तथा पुनर्स्थापना आयोजना (RRRSDP) अन्तर्गत मर्मत तथा स्तरोन्नती हुन लागेको यस रंगेली-केराबारी-सिंहदेवी सडक आयोजना यस् क्षेत्रमा धेरै समयदेखी माग गरिएको आयोजना भएको र यस् सडकको स्तर उन्नतिले समग्रमा यस् क्षेत्रकै विकास हुने तथा स्थानिय जनताको जिवन स्तर सुध्रने भएकाले यो सडकको निर्माण अत्यावश्यक देखिन्छ। तथापी सडक निर्माणको बेला कुनै नकारात्मक प्रभाव देखिन गएमा तत्काल न्यूनिकरणका उपायहरु अवलम्बन गर्नुपर्ने सुझावका साथ यस आयोजनाको कार्य छिट्टै अघी बढाई दिनुहुन सिफारिस गरिन्छ।

कमल कोइराला
गा.वि.स. अध्यक्ष

जिल्ला वन कार्यालय

विषय : ...

छतिवन सामुदायिक वन उपभोक्ता समूह

प.स. ०६०/०६१
च.नं. ३२

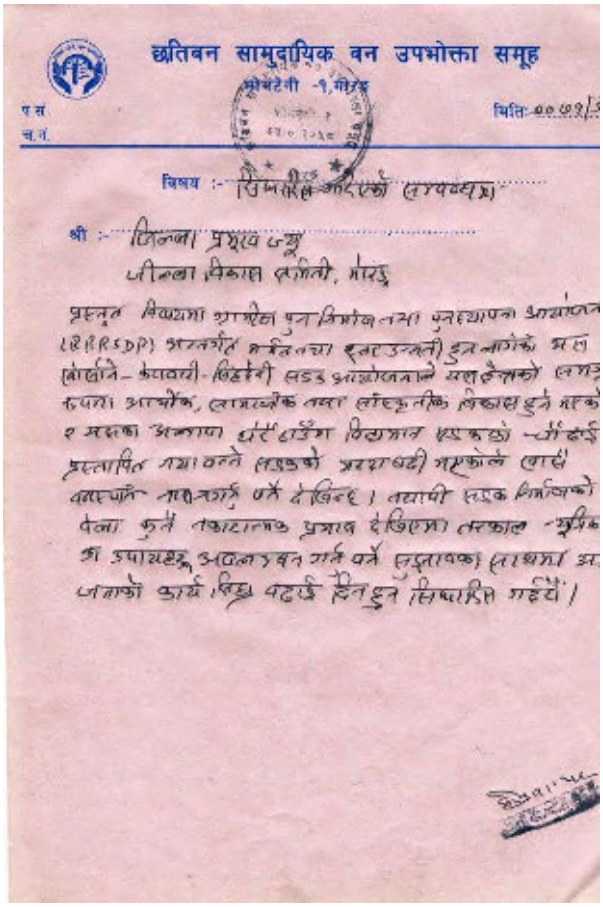
मिति: २०६०/...

विषय :- सूचना टाँस गरिएको सम्बन्धमा।

श्री :- जिल्ला विकास समिति मोरङ्ग

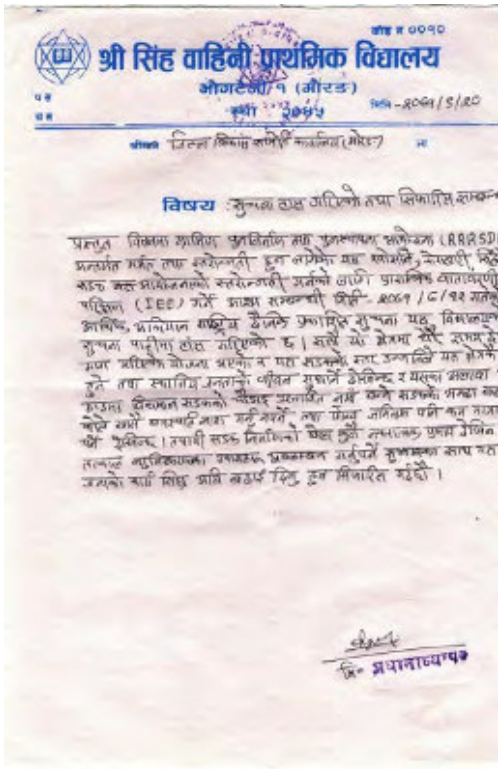
प्रस्तुत विषयमा ग्रामिण पुन निर्माण ... पुन स्थापना आयोजना (R.R.R.S.D.P) अन्तर्गत मर्मत तथा स्तर उन्नती हुन लागेको यस रंगेली - केराबारी - मोरंगेनी - सिंहदेवी सडक ... प्रारम्भिक वातावरणीय परिक्षण (I.E.E) ... अवस्था सम्बन्धी मिति 2060/6/12 गतेको दिन आर्थिक अभियान दैनिक प्रकाशीत सूचना यस कार्यालयको सूचना पाटीमा ... गरिएको जानकारी गराउँछु।

अध्यक्ष



छतिवन सामुदायिक वन उपभोक्ता समूह

श्री तिसशो बतिसजुरे सामुदायिक वन उपभोक्ता समूह



श्री सिंह वाहिनी प्राथमिक विद्यालय

जंफाले सामुदायिक वन उपभोक्ता समूह

बलानटार–१,९, धनकुटा

२०५१

मिति २०६७।८।१८...

प० सं. २०६७।६८

च० नं.– ४.

विषयः–(RRRSDP) लाई सिफारिस दिएको सम्बन्ध...

प्रस्तुत विषयमा यस जंफाले सा०व०उ०समूहमा ...

दैनिकमा मिति २०६७।०८।१२ गतेका दिन प्रकाशित ...

यस जंफाले सामुदायिक वन कार्यालयको सूचना ...

उल्लेख गरिएको हुँदा सो आफ्नो बेरोजगारी ... देवी ...

अमित निमागलाई ... नपुग्ने गरी ...

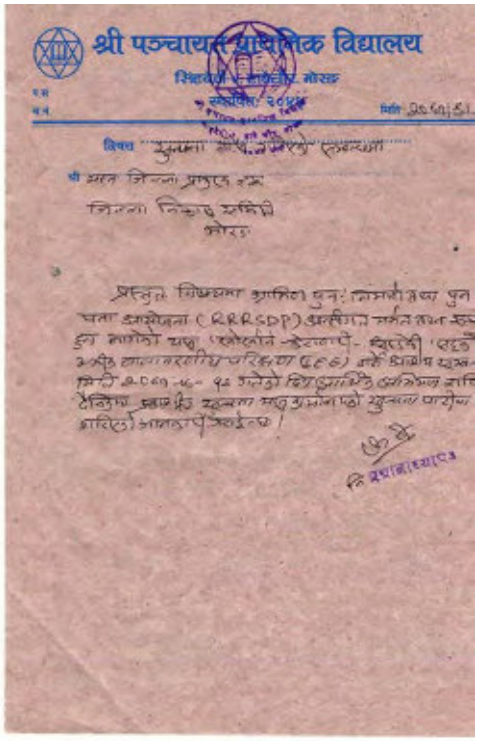
जंफाले सामुदायिक वन उपभोक्ता समूह द्वारा ...

सिफारिस गरिदिएको व्यहोरा जानकारी गरा...

सचिव सचिव

नाम [illegible]

अध्यक्ष अध्यक्ष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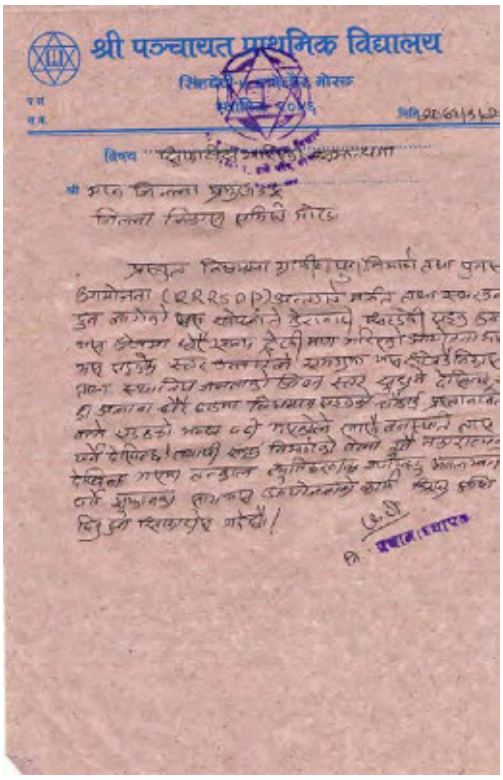
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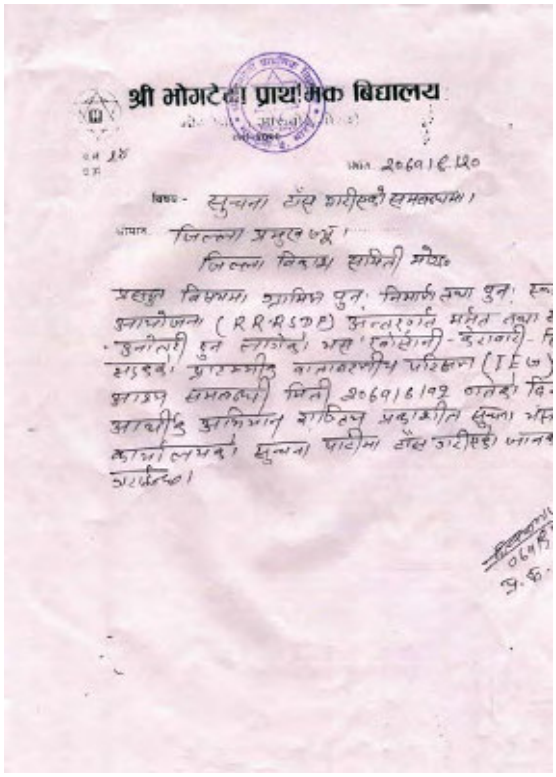
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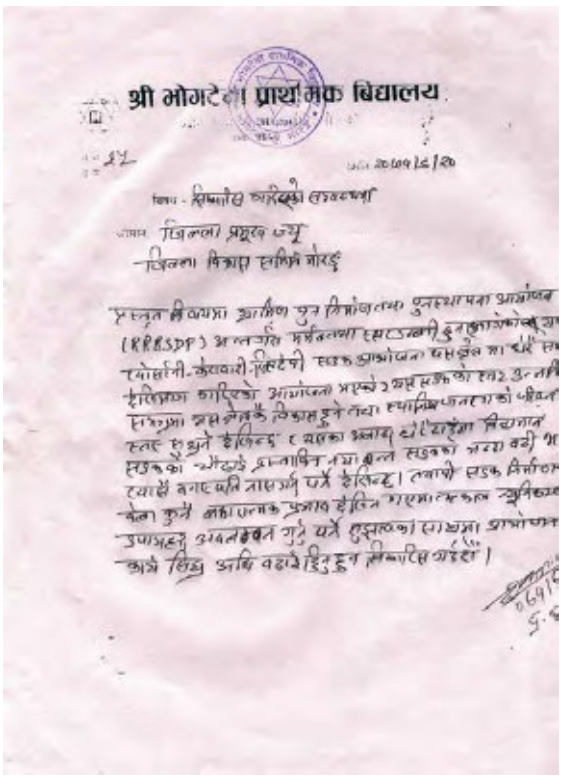
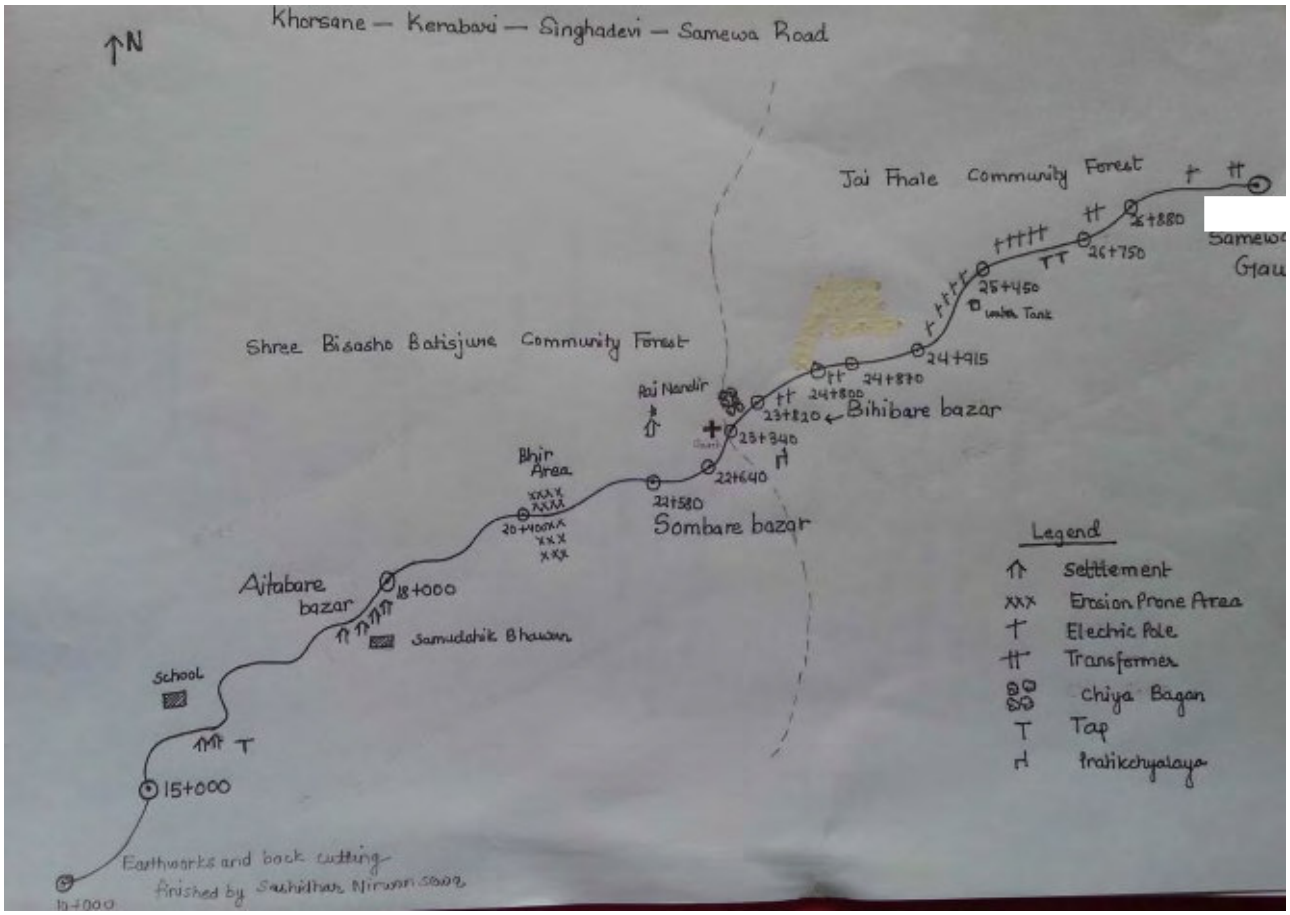

श्री भोगटे प्राथमिक विद्यालय

ANNEX 2: PHOTOGRAPHS

		
Photograph 1. Start point (15+000 chainage). Note the Sasidhar Nirwan sewa has finished the earthworks and back cutting of the proposed road from 10+000-15+000. From this point the works need to be done.		Photograph 2. The typical alignment of the road at ch 15+450. Note the road needs widening and proper drainage system.
		
Photograph 3. Typical settlement area along the project road (17+000). Note the settlement needs proper drainage system		Photograph 4. Start of the steepest (20+400-20+700) of the road. Note the area is critical for landslide and need proper slope stabilization.

		
Photograph 5. The settlement at 22+900. Note the settlement lie near the edge of the road and needs proper protection.		Photograph 6: The Bihibare bazar at ch 24+400. Note the settlement at Bihibare lie near the road alignment.
		
Photograph 7: The end point of the proposed road i.e Samewa Gau.		Photograph 8: Discussion with the local people during the transect work.

ANNEX 2: TRANSECT STRIP MAP



ANNEX 3: Environmental issue mention in Detailed Project report

16.1 Alignment

The proposed road has planned to be designed considering the impact on environment. Proposed road alignment follows existing pathway to the maximum extent so that huge land acquisition is not necessary for construction of the project road. Proposed road, when completed, will be an addition to the aesthetics of this rural area.

16.2 Environmental Sensitive Area (National Park, Wild Life Sanctuary, Protected /Reserve Forest, Wet land etc.)

The alignment will be finalized avoiding the environmental sensitive areas such as National Park, Wild Life Sanctuary, Protected /Reserve Forest, Wet land etc. It is also necessary to maintain the minimum distance of 500 m of the project road from environmental sensitive area.

16.3 Construction Camp

Construction camps will be established away from forest area/water body. The minimum facilities such as water supply, sanitation, storm water drainage, solid waste management and first aid box will be provided during the construction period of the project. Necessary provision for rehabilitation or restoration after the completion of construction phase will be done.

16.4 Permit / Clearance required prior to commending of civil work

- No objection Certificate- This will be taken by PIU from SPCB (State Pollution Control Board).
- Forest Department- If the project road passing thorough forest land and acquisition of the same is involved and it will be taken by PIU from Forest Department
- Consent to establish (CFE) and Consent to Operate (CFO) - This is required for Plant Hot Mix Plant, WMM Plant, Batching Plant required for the project and the same will be taken by the Contractor from SPCB.
- Lease from Mines & Geology- This will be taken by the Contractor for new Stone Quarry required for the project.

16.11 Borrow area

The filling soil will have to be procured from borrow pit. Borrow area will be so excavated that the lands can reused as agricultural field. The depth of borrow pit shall not exceed 450 mm (150 mm top soil included). The top soil shall be stripped and stacked and shall be spread back on the land. As far as possible the borrow pits shall not be dug close to the road embankment. The Redevelopment of borrow area

will be done before closure of the same and it will be as per agreement between landowner and the Contractor.

16.12 Erosion Control

Turfing of the embankment slopes and earthen shoulder to prevent erosion of slopes of the embankment, rain cuts and erosion of shoulder is being suggested.

16.13 Drainage

Suitable cross drainage structures have been provided on the basis of hydrological survey of the area. So, there will be no obstruction to the natural drainage of the area. Rainwater may flow longitudinally along the road, scouring weak surfaces and forming a gully along the road. In such cases, drains are provided to guide the rainwater to the nearest cross drainage structure or gully Road side drainage is also duly considered in a manner so that surface water is led to the low points and is drained through the CD structures.