Environmental and Social Impact Assessment

for

Improvement of Dulegaunda – Lamagaun Road (Dulegaunda – Lila Chowk Section)

Shuklagandaki Municipality, Tanahun Distrit, Gandaki Province

Submitted to:

Governmant of Nepal

Department of Urban Development

Nepal Urban Governance and Infrastructure Project (NUGIP)

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ACRONYM

AADT	: Annual Average Daily Traffic
BoQ	: Bill of Quantity
CBOs	: Community Based Organizations
CESMP	: Construction Environment and Social Management Plan
CGI	: Corrugated Galvanized Iron
DIZ	: Direct Influence Zone
DPR	: Detailed Project Report
DSC	: Design and Supervision Consultant
DTO	: District Transport Office
DUDBC	: Department of Urban Development & Building Construction
EA	: Environmental Assessment
EHS	: Environment, Health and Safety
EPR	: Environmental Protection Rule
ESIA	: Environmental and Social Impact Assessment
ESMP	: Environmental and Social Management Plan
FGD	: Focus Group Discussion
FR	: Feasibility Report
GSB	: Granular Sub Base
HIV AIDS	: Human Immunodeficiency Virus Infection and Acquired Immune Deficiency Syndrome
HR	: Human Resources
IDA	: International Development Association
IIZ	: Indirect Influence Zone
ILO	: International Labor Organization
IP	: Indigenous People
ISR	: Implementation Status Review
KII	: Key Informant Interview
NGO	: Non-Governmental Organization
NUGIP	: Nepal Urban Governance and Infrastructure Project
OP	: Operational Policy
OP/BP	: Operational Policy/Bank Policy
PAP	: Project Affected Person
PCO	: Project Coordination Office
PCU	: Passenger Car Unit

PIM	: Project Implementation Manual
PIU	: Project Implementation Unit
PPE	: Personal Protective Equipment
RAP	: Resettlement Action Plan
RCC	: Reinforced Cement Concrete
RoW	: Right of Way
SEA/SH	: Sexual Exploitation and Abuse/Sexual Harassment
SHE	: Safety, Health and Environment
STD	: Sexually Transmitted Disease
TOR	: Terms of Reference
WMM	: Wet Mix Macadam

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EXECUTIVE SUMMARY

1. Introduction

The Government of Nepal and the World Bank have signed an agreement to implement the Nepal Urban Governance and Infrastructure Project on November 18, 2020 (Mangsir 3, 2077). According to the agreement, World Bank Provide US$ 150 million as a loan for the implementation of the project. The federal government will manage and monitor the overall project, and the local level will directly implement the program. There are mainly five components in this project, among which the first component is to build urban infrastructures by giving urban development grants to 17 municipalities (9 municipalities in the eastern cluster and 8 municipalities in the western cluster). Among 17 Municipalities, Shuklagandaki Municipality is one of the selected municipalities from Western cluster of Gandaki Province for the Urban Development Grant (UDG) provided by the World Bank. Office of Municipal Executive, Shuklagandaki Municipality, Tanahun is going to upgrade Dulegaunda – Lila Chowk Road (7.222 Km) from Urban Development Grants (UDG). This project is expected to improve the livelihood of the local residents of the settlements around the proposed road.

The project area lies in Ward no. 4, 8, 9 and 12 of Shuklagandaki Municipality, Tanahun district, Gandaki Province, Nepal. The proposed Upgrading of Dulegaunda – Lila Chowk Road (7.222 Km) consist of

i) Upgrading of Dulegaunda- Health Post Chowk – Lila Chowk Road (6.769 Km) i.e. Road A; and

ii) Upgrading of B.P. Chowk - Health Post Chowk Road (0.453 Km) i.e. Road B.

Dulegaunda- Lila Chowk road (Road A) is proposed to have double lane road, whereas, road from Dulegaunda Chowk (CH 0+000) to Dulegaunda Khaireni Health Post (CH 0+070) and from BP Chowk to Dulegaunda Khaireni Health Post (Road B) has only 6.0m RoW and are proposed to have single lane roads and will serve as one-way road from Dulegaunda Khaireni Health Post to Prithvi Highway. The proposed road project starts from B.P. Chowk and Dulegauda of Prithivi Highway (H04), Ward no. 4, Shuklagandaki Municipality and ends Lila Chowk, Ward no. 12, Shuklagandaki Municipality. The major settlements lie within the road alignments are: B.P. Chowk, Dulegauda, Health Post Chowk, Pulchowk, Ghari, Taalbeshi, Malebagar and Lila Chowk. The total length of proposed road section is 7.22 Km. The surface of road will be asphalt Concrete in most of the chainage as well as Cement Concrete in few chainage. The estimated cost of the project without VAT and Contigency is NRs. 32,70,70,590 (USD 2,515,927.62.)

2. Baseline Information

Shuklagandaki Municipality falls on Midlands. with an altitude ranging from 479m (Ch 01+080 of Road A) to 560m (Ch 06+769 of Road) above mean sea level and located between 28° 3'25.27"N and 28°05'18.11"N latitude and 84° 4'17.16"E and 84°02'25.78"E longitude. Shuklagandaki municipality falls on tropical climatic zone. The mean minimum temperature reaches up to 17.75^{o}C and mean maximum temperature is nearly 30.45^{o}C. The average annual rainfall of the project area is 1459.67 mm. The major rivers flowing within the project area are Seti River (Ch 00+980 of Road A) and Saraudi Khola (Ch 02+745 & Ch 06+330 of Road A)., In existing condition, there are 2 bridges over Seti River (Ch 00+900 of Road A) and Saraudi Khola (Ch 06+250 of Road A)whereas one slab culvert in Saraudi Khola (Ch 02+745). In the Fiscal year 2072, Office of Municipal Executives, Shuklagandaki Municipality, Tanahun declared 10m Right of way (RoW) for proposed Dulegauda- Lilachowk Road and RoW land is in jurisdiction of Suklagandaki Municipality. The land within the proposed construction width is already in use by the public. However, due to the narrow road width in a few locations, the

construction width of the proposed road has been reduced. The main landslide prone area land within the proposed road alignments is Kamero mato area (Ch 06+030 -06+375), Ward no. 9, Shuklagandaki Municipality. There area 54 eletric pole, one transformer and one Pratikshyala in Lila Chowk, Three Chautara, 36.25 m^3 boundary wall and and 32.75 m3 stone masonry wall of Tibetian camp within the formation width.

There is no forest within direct impact area of proposed road alignments. There are all together 19 trees (Sissau- 18 and Pipal- 1) within the formation width of proposed road alignment. All 19 trees lie in public land. The major wildlife reported in the project area are Jungle cat, Jackal, Squirrel, Yellow Throated Marten etc. The Dominant birds reported in the project area are Black Kite, Egyptian Vulture, Little Egret, Cattle Egret, Sparrow, Red Junglefowl, Black Frankolin, Common Myna etc. The major fish species found in Seti River and Saraudi Khola are Snow Trout, Spiny eel, Kalabans, Barred Baril, Annandale garra, Copper mahseer etc.

The National Population and Household Census, 2021 census gave a total population of 16,600 individuals with 7,784 males and 8.816 females in 4,499 households of Indirect Impact Area (i.e. Ward no. 4, 8, 9 and 12 of Shuklagandaki Municipality). The literacy rate of the population over 5 years of age of the project area is 86.7 % of the population (Male – 92.57%), Female-81.84%). It was found that maximum households (58.5 % of households) of the project area used tap water distributed from pipes inside the house premises for drinking water and 85.86% of households were using flush toilets with septic tanks. In addition, 0.42 % of household donot have toilet at all. There are 39 Childhood Development Centers, 45 Basic Schools, 8 Secondary Schools, 8 Higher Secondary Schools, and 2 Campuses in the project area. There are 10 private structures (4 Store Shed made of Cement block and CGI Sheet, single side wall of one toilet made up of cement block, one cow shed, one goat shed, 1.8 m^3 compound wall of one house, 4 m^3 cemented finished surface of a house) lies within the RoW. These private structures were constructed before declaration of Right of Way (i.e. 10m) of Dulegauda- Lilachowk Road in 2072 by Office of Municipal Executives, Shuklagandaki Municipality, Tanahun. Many people come from different part of Rural area of Tanahun district into Dulegauda of Shuklagandaki Municipality to do business, to find job and to do agriculture in fertile land. Dumre, Damauli, and Pokhara are the main markets for most of the residents living in the project affected areas.

3. Legal and Regulatory Requirements

The sectoral and cross-sectoral guidelines and standards promulgated by the GoN in various periods are adequate to mainstream the environmental and social safeguard dimensions in the project preparation and implementation phases. The report has included the applicable GoN plan, policies, act, regulations, guidelines, and standards. Similarly, the report has also included the environmental and social standards of the World Bank.

4. Impacts Area Delineation of the Project

Direct Impact area of the project is considered as Right of Way (i.e.RoW- 10 m) of proposed road and construction areas of project activities (Road alignment, camp facilities, stock piling areas, spoil disposal area, extraction sites, quarry sites, crusher operating area, bitumen heating zone etc). Similarly, the indirect impact area is fall within 200 m on either side of the road outside the direct impact area Environmental and Social checklists were used for screening and summarizing the overall impacts. The site-specific impacts in construction and operation phases are included in the ESIA report.

5. Impacts of the Project

5.1 Benificial Impacts

According to National Census, 2021, it was found that 16,600 people (male – 7,784 and female – 8,816) of 4,499 households will benefit from this project. During the construction phase of the project total 53,714 workers (Skilled- 6,499 and Unskilled- 47,215) will get employment and gain other technical knowledge and skill. During operation stage, an improved road access will

bring an improvement in overall economic and social condition. The road will also provide cheap, safe and fast transport of goods and services from various settlements around the project area such as Lilachowk, Lamagaun, Jaspur, Malebagar, Syaule Bazar, Ghari, Pulchowk to Center of Shuklagandaki Municipality's Dulegauda and major city area of Gandaki Province Pokhara, Damaule, Gorkha etc. There is a possibility of increased economic opportunities and significant growth and extension of the local markets along the road alignment. Once this road is on operation, trade and business activities will be further promoted. In addition, construction of road will lead to appreciation of land values particularly near the market and settlement areas.

5.2 Adverse Impacts

Due to the implementation of project, 54 eletric pole, one transformer and one Pratikshyala in Lila Chowk, Three Chautara, 36.25 m^3 boundary wall and 32.75 m^3 stone masonry wall of Tibetian camp will be affected. It is necessary to relocate and reconstruct the above mentioned local infrastructure and public property for the upgrading of proposed road. The use of heavy vehicles and equipment seems to create noise pollution in and around the project site. In addition, emission of dust and fumes from vehicle and construction equipments while transporting construction material and doing construction work contribute to air pollution, which adversely affect the health of workers and locals. The physical adverse impacts during construction will be due to change in land use, road slope instability, water pollution of seti river and Saraudi Khola and spoil disposal.

The biological impacts during upgrading works include 19 individual trees (Sissau- 18 and Pipal- 1) within the formation width (i.e. 10m) need to be felled down from private land (Settlement area- 1 Sissau tree and Cultivated land- 3 Sissau tree) and public land (14 Sissau tree and one Pipal Tree). There is possibility of disturbance to wildlife and birds and use of forest product by construction crew during construction. Furthermore, possibility of hunting birds from forest area by the construction worker could cause disturbance to bird habitat as well as wildlife habitat. During operation of road, Unnecessary honking of vehicles, littering of passengers, etc., frighten the birds and wildlife in the area, and adversely affect the health and habitat of the wildlife.

The construction crew will put additional pressure on social services and basic amenities in the locality. Due to the lack of safe drinking water faicilities and toilets in the labor camps and construction sites, various communiciable diseases like Covid-19, Diarrhea, Cholera etc. are likely to cause epidemics among the workers. During the operation of this road, it was found that there will be hapzard expansion of new settlements and markets due to social and economic effects.

6. Sexual exploitation and Abuse and Sexual Harassment Prevention and Response Action Plan

During the fiscal year 2079/ 080, the major crime cases related to GBV were found to be rape, attempt to rape, polygamy and child sexual abuse in Shuklagandaki Municipality. For mitigation of GBV/ SEA/SH issues during construction phase, Code of Conduct will be prepared and will be strictly implemented during construction phase, awareness Program will be conducted to mitigate the issues realated SEA/SH issues for labor and local community, province and federal state. providing female labor-centric facilities such as separate female toilets, separate female camps and mother's rooms on the site and anti-harrasement cell will will be formed

7. Environment and Social Management Plan

On the basis of skills and competencies, priority will be given to the local community especially the poor, vulnerable groups, women in construction work and their skills will be enhanced. In addition, the people of the project affected areas who are involved in the construction work will be given priority by encouraging them to acquire skills in the operation of new technological machinery. Necessary infrastructure in the market area (such as construction of drains, placing of traffic signs, construction of speed breakers for speed control, keeping of zebra crossings etc.)

will be managed. Trees will be planted on both sides of the road to promote greenery of the project area.

Affected public utilities susch as 54 eletric pole, one transformer and one Pratikshyala will be relocated and Three Chautara, 36.25 m^3 and 32.75 m^3 stone masonry wall of Tibetian camp boundary wall will be reconstructed after consulting with concerned authority. Spoil will be utilized for filling the pit of Talbeshi Ma. Vi. School's playing ground, Sundare Playing Ground and for the construction of embankment on seti river adjoin to the proposed road. Such tipping site will be reinstated with the plantation of trees maintaining vegetation within the project area. Project ancillary facilities like camp sites will be reinstated and cleaned up to make it to the previous condition. Bioengineering works and plantation of Amriso, Narkat, Baans etc. will be done in landslide prone area to prevent from landslide and soil erosion. Noise silencer equipped machines and technology will be used to deal with possible noise pollution whereas water will be sprinkled three times a day if necessary to reduce possible air pollution. Adequate road safety measures such as signboards of prohibited horn in school and settlement area, public awareness hoarding board will be placed in proposed road alignments. Roadside plantation of 190 saplings for 19 roadside trees to be fell down and addition 10 saplings, all together 200 saplings will be planted along roadside and public places and the responsibility of caring for those saplings will be given to the concerned persons / organizations. The contractor will provide clean and safe drinking water facility as well as toilet facility for labor camp. It will also provide all labor camp related safety like fire extinguisher, communication means, electricity and other personal protecting equipments like Safety Helmet, Reflecting Vest, Mask, Earplugs etc. including first aid and health facilities as well as insurance depending on the nature of the construction work. The mitigation cost for environmental and social impacts in construction and operation phases are included in ESIA report. In addition, agencies responsible for executing environmental mitigation measures and monitoring have been identified in the ESMP. Different monitoring indicators on the physical, biological, socio-economic and cultural environment have also been identified. The project along with the stakeholders will monitor during reconstruction and operation phase. The project also includes a grievance redress mechanism (GRM) for timely update and resolution of of stakeholders' queries and grievances.

8. Institutional arrangements

The Ministry of Urban Development (MoUD) has set up a Project Coordination Office (PCO) under the Department of Urban Development and Building Construction (DUDBC) to implement NUGIP. The PCO is responsible for overall project compliance including compliance with environmental and social measures. The PCO will be supported by a Project Management Support Team (PMST). A Project Implementation Unit (PIU) will be established in each municipality for implementation of the subproject project at the local level and will be responsible for implementation of the ESMP and other environmental and social instruments. Technical Assistance will be provided through a Design and Supervision Consultancy (DSC) which includes safeguards specialists.

कार्यकारी सारांश

१. परिचयः

नेपाल सरकार र विश्व बैंक बिच सन् २०२० नोभेम्बर १८ (२०७७ साल मंसीर ३) मा नेपाल शहरी शासकिय तथा पूर्वाधार आयोजना संचालन गर्न १५ करोड अमेरिकी डलरको ऋण सम्झौता भएको छ । सम्झौता अनुसार संघिय सरकारले समग्र आयोजनाको व्यवस्थापन र अनुगमन गर्नेछ भने स्थानिय तहहरुले प्रत्यक्ष रुपमा आयोजना कार्यन्वयन गर्नेछन् । यस आयोजनामा मुख्यत पाँचवटा अवयवहरू रहेका छन् जसमध्ये पहिलो अवयव पूर्वी क्लस्टरका ९ वटा नगरपालिका तथा पश्चिम क्लस्टरका ८ वटा नगरपालिका गरि कूल १७ वटा नगरपालिकाहरुमा सहरी विकास अनुदान (UDG- Urban development Grant) प्रदान गरी शहरी पूर्वाधारहरु निर्माण गर्ने हो । शुक्लागण्डकी नगरपालिका विश्व बैंकले प्रदान गरेको सहरी विकास अनुदान (UDG) का लागि पश्चिम क्लस्टरको गण्डकी प्रदेशबाट छनोटमा परेको नगरपालिकाहरु मध्ये एक हो । शुक्लागण्डकी नगरपालिका, नगर कार्यपालिकाको कार्यालय, तनहुँले सहरी विकास अनुदान (युडीजी) बाट दुलेगौंडा – लिलाचोक (७.२२२ किलोमिटर) सडक स्तरोन्नति गर्न लागेको हो । यस आयोजनाले प्रस्तावित बाटो वरिपरिका बस्तीहरुका स्थानीय बासिन्दाहरुको जीविकोपार्जनमा सुधार ल्याउने अपेक्षा गरिएको छ ।

यस आयोजना गण्डकी प्रदेश, तनहुँ जिल्ला, शुक्लागण्डकी नगरपालिका, वडा नं. ४, ८, ९ र १२ मा पर्दछ । प्रस्तावित आयोजना दुलेगौंडा – लिलाचोक सडक (७.२२२ किलोमिटर) स्तरोन्नति अन्तर्गत क) दुलेगौंडा- खैरेनी हेल्थ पोष्ट– लीला चोक सडक अर्थात् Road A (६.७६९ किलोमिटर) स्तरोन्नति र ख) विपी चोक- खैरेनी हेल्थ पोष्ट सडक अर्थात् Road B (०.४५३ किलोमिटर) स्तरोन्नति पर्दछ । प्रस्तावित दुलेगौंडा – लिलाचोक सडक (७.२२ किलोमिटर) स्तरोन्नति शुक्लागण्डकी नगरपालिका, वडा नं. ४ अन्तर्गत पृथ्वी राजमार्गको वि.पी. चोक र दुलेगौंडाबाट सुरु भई शुक्लागण्डकी नगरपालिका, वडा नं. १२, लीला चोकमा पुगेर अन्त्य हुन्छ । आयोजना क्षेत्र अन्तर्गत पर्ने प्रमुख बस्तीहरू हुन्: विपी चोक, दुलेगौंडा, हेल्थपोष्ट चोक, पुचोक, घारी, तालवेशी, मालेबगर र लिलाचोक पर्दछन् । प्रस्तावित सडक खण्डको कुल लम्बाई ७.२२ किलोमिटर रहेको छ । प्रतावित दुलेगौंडा –लीला चोक सडकको क्षेत्राधिकार (RoW) १० मि. को रहेको छ र यसलाई double lane को सडक बनाउने प्रस्ताव गरिएको छ । तर, Road A को दुलेगौंडा चोक (CH 0+000) देखि खैरेनी स्वास्थ्य चौकी (CH 0+070) सम्म र Road B (बीपी चोक -खैरेनी स्वास्थ्य चौकी सडक) को सडकको क्षेत्राधिकार (RoW) ६ मि. को हुनेछ र Single lane को सडक प्रस्ताव गरिएको छ । उक्त सडकहरुले खैरेनी हेल्थ पोष्ट चोक देखि पृथ्वी राजमार्गको दुलेगौडा र बिपि चोक सम्म एकतर्फी सडकको रूपमा काम गर्नेछ । सडकको सतह धेरैजसो चेनेजमा Asphalt Concrete र केही चेनमा Cement Concrete हुनेछ । यस आयोजनाको कूल लागत मूल्य अभिवृद्धि कर र कन्टिजेन्सी बाहेक करिव रू. ३२,७०,७०,५९०/- (अमेरिकी डलर २५,१५,९२७.६२) रहने अनुमान गरिएको छ ।

२. विद्यमान अवस्था

शुक्लागण्डकी नगरपालिका नेपालको तल्लो पहाडी क्षेत्रमा पर्दछ । आयोजना क्षेत्र विश्व मानचित्रमा २८°०३'२५.२७" देखि २८°०५'१८.११'' उत्तरी अक्षांश र ८४°०४'१७.१६" देखि ८४°०२'२५.७८६"पूर्वी देशान्तर सम्म फैलिएको छ । आयोजना स्थल समुन्द्र सतह देखि न्यूनतम ४७९ मि. उचाई (Road A को चेनेज ०१+०८०) र अधिकतम ५६० मि. उचाई (Road A को चेनेज ०६+ ७६९) मा अवस्थित रहेको छ । आयोजना क्षेत्रमा उष्ण मनसुनी हावापानीको प्रभाव रहेको छ । यस क्षेत्रको वार्षिक औषत न्यूनतम तापक्रम र अधिकतम तापक्रम क्रमश १७.७५° से. र ३०.४५° से. पाइन्छ भने वार्षिक औषत वर्षा १४५९.६७ मिली मिटर भएको पाइन्छ । आयोजना क्षेत्र भएर बग्ने प्रमुख नदिहरुमा सेती नदि (Road A को चेनेज ००+९८०) र सरौदी खोला (Road A को चेनेज ०२+७४५ र ०६+३३०) पर्दछन् । हाल सेती नदि (Road A को चेनेज ००+९८०) र सरौदी खोला (Road A को चेनेज ०६+३३०) माथि २ वटा पुलहरु रहेका छन् भने सरौदी खोला (Road A को चेनेज ०२+७४५०) मा एक वटा स्लाब कल्भर्ट रहेको छ । शुक्लागण्डकी नगरपालिका, तनहुँले २०७२ सालमा नगर कार्यपालिकाको निर्णयबाट प्रस्तावित दुलेगौंडा – लिलाचोक सडक खण्डको क्षेत्राधिकार १० मि. निर्धारण गरि सकेको छ । सडक क्षेत्राधिकार भित्र पर्ने सम्पूर्ण जग्गा जमिनको शुक्लागण्डकी नगरपालिकाको स्वामित्वमा रहेको छ । दुलेगौंडा – लिलाचोक सडक स्तरोन्नतिको लागि थप जग्गा आवश्यक नपर्ने देखिन्छ । केहि वर्ष अघि देखि सडकको क्षेत्रधिकार भित्र पर्ने सबै जग्गा सार्वजनिक प्रयोगमा रहेको छ । सडकको क्षेत्राधिकार भित्र रहेका निजि संरचनाहरु भएको ठाउँमा सडकको चौडाई घटाईएको छ । हाल यस आयोजनाले ६.९१ हेक्टर

क्षेत्रफ़लको जमिन (सार्वजनिक – २.८ हेक्टर, आवास क्षेत्र- २.४६ हेक्टर , खेतीयोग्य जमिन – १.५६ हेक्टर र खोला उकासको जग्गा – ०.०९ हेक्टर) ओगटेको छ। प्रस्तावित दुलेगौंडा – लिलाचोक सडक खण्डलाई स्तरोन्नति गर्दा थप जग्गा आवश्यक पर्ने देखिदैन। शुक्लगण्डकी नगरपालिका, वडा नं. ९, कमेरो माटो क्षेत्र (Ch 06+030 -06+375) आसपासको क्षेत्र पहिरोको उच्च जोखिममा रहेको छ। १० मिटर चौडाईको सडक निर्माण क्षेत्र भित्र ५४ वटा विद्युतीय पोल, लिलाचोकमा एक वाट ट्रान्सफर्मर र एक वटा प्रतीक्षालय, ३ वटा चौतारा, ३६.२५ घनमिटरको घेरा पर्खाल र तिब्बतीयन क्याम्पको ३२.७५ घनमिटरको ढुंगाको पर्खाल पर्दछ।

आयोजना क्षेत्रमा कुनै पनि वन क्षेत्र पर्दैन। सडकको निर्माण क्षेत्र भित्र १९ वटा रुख (सिशौ –१८ र पिपल–१) पर्दछन्। निर्माण क्षेत्र भित्र पर्ने सम्पूर्ण १९ वटा रुखहरु सार्वजनिक जग्गामा पर्दछ। आयोजना क्षेत्रमा देखिने प्रमुख वन्यजन्तुहरू वन बिरालो, स्याल, लोखर्के, मलसाप्रो आदि रहेका छन् भने चराचुरुङ्गीहरूमा कालो चिल, सेतो गिद्ध, सानो सेतो बकुल्ला, गाई बकुल्ला, भंगेरा, लुईचे, कालो तित्रा, रुपी आदि रहेका छन्। स्थानीय बासिन्दाहरुका अनुसार सेती नदी र सरौदी खोलामा पाइने प्रमुख माछा प्रजातिहरू अस्ला, बाम , गर्दी, फकेटा, लहरे बुधुना, कत्ले आदि हुन्।

राष्ट्रिय जनगणना २०७८ अनुसार आयोजना कार्यान्वयन हुने क्षेत्र शुक्लागण्डकी नगरपालिकाको वडा नं. ४, ८, ९ र १२ को कुल ४,४९९ घरधुरीमा ७,७८४ पुरुष र ८,८१६ महिला गरी कुल १६,६०० जनसंख्या रहेको देखिन्छ। आयोजना क्षेत्रको औषत घर परिवार संख्या ३.६९ रहेको देखिन्छ। आयोजना क्षेत्रको ५ वर्ष भन्दा माथिको जनसंख्याको साक्षरता दर ८६.७% ((पुरुष – ९२.५७ %, महिला – ८१.८४%) रहेको छ। आयोजना क्षेत्रका अधिकांश घरधुरी (५८.५% घरपरिवार) ले घर खानेपानीको लागि घर कम्पाउण्ड भित्र रहेको पाइपबाटवितरित धाराको पानी प्रयोग गरेको देखिन्छ भने ८५.८६% घरपरिवारले सेप्टिक ट्याङ्की सहित फ्लस शौचालय प्रयोग गर्ने गरेको देखिन्छ। यसबाहेक, ०.४२% घरपरिवारमा शौचालय नभएको देखिन्छ। आयोजना क्षेत्रमा ३९ बाल विकास केन्द्र, ४५ आधारभूत विद्यालय, ८ माध्यमिक विद्यालय, ८ उच्च माध्यमिक विद्यालय र २ वटा क्याम्पसहरु रहेका छन्। प्रस्तावित सडक खण्डको निर्माण क्षेत्र भित्र १० वटा निजी संरचनाहरु (सिमेन्टको ब्लक र जस्ता पाताले निर्माण भएका ४ वटा भण्डारण टहरा, सिमेन्ट ब्लकले निर्माण भएको शौचालयको एकतर्फी पर्खाल, १ वटा गाई गोठ, १ वटा बाख्राको खोर, १ वटा घरको १.८ घन मिटरको घेरा पर्खाल र एक वटा घरको ४ घन मिटरको पेटी) रहेका छन्। उल्लेखित संरचनाहरू नगर कार्यपालिकाको कार्यालय, शुक्लागण्डकी नगरपालिका, तनहुँले २०७२ सालमा दुलेगौडा–लीलाचोक सडकको क्षेत्राधिकार (१० मिटर) घोषणा गर्नु अघि निर्माण भएका हुन्। शुक्लागण्डकी नगरपालिकाको दुलेगौडामा व्यापार, रोजगारीको खोजी र उर्वर जमिनमा खेतीपाती गर्न तनहुँ जिल्लाका विभिन्न ग्रामीण भेगबाट धेरै मानिसहरु आउने गरेका छन्। डुम्रे, दमौली र पोखरा आयोजना प्रभावित क्षेत्रमा बसोबास गर्ने अधिकांश बासिन्दाहरुको मुख्य बजार हुन्।

३. ऐन तथा नीति, नियमको आवश्यकता

नेपाल सरकारले विभिन्न समयमा जारी गरेका विषयगत तथा बहुविषयगत निर्देशिका तथा मापदण्डहरु आयोजना तयार गर्न तथा कार्यान्वयन चरणहरुमा वातावरणीय एवम् सामाजिक सुरक्षण आयामहरु मूल प्रवाहीकरण गर्न यथेष्ठ छन्। यस प्रतिवेदनले सम्बन्धित नेपाल सरकारका योजना, निति, ऐन, नियम, निर्देशिका एवम् मापदण्डहरु समेटेको छ। त्यसैगरी यस प्रतिवेदनले विश्व बैङ्कको वातावरणीय तथा सामाजिक मापदण्डहरु पनि समेटेको छ।

४. आयोजनाको प्रभाव क्षेत्र निर्धारण

आयोजनाको प्रत्यक्ष प्रभाव क्षेत्र सडकको क्षेत्रधिकार १० मि. सहित निर्माण क्षेत्र (जहाँ आयोजनाका विभिन्न संरचनाहरु जस्तै सडक पंक्ति, कामदार शिविर, उत्खनन क्षेत्र, खानी क्षेत्र, अलकत्रा तताउने क्षेत्र, निर्माण सामाग्री थुपार्ने क्षेत्र, बिग्रन व्यवस्थापन क्षेत्र, क्रसर संचालन क्षेत्र आदि निर्माण तथा संचालन गरीन्छ) लाई मानिएको छ। त्यसै गरी अप्रत्यक्ष प्रभाव क्षेत्र प्रत्यक्ष प्रभाव क्षेत्र भन्दा बाहिर सडकको दुबैतिर २०० मि. दूरी सम्म पर्ने क्षेत्रलाई मानिएको छ । प्रभावहरुको वर्गीकरण तथा संक्षेपीकरण गर्न वातावरणीय तथा सामाजिक चेकलिष्ट प्रयोग गरिएको छ। स्थान विशेषको प्रभावहरु वातावरणीय तथा सामाजिक प्रभाव मूल्याङ्कन मा समावेश गरिएका छन्।

५. आयोजनाका प्रभावहरु

५.१ सकारात्मक प्रभावहरु

राष्ट्रिय जनगणना २०७८ को तथ्यांकलाई विश्लेषण गर्दा यस आयोजनाबाट ४,४९९ घरधुरीका १६,६०० जनसंख्या (पुरूष – ७,७८४ र महिला – ८,८१६) लाभान्वित हुने देखिन्छ। यस आयोजना कार्यान्वयन गर्दा ५३,७१४ श्रमिकहरुले (दक्ष- ६,४९९ र २७,००० अर्ददक्ष ४७,२१५) सिप र दक्षताको आधारमा रोजगारीको अवसरहरु प्राप्त गर्नेछन्। साथसाथै प्राविधिक सीप तथा ज्ञान समेत प्राप्त गर्ने मौका पाउने छन्। सडक स्तरोन्नति भई संचालनको अवस्थामा त्यस क्षेत्रमा आर्थिक तथा सामाजिक स्थायित्व बढ्न जानेछ। साथै स्तरोन्नति भएको सडक यातायातले गर्दा लिलाचोक, लामागाउँ, जसपुर, मालेबगर, स्याउले बजार, घारी, पुलचोक देखि शुक्लागण्डकी नगरपालिकाको दुलेगौंडा तथा गण्डकी प्रदेशको प्रमुख व्यापारिक स्थलहरु पोखरा, दमौली, गोरखा बिच यातायात सेवा तथा सामानहरुको ओसार पसारमा छिटो, छरितो, सुलभ तथा सस्तो हुन जानेछ। बजारमा पहुँच भएको कारण कृषि उत्पादन बढाउन कृषकहरु उत्साही हुनेछन्, जसले गर्दा उत्पादकत्वमा वृद्धि भई ग्रामीण भेगका बासिन्दाको जीवनस्तरमा सुधार हुन जानेछ। सडक संचालन हुँदा व्यापार व्यवसायमा वृद्धि हुन जानेछ। बजार क्षेत्रको विकासले गर्दा जग्गाको मूल्यमा समेत वृद्धि हुन जानेछ।

५.२ नकारात्मक प्रभावहरु

यस आयोजनाको कार्यान्वयनबाट ५४ वटा विद्युतीय पोल, लिलाचोकमा एक वाट ट्रान्सफर्मर र एक वटा प्रतीक्षालय, ३ वटा चौतारा, ३६.२५ घनमिटरको घेरा पर्खाल र तिब्बतीयन क्याम्पको ३२.७५ घनमिटरको ढुंगाको पर्खालमा असर पर्ने देखिन्छ। उलेल्खित स्थानीय पूर्वाधार तथा सार्वजनिक सम्पतिलाई स्थान्तरण र पुन निर्माण गर्नु पर्ने देखिन्छ। ठुला सवारी साधन र उपकरणहरुको प्रयोगले आयोजना स्थल र आसपासका क्षेत्रहरुमा ध्वनि प्रदूषण हुने देखिन्छ। साथै ठुला सवारी साधन प्रयोग गरि निर्माण सामग्री ढुवानी गर्दा तथा निर्माण कार्यमा हेभी उपकरणको प्रयोगले गर्दा उड्ने धुलो र धुवाँले वायु प्रदूषण गरि श्रमिक तथा स्थानीय बासिन्दाहरुको स्वास्थ्यमा प्रतिकूल असर पर्न जाने देखिन्छ। अन्य नकारात्मक प्रभावहरुमा सडक छेउका भू-स्वामित्वको प्रयोगमा बदलाव तथा सेती नदि र सरौदी खोलाको जल प्रदूषण समेत हुने देखिन्छ। आयोजना कार्यान्वयनको क्रममा आयोजना क्षेत्र अन्तर्गतको सार्वजनिक जग्गाबाट १९ वटा रुख (सिसौ–१८ र पिपल–१) कटान गर्नुपर्ने देखिन्छ। सडक निर्माणको क्रममा निर्माण कार्यमा खटिएका कमादारहरुबाट जीवजन्तु तथा चराचुरुङ्गीमा आशिंक प्रभाव पर्ने देखिन्छ। सडक निर्माण कार्यमा खटिएका कमादारहरुले जीवजन्तु तथा चराचुरुङ्गीलाई सिकार गर्ने तथा खोलामा माछा मार्न सक्ने सम्भावनाले आयोजना क्षेत्र भित्रका वन्यजन्तु, चराचुरुङ्गी र जलचरहरुको बासस्थानमा प्रभाव पर्न जाने देखिन्छ। यसै गरि सडक संचालनको क्रममा अनावश्यक रुपमा सवारी साधनहरुले हर्न बजाउने, यात्रु हरुले फोहोर फ्याक्ने जस्ता क्रियाकलापहरुले त्यस क्षेत्रमा पाइने चराचुरुंगी र वन्यजन्तुहरु तर्सिने, डराउने तथा वन्यजन्तुको स्वास्थ्यमा र बासस्थानमा प्रतिकूल असर पर्न जाने देखिन्छ। निर्माण कार्यको क्रममा श्रमिकहरुको संख्यात्मक वृद्धिको कारण स्थानीय सामाजिक सेवामा हाल उपलब्ध सुविधाहरुमा चाप बढ्नाले उपभोगमा समस्या आउन सक्नेछ। कामदार सिविर र निर्माण कार्य स्थलमा सुरक्षित खानेपानी तथा शौचालयको व्यवस्था नभएको खण्डमा कामदारहरुमा विभिन्न प्रकारका संक्रामक रोगहरु जस्तै कोभिड- १९, झाडापखाला, हैजा आदीले महामारीको रुप निम्त्याउने देखिन्छ। सडक संचालनको क्रममा सामाजिक तथा आर्थिक प्रभावहरुमा नयाँ बस्ती र बजारको अव्यवस्थित विस्तार हुन जाने देखिन्छ।

६. यौन शोसण तथा दुर्वेसन एवम् दुर्व्यवहार रोकथाम तथा सम्बोधन कार्य योजना

आर्थिक वर्ष २०७९/०८० मा शुक्लागण्डकी नगरपालिकामा जबर्जस्ती करणी, बलात्कार प्रयास, बहुविवाह र बाल यौन दुर्व्यवहारका प्रमुख अपराधका घटनाहरूको रुपमा पाइएको छ। निर्माण चरणमा GBV/SEA/SH समस्याहरू न्यूनीकरणका लागि आचारसंहिता तयार गरिनेछ र निर्माण चरणमा कडाईका साथ लागू गरिनेछ, श्रम र स्थानीय समुदाय, प्रदेश र स्थानीय समुदायका लागि SEA/SH समस्याहरूलाई न्यूनीकरण गर्न सचेतना कार्यक्रम सञ्चालन गरिनेछ, आयोजना स्थलमा छुट्टै महिला शौचालय, छुट्टै महिला शिविर र आमाको कोठा जस्ता महिला श्रम केन्द्रित सुविधा उपलब्ध गराउने र उत्पीडन विरोधी सेल गठन गरिनेछ।

७. वातावरण तथा सामाजिक व्यवस्थापन योजना

सिप र दक्षताको आधारमा स्थानीय समुदाय विशेष गरि गरीब, जोखिमयुक्त वर्ग, महिलालाई निर्माण कार्यमा प्राथमिकता दिई उनीहरुको सीपमा अभिवृद्धि गराईनेछ। साथै निर्माण कार्यमा संलग्न हुने आयोजना प्रभावित क्षेत्रका मानिसहरुलाई नयाँ प्रविधियुक्त मेशेनरी औजार संचालनमा सिप हासिल गर्न हौसला प्रदान गरी प्राथमिकतामा राखिने छ। बजार क्षेत्रमा आवश्यक पूर्वाधार (जस्तै नालि निर्माण गर्ने, ट्राफिक संकेत चिन्ह राख्ने, बजार क्षेत्र र विद्यालय क्षेत्रमा जेब्रा क्रसिंग राख्ने आदी) हरुको

व्यवस्थापन गरीनेछ । आयोजना क्षेत्रको हरियाली प्रबर्दन गर्न सडक किनारको दुबै तर्फ वृक्षारोपण गरिनेछ । आयोजनाबाट प्रभावित ५३ वटा विद्युतीय पोल, लिलाचोकमा एक वाट ट्रान्सफर्मर र एक वटा प्रतीक्षालय, ३ वटा चौतारा, ३६.२५ घनमिटरको घेरा पर्खाल र तिब्बतीयन क्याम्पको ३२.७५ घनमिटरको ढुंगाको पर्खाल सम्बन्धित निकायसँग समन्वय गरी उचित ढंगले मर्मत सम्भार तथा स्थानान्तरण गरीनेछ । साथै खेतीयोग्य जमिनमा रहेका खडाबालीहरुको उचित क्षतिपूर्ति प्रदान गरिनेछ । आयोजना कार्यान्वयनको क्रममा माटो कटान र भरणको सन्तुलन मिलाई आयोजनाबाट निस्किएको बिग्रनलाई हावाले नउडाउने र पानीले नबगाउने तरिकाले तालबेशी मा.वि. को खेलमैदान, सुन्दरे खेल मैदान र सेती नदि किनारमा तटबन्धन निर्माणकार्यमा प्रयोग गरिनेछ । आयोजना सम्पन्न पश्च्यात बिग्रन व्यवस्थापन स्थल सम्याएर आवाद गरी वृक्षारोपण गरिनेछ । आयोजनाको प्रयोगका लागि बनाईएका कामदार शिविरहरु आयोजनाको समाप्ति पश्चात हटाई पहिलेकै अवस्थामा ल्याईने छन् । ध्वनि र वायु प्रदूषण कम गर्न नियमित रुपमा सवारी साधन र निर्माण कार्यमा प्रयोग हुने उपकरणहरु मर्मत सम्भार गरिनेछ । साथै निर्माण कार्य भईरहेको स्थलमा आवश्यकता अनुसार हरेक दिन बिहान बेलुका पानी छर्कने कार्य गरिनेछ । आयोजना कार्यान्वयन क्षेत्र अन्तर्गतको अस्थिर स्थानहरुमा टेवा पर्खाल निर्माण गर्नुका साथै बायोइन्जिनियरिंग का साधन प्रयोग गरिनेछ जस्तै स्लोप भएको ठाउँमा अम्रिसो, बाँस, नर्कट रोपिनेछ । साथै पहिरो ग्रस्त क्षेत्र संकेत गर्ने साईन बोर्डहरु समेत राखिनेछ । आयोजना क्षेत्रबाट कटान गर्नु पर्ने १९ वटा रुखहरुको हकमा स्कुल व्यवस्थापन समिति र सरोकारवाला व्यक्तिको समन्वयमा क्षतिपूर्ति स्वरूप १९० र आयोजनाबाट थप १० विरुवा गरी २०० वटा विभिन्न प्रजातिका विरुवाहरु सडक छेउ र सार्वजनिक स्थलमा रोपी सरोकारावाला व्यक्ति/ संघ संस्थाहरुलाई हेरचाहको जिम्मेवारी प्रदान गरिनेछ । कामदारहरुलाई कामको प्रकृति अनुसार व्यक्तिगत सुरक्षाका साधनहरु (PPE- Safety Helmet, Reflecting Vest, Mask, Earplugs) प्रदान गरिनेछ । कामदारहरुलाई दुर्घटना बीमाको व्यवस्था उपलब्ध गराईनेछ । संभावित दुर्घटनाबाट जोगाउन उपयुक्त सडक सुरक्षाका उपायहरु जस्तै विद्यालय र आवास क्षेत्रमा हर्न बजाउन निषेध गरिएका साइन बोर्डहरु, जनचेतनामुलक संकेत बोर्डहरु समेत यस सडक खण्डमा राखिनेछ । निर्माण तथा सञ्चालन चरणमा हुने वातावरणीय तथा सामाजिक प्रभाव न्यूनीकरण गर्ने लागत खर्च वातावरणीय तथा सामाजिक प्रभाव मूल्याङ्कन प्रतिवेदनमा संलग्न छ । अझ वातावरणीय प्रभाव न्यूनीकरण व्यवस्था तथा अनुगमन गर्ने जिम्मेवार निकायहरु वातावरणीय तथा सामाजिक व्यवस्थापन योजनामा तोकिएको छ । भौतिक जैविक, अर्थ सामाजिक तथा सांस्कृतिक वातावरण अनुगमन गर्ने विभिन्न सूचकांकहरु पनि तोकिएको छ । पुनःनिर्माण तथा सञ्चालनको चरणमा आयोजनाले सरोकारवालाहरुसंग मिलेर अनुगमन गर्नेछ । यस उपआयोजनामा सरोकारवालाहरुको जिज्ञासा एवम् गुनासोहरुको बारे अद्यावधिक सूची राख्न र उपयुक्त समयमै समाधान गर्न एवम् गुनासो सम्बोधन विधि समेत समेटिएको छ ।

८. संस्थागत व्यवस्था

आयोजना कार्यान्वयन गर्न शहरी विकास मन्त्रालयले शहरी विकास तथा भवन निर्माण विभाग अन्तर्गत एउटा आयोजना समन्वय कार्यालय स्थापना गरेको छ । वातावरणीय तथा सामाजिक विधिको साथै सम्पूर्ण विधिहरु पालना सम्बन्धी जिम्मेवारीको जवाफदेहिता आयोजना समन्वय कार्यालयमा रहने छ । आयोजना समन्वय कार्यालयलाई एउटा आयोजना व्यवस्थापन सहयोग टोलीले सहयोग गर्नेछ । उपआयोजनाहरुको वातावरणीय तथा सामाजिक व्यवस्थापन योजना कार्यान्वयन स्थानीय तहमा गर्न र तथा अन्य वातावरणीय एवम् सामाजिक संयन्त्रहरुको कार्यान्वयनका जिम्मेवार हुने गरी प्रत्येक नगरपालिकामा एकएक आयोजना कार्यान्वयन इकाइ स्थापना गरिनेछ । सुरक्षण विशेषज्ञ सहितको डिजाइन तथा सुपरिवेक्षक परामर्शदाता मार्फत प्राविधिक साहायाता पुऱ्याइनेछ ।

CHAPTER -1: INTRODUCTION

1.1 Background

According to the Constitution of Nepal, the Government of Nepal and the World Bank, has signed to implement the Nepal Urban Governance and Infrastructure Project on November 18, 2020 (Mangsir 3, 2077). According to the agreement, World Bank Provide US$ 150 million as a loan for the implementation of the project. The federal government will manage and monitor the overall project, and the local level will directly implement the program. There are mainly five components in this project, among which the first component is to build urban infrastructures by giving urban development grants (UDG) to 17 municipalities (9 municipalities in the eastern cluster and 8 municipalities in the western cluster). The component will provide Urban Development Grants (UDG) to participating municipalities for financing strategic municipal infrastructure sub-projects focusing on, amongst others, rehabilitation and improvements in municipal roads, drainage, drinking water supply and onsite sanitation, as well as associated design and implementation support. The component will support the operationalization of Nepal‟s first urban sector conditional grant (UDG) system, that focuses exclusively on strategic municipal infrastructure and service delivery improvement at the local level. Among 17 Municipalities, Shuklagandaki Municipality is one of the selected municipalities from Western cluster of Gandaki Province for the Urban Development Grant (UDG) provided by the World Bank. Office of Municipal Executive, Shuklagandaki Municipality, Tanahun is going to upgrade Dulegaunda – Lamagaun Road (Dulegaunda – Lila Chowk Section) from Urban Development Grants (UDG). This project is expected to improve the livelihood of the local residents of the settlements around the proposed road.

1.2 Description of the Sub-Project

The project area lies in Ward no. 4, 8, 9 and 12 of Shuklagandaki Municipality, Tanahun district, Gandaki Province, Nepal. The proposed Upgrading of Dulegaunda – Lila Chowk Road (7.222 Km) consist of i) Upgrading of Dulegaunda- Health Post Chowk – Lila Chowk Road (6.769 Km) i.e. Road A and ii) Upgrading of B.P. Chowk - Health Post Chowk Road (0.453 Km) .i.e. Road B. The proposed road project starts from B.P. Chowk and Dulegauda of Prithivi Highway (H04), Ward no. 4, Shuklagandaki Municipality and ends Lila Chowk, Ward no. 12, Shuklagandaki Municipality. The major settlements lie within the road alignments are: B.P. Chowk, Dulegauda, Health Post Chowk, Pulchowk, Ghari, Taalbeshi, Malebagar and Lila Chowk. The total length of proposed road section is 7.22 Km. Dulegaunda- Lila Chowk road has 10.0m RoW and is proposed to have double lane road. However, the road from Dulegaunda Chowk (CH 0+000) to Dulegaunda Khaireni Health Post (CH 0+070) and from BP Chowk to Dulegaunda Khaireni Health Post has only 6.0m RoW and are proposed to have single lane roads and will serve as one-way road from Dulegaunda Khaireni Health Post to Prithvi Highway. The surface of road will be asphalt Concrete in most of the chainage as well as Cement Concrete in few chainage. The estimated cost of the project without VAT and Contigency is NRs. 32,70,70,590 (USD 2,515,927.62; Taking 1USD= 130 NRs.).

1.3 Objectives of the Sub-project

The objective of the sub-project is to provide better and enhanced services to the road user along with better quality of road and improving the aesthetics of the street. As such, the proposed road subproject serves the purpose to provide basic service to the people and connect the settlements to the local and National Highway (NH).

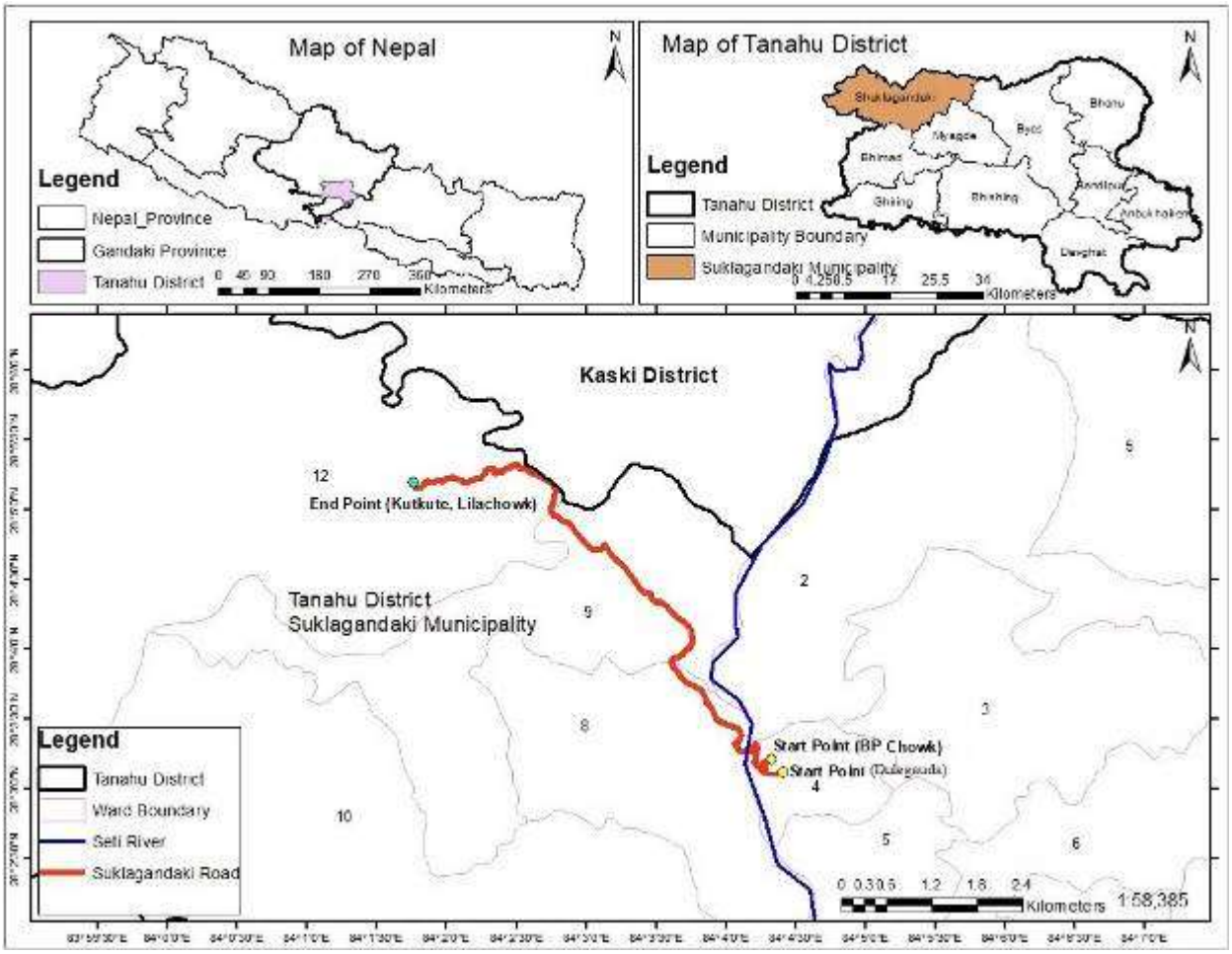


Figure 1.1: Project Area Map

1.4 Salient Feature of the Sub-project

Salient features relating to the proposed road are shown in the table 1.1.

Table 1. 1: Salient Feature of Proposed Road

Description	Project Features
Name of Sub-Project	Improvement of Dulegaunda – Lamagaun Road (Dulegaunda – Lila Chowk Section)
Geography	
State/Province	Gandaki
Project Districts	Tanahun
Affected Municipality / Ward	Shuklagandaki Municipality (Ward no. 4, 8, 9 & 12)
Major Settlements	B.P Chowk, Dulegauda, Healthpost Chowk, Ghari, Syaule Bazaar, Talbeshi, Malebagar, Lila Chowk and Kutkute
Terrian	Hill
Total Length of Road	7.222 Km
Existing Road Condition	
Carriageway Width	3-5m
Road Type	Municipal Road

Description	Project Features	
Traffic lane	Most of the portion is Single Lane, Intermediate lane at some strecthes	
Camber of Carriage way	2-2.5%	
Pavement Surfacing	Pre-mix carpet /Gravel /Earthen	
Terrain Type	Rolling and Flat Terrain	
Name of Roads	**Road A**	**Road B**
Starting Chainage	Ch 00+000- Shuklagandaki Municipality, Ward no. 4, Dulegaunda (28°03'12.26"N/ 84° 4'21.10"E, Altitude- 540m asl)	Ch 00+000- Shuklagandaki Municipality, Ward no. 4, B.P. Chowk (28°03'25.27"N/ 84°04'17.16"E, Altitude- 540m asl)
Ending Chainage	Ch 06+769- Shuklagandaki Municipality, Ward no. 12, Lila Chowk, (28°05'18.11"N/ 84°02'25.78"E, Altitude 560m asl)	Ch 00+0453- Shuklagandaki Municipality, Ward no. 4, Dulegaunda Khaireni Health Post (28°03'11.87"N/ 84°04'18.75"E, Altitude- 538 m asl)
Length of Road	6.769 Km	0.453 Km
Existing Width	6m (Ch 00+000 to Ch 00+ 070) & 10 m (Ch 00+070 to Ch 06+769)	6m
Design Parameters		
Right of Way:	6m (Ch 00+000- Ch 00+ 070), 10 m (Ch 00+070- Ch 06+769), Almost in Public Use	6 m, Almost in Public Use
Carriageway Width	7.0 m (Carriageway width is almost clear and is in public use)	4 m (Carriageway width is almost clear and is in public use)
Road Classification:	Urban Road	
Pavement Design:		
Surface	Asphalt Concrete and Cement Concrete	
Asphalt Concrete	AC= 40mm, Base= 150mm, Sub-base- 150mm	
Cement Concrete	RCC M25 = 200 mm, Sub-base- 150mm	
Cross Drainage		
Slab Culvert	1 Nos (5 m Span), 1 Nos (2 m Span)	
RCC Pipe Culvert	11 Nos (0.9 m Diameter) and 5 Nos (1.2 m Diameter)	
Side Drains	1.40 m Plum-concrete on hilly areas wherever necessary 1.0 m RCC at settlement area with cover slab	

Description	Project Features
Retaining Structures	
Plum Concrete	9,335.80 m^3
Gabion masonry	2,113.50 m^3
Stone masonry	1,465.03 m^3
Earth Work	
E/W in Excavation all	20,319.59 m^3
Embankment & other fill	15,288.80 m^3
Protection Works	Retaining wall/slope protection measures as per requirement
Traffic signs/signage and road marking	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic
Road furniture (street lights, delineators, etc)	Provided all along the road
Traffic volume (AADT)	CH 1+300: 663 PCU (in 2023 AD) & 2277 PCU (in 2040 AD)
Project Cost (Without VAT & Contingency)	
Total Cost	NRs. 32,70,70,590 (USD 2,515,927.62; Taking 1USD= 130 NRs.)
Per Km Cost of Road	NRS. 4,52,88,091 (USD 348,369.93; Taking 1USD= NRs.130)

{**Source:** Detail Project Report of Improvement of Dulegaunda – Lamagaun Road (Dulegaunda – Lila Chowk Section), 2023}

1.5 Objectives of Environment and Social Management Plan

The basic objectives of the ESMP are to:

- ensure that all mitigation measures and monitoring requirements will actually be carried out at different stages of project implementation and operation - pre-construction, construction and operation and maintenance;
- recommend a plan of action and a means of testing the plan to meet existing and projected environmental problems;
- establish the roles and responsibilities of all parties involved in the project's environmental management;
- describe mitigation measures that shall be implemented to avoid or mitigate adverse environmental impacts and maximizing the positive ones;
- ensure requirements of RAP, GAP, VCDP (as applicable) in the sub project context of NUGIP.

1.6 Materials to be used

The upgrading of road will require boulders, sand and aggregates in activities like gravelling, construction of retaining walls and other structures. These construction materials will be brought from the established quarry sites at the Kotre Khola (which have already received the environment clearance) within the Shuklagandaki municipality. The Contractor may also obtain required construction materials from the legally operating crusher industries other than proposed quarry sites. However, the quarry sites and amount of quarrying material will be included in Construction Environment and Social Management Plan (CESMP) within 45 days of commencement of works. PIU will check the site requirements and quality of quarrying material

and approve it. DSC will also monitor whether the quarry sites has been legally operating or not. Other materials like: cement, rods, wire mesh, bitumen etc will be bought from Kathmandu, and Pokhara, the materials to be used in the project works is presented in **Table 1.2**.

Table 1. 2: Summary of Estimated Quantities of Materials

S. N	Item Description	Unit	Quantity	Source
1	Sub-base Material	m^3	8053	Kotre Khola
2	Base Material	m^3	6904	Kotre Khola
3	Boulders for Soling, Random Rubble Masonry works	m^3	7888	Kotre Khola
4	Aggregate	m^3	21000	Kotre Khola
5	Sand	m^3	9000	Kotre Khola
6	Cement	mt	70	Kathmandu, Pokhara,
7	Bitumen	mt	53	Kathmandu, Pokhara,
8	Reinforcement Steel	kg	52	Kathmandu, Pokhara,
9	GI Railing	rm	400	Kathmandu, Pokhara,

{**Source:** Detail Project Report of Improvement of Dulegaunda – Lamagaun Road (Dulegaunda – Lila Chowk Section), 2023}

Table 1. 3: Proposed Quarry Sites Details

S.N.	Pit No.	Source	Co-ordinates (WGS 84)		Type of Sample
			Northing	Easting	
1	Pit 1	Kotre Khola	215114	3112563	Construction Material (sand, gravels, boulders)
2	Pit 2	Kotre Khola	214982	3112545	Construction Material (sand, gravels, boulders)

(**Source:** Detail Design Report of Improvement of Dulegaunda- Lama Gaun Road, Shuklagandaki Municipality, Tanahun, Gandaki Province)

Figure 1.2: Location of Extraction Sites

1.7 Energy to be used

Fuels like electricity, diesel, petrol, LPG etc. are used while implementing the project. Diesel and petrol will be used for construction activities and transportation of construction materials. while LPG is used in labor camps for cooking. All these fuel demands will be fulfilled by the builders from outside the project area so that there will be no pressure on the local fuel demand. From the combustion of fuel in construction phase for different purposes, it is estimated that 418.92 metric tonne carbon will be emitted into the atmosphere (**Table 1.4**). Detailed calculation is presented in Annex III.

Table 1. 4: Carbon Emission from Fuel Combustion in Upgrading of the Road

S.N	Fuel	Source of Energy	Expected Volume	Carbon Emmission (metric Ton)	Remarks
1	Diesel	Local Oil Depo	200000 lt	147.12	From IPCC , 2006
2	Petrol	Local Oil Depo	2000 lt	1.27	
3	Kerosene	Local Oil Depo	50000 lt	270.49	
4	LPG	Suppliers	100 Cylinder	0.04	
Total				**418.92**	

(**Source:** Detail Design Report of Improvement of Dulegaunda- Lama Gaun Road, Shuklagandaki Municipality, Tanahun, Gandaki Province)

1.8 Human resources requirements

For total project construction period (1 year), it is estimated that 53,714 workers (Skilled- 6,499 and Unskilled- 47,215) will be required for the completion of the project while taking 300 days as working days.

1.9 Land required for the project

In the Fiscal year 2072, Office of Municipal Executives, Shuklagandaki Municipality, Tanahun declared 10m Right of way (RoW) for proposed Dulegauda- Lilachowk Road and RoW land is in jurisdiction of Suklagandaki Municipality (Refer to Annex XIII). No extra land beyond RoW is required for the upgrading of Dulegauda- Lila Chowk Road. Almost all the land within RoW of proposed road section is in public use since many years. The Construction Work will be done in available width at the location where private structures have congested road width. During construction period, 1.46 ha of land (outside RoW) will be required for project ancillaries facilities such as construction of workforce camp, stockpiling of construction material and spoil disposal (**Table 1.5/ Annex II**).

Table 1. 5: Land Required for Ancillaries Facilities

S.N.	Description of Project	Private Cultivated Land	Public Land	Total
1	Labor Camp		0.38	0.38
2	Stockpillng Sites		0.43	0.43
3	Spoil Disposal Sites	0.19	0.46	0.65
Land required temporarily for the project		**0.19**	**1.27**	**1.46**

(**Source**: Field Visit, 2023)

1.10 Construction Technology and Implementation Mechanism

While conducting and implementing the project, emphasis will be placed on environmental friendly construction techniques that are readily available and available at the local level as much as possible. Both humans and machines will be used for project management. Human workers will be used for the construction of Stone masonry wall, Gabion Wall and other roadside structures. During construction phase of the project, 2 excavators for soil cutting and filling work, 1 asphalt plant, 1 asphalt paver, 1 grader, 1 water tanker, 2 vibratory rollers, 1 bitumen distributor, 1 concrete batching plant and other construction related devices (mixer, vibration roller, water browser, air compressor, mechanical broom etc.) will be used.

1.11 Project Ancillary Facilities

1.11.1 Labor Camp

All togeteher 53,714 workers (Skilled- 6,499 and Unskilled- 47,215) workers will be engaged in the proposed project. Local community especially poor, vulnerable groups, women will be given priority in construction work based on skills and competenc. It is anticipated that about 78% of unskilled and 12% of skilled workforce will be migrant workers On the basis of skill and capacity, empahasis will be given to local labors as much as possible. Total 0.38 Ha. of land has been identified for the construction of labor camp required for the proposed project. Hard barricade will be used to encircle the labor camp and appropriate measures will be taken to drain the water at that place. Safe drinking water and gender-friendly toilets will be provided for the workers. First Aid Kit Box will be kept in the labors camp. Female labor-centric facilities such as separate female toilets, separate female camps, separate family camps will be provided. Detail description of labor camp required for the project is presented in table 1.7 and figure 1.3. Labor camps will be strongly fenced with galvanized sheet Detail of labor Camp sites are presented on **Table 1.6.**

Table 1. 6: Description of Labor Camp Sites

S.N	Address	Chainage (Co-ordinate)	Area (Ha.)	Remarks
1	Shuklagandaki Municipality, Ward no. 8, Nearby Tibetian Camp	Ch 02+030- 02+380 of Road A (28.076756°N/ 84.052967°E)	0.07	Public Land Owned by Shuklagandaki Municipality
2	Shuklagandaki Municipality, Ward no. 9, Nearby Saraudi Dhandaar	Ch 02+795- 03+280 of Road A (28.0706°N/ 84.061°E)	0.16	Public Land Owned by Shuklagandaki Municipality
3	Shuklagandaki Municipality, Ward no. 9, Malebagar	Ch 04+880- 05+280 of Road A (28.0797°N/ 84.052°E)	0.09	Public Land Owned by Shuklagandaki Municipality
4	Shuklagandaki Municipality, Ward no. 12, Sundare	Ch 06+430- 06+630 of Road A (28.088°N/ 84.04°E)	0.06	Public Land Owned by Shuklagandaki Municipality
Total			**0.38**	

(**Source:** Field Visit, 2023)

1.11.2 Stockpiling Sites

Total 0.43 Ha. of land has been identified for the storage of construction materials. Detail description of stockpiling sites required for the project is presented in Table 1.7 and Figure 1.4. Stockpiling sites will be strongle fenced with galvanized sheet. Detail of Stock piling sites are presented on **Table 1.7.**

Table 1. 7: Description of Stock Piling Sites

S.N	Address	Chainage (Co-ordinate)	Area (Ha.)	Remarks
1	Shuklagandaki Municipality, Ward no. 4	Ch 00+480- 00+830 of Road A (28.054°N/84.07°E)	0.13	Public Land Owned by Panchamuni Ma.Vi.
2	Shuklagandaki Municipality, Ward no. 8, Nearby Tibetian Camp	Ch 02+030- 02+380 of Road A (28.076756°N/ 84.052967°E)	0.16	Public Land Owned by Shuklagandaki Municipality

S.N	Address	Chainage (Co-ordinate)	Area (Ha.)	Remarks
3	Shuklagandaki Municipality, Ward no. 12, Sundare Chaur	Ch 06+375- 06+630 of Road A (28.088°N/ 84.04°E)	0.14	Public Land Owned by Shuklagandaki Municipality
Total			**0.43**	

(**Source:** Field Visit, 2023)

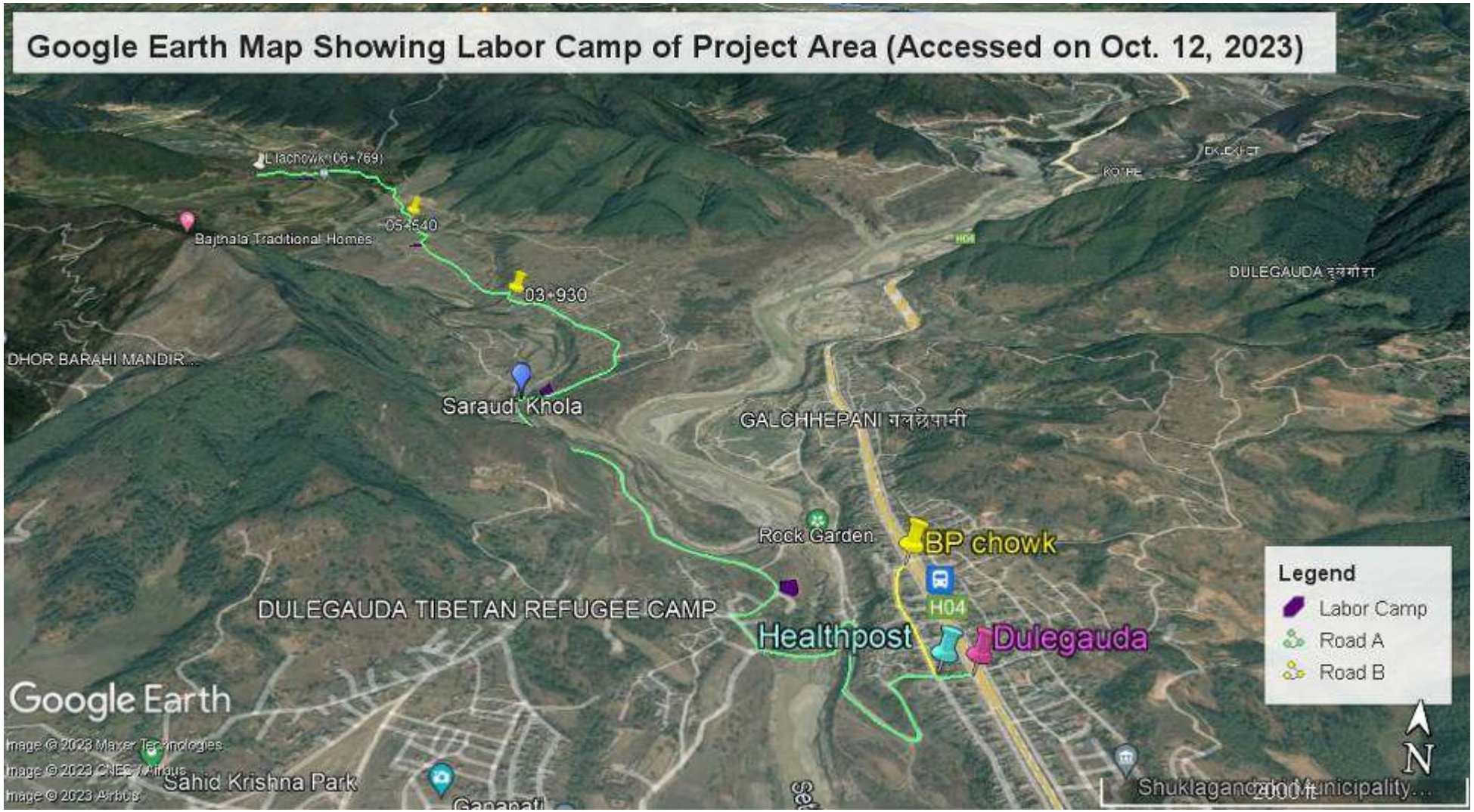


Figure 1.3: Location of Labor Camp Sites

Figure 1.4: Location of Stockpiling Sites

1.11.3 Spoil Disposal Sites

Three sites of total area 0.65 Ha. has been identified for Spoil Disposal sites within the project area. The Detail description of Spoil disposal sites are presented in **Table 1.8.** and **Figure 1.5.**

Table 1. 8: Description of Spoil Disposal Sites

S.N	Address	Chainage (Co-ordinate)	Area (Ha.)	Quantity (m^3)	Remarks
1	Shuklagandaki Municipality, Ward no. 4, Pulchowk	Ch 00+830- 00+980 of Road A ($28^0$03'18.19''N/$84^0$04'12.66"E)	0.19	2,850	Private Land Owned by Krishna Raj Pandit
2	Shuklagandaki Municipality, Ward no. 9, Jhakrithaan Kholso	Ch 03+280- 03+530 0f Road A ($28^0$04'22.02''N/$84^0$03'35.04"E)	0.07	1,400	Public Land (GoN)
3	Shuklagandaki Municipality, Ward no. 9, Ground of Talbeshi Secondary School, Syaule Bazaar	Ch 03+530- 03+930 of Road A ($28^0$04'08.75''N/$84^0$03 45.72"E)	0.39	2,730	Materials used for leveling the School ground Owned by Talbeshi Secondary School
Total			0.65		

(**Source**: Field Visit, 2023)

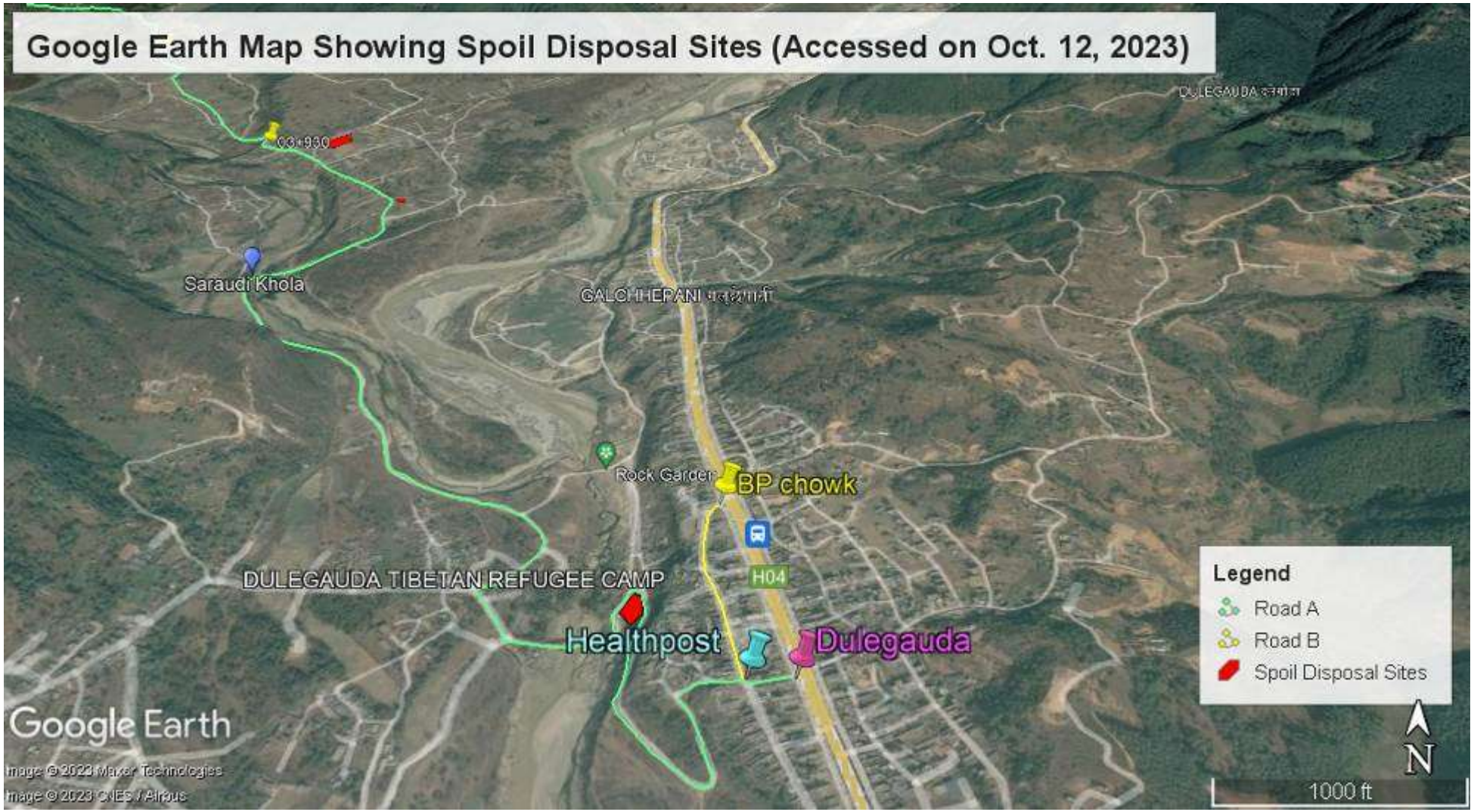
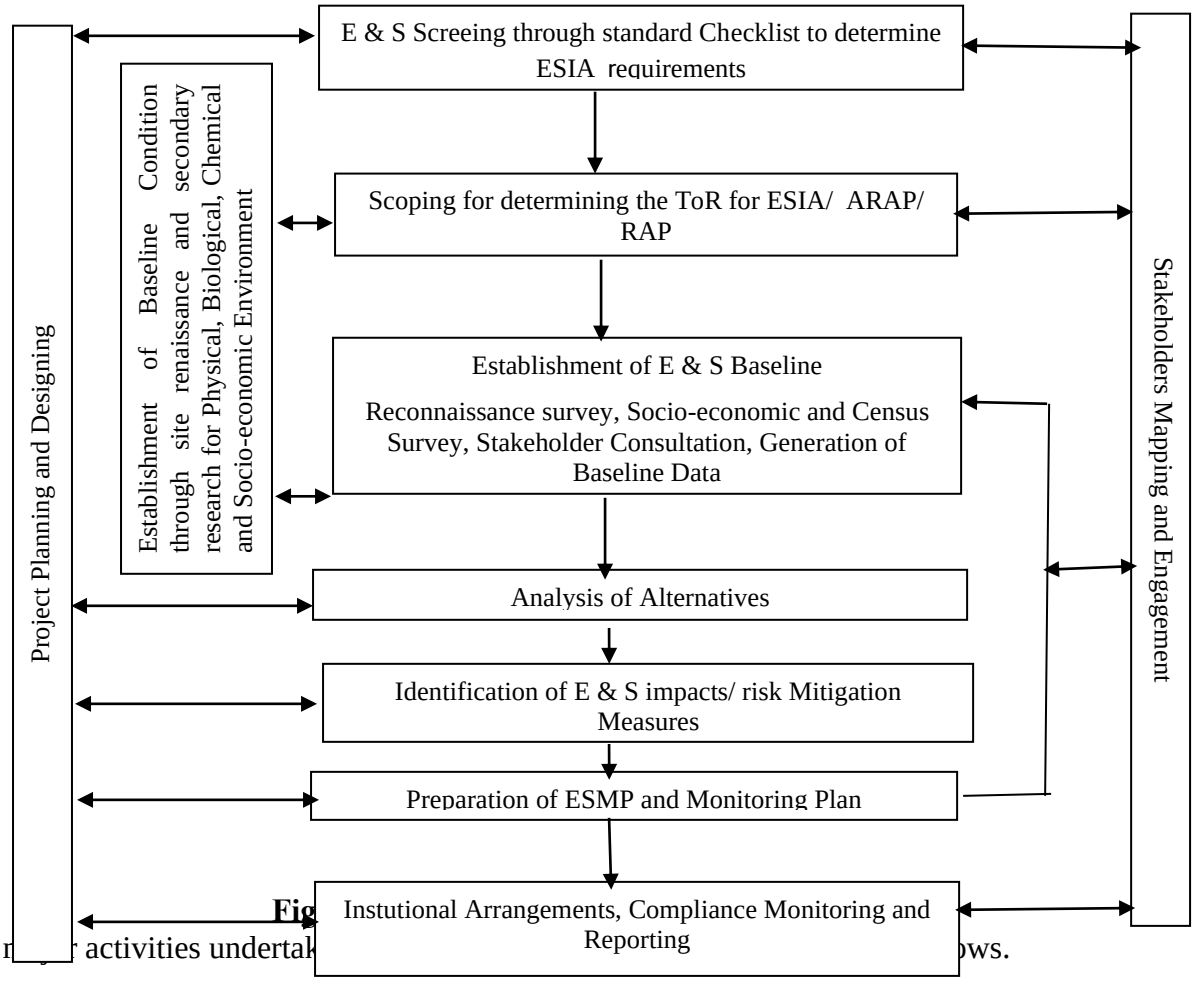


Figure 1.5: Location of Spoil Disposal Sites

CHAPTER 2 - ESIA METHODOLOGY

The Environmental and Social Impact Assessment (ESIA) was done for preparing an Environmental and Social Management Plan (ESMP). ESIA Report was prepared by following guidance provided by the Environmental and Social Management Framework (ESMF). A consultative and participatory process was adopted to conduct the ESIA and prepare the ESMP for the sub-project of Upgrading of Dulegaunda – Lila Chowk Road (7.22 Km). The strategies to undertake the ESIA and preparing the ESMP required both qualitative and quantitative information gathering at both primary and secondary levels.



Fig

The r activities undertak ows.

2.1 Desk Study

The relevant documents of laws, acts, guidelines, plans and policies of GoN, World Bank Policies, scope of works in the Terms of Reference (TOR) for the ESIA/ESMP, Project Implementation Manual (PIM), feasibility reports and Detail Design Report of Dulegauda-Lamagaun road, Geological Map of Nepal published by Department of Mines and Geology in 1994, Environment Statistics of Nepal published by CBS in 2019, Seismic Zoning Map of Nepal published by Ministry of Urban Development in 2020, Topo-graphic Map (Topo-sheet- 2884 13c Khairenitar). published by Survey Department in 2001, Birds of Nepal; An Official Checklist published by Department of National Parks and Wildlife Conservation (DNPWC) in 2018, The Status of Nepal's Mammals: The National Red List Series published by DNPWC in 2011 and Shuklagandaki Municipality Profile were reviewed to generate secondary data on physical, biological and socio-economic and cultural environment of the subproject area.

2.2 Checklist/ Format/ Questionnaire Preparation

In order to meet the objectives of ESIA, different checklist and questionnaire were prepared for the collection of primary information on physical, biological, socio-economic and cultural environment through field studies The checklist was based on ESMF. The likely Impacts (both beneficial and adverse) were identified and/ predicted by adopting the simple checklists and matrix methods outlined in the environmental guidelines. Based on the likely impacts in terms of its magnitude, duration and extent, the Environment and Social Management Plan (ESMP) have been designed. Similarly, Environmental Monitoring Plans have been prepared taking into consideration the types of impacts and suggested mitigation measures.

2.3 Field Study and Baseline Data Collection

The field study was carried out to collect the baseline information on physical, biological, socio-economic and cultural environment of the project area during **September 04, 2022 to March 26, 2023**. Walk through Survey, Focus Group Discussions (FGDs), Key Informant Interviews (KII) and Public Hearing were conducted to collect baseline data.

2.3.1 Collection of data related to physical environment Survey

In order to collect data related to the physical environment of proposed project area, the study team conducted on-site observation of the project area, walk through survey and group discussion. Data related to the physical environment were collected by the following method.

Meteorological data (temperature and precipitation): Temperature and rainfall of the project area was determined by analyzing the data obtained from nearby Damulai Station (Station Index No.- 817) of Department of Hydrology and Metrology in Tanahunn District, Gandaki Province.

Description of Water Sources: During field visit, the different water sources within the project area were listed according to the chainage using the checklist. In addition, water pollution condition, river bank erosion condition and availability of river materials on those water sources were also analyzed.

Geological studies: On the basis of on-site study and observation, the type of soil and rock type found in the project site were noted according to the chainage based on the checklist. The geological structures and geological formation of the project site were analyzed on the basis of geological map.

Air Quality: The 24hrs air quality of Dulegaunda Chowk (A1), Syaulibazar (A2), Crusher Plant, Kotre (A3), and Lila Chowk (A4) of project Area was monitored by using high volume Combine sampler (Model No.: GTI 241, Manufacturer: Greentech Instruments, New Delhi India, Serial No.: 121-DTF-2016). The detail of air quality monitoring is presented in **Table 2.1**. Among the four air quality monitoring points, A3 is situated at the crusher plant, while A1, A2, and A4 are representative of the settlement area along proposed project area. Carbon emission from fuel combustion during construction phase were calculated by following IPCC (2006) guideline (Annex III).

Table 2.1: Sampling Detail of Air Quality Monitoring

S.N.	Location	Symbol	Latitude	Longitude	Monitoring Date and Time
1.	Dulegaunda Chowk	A1	28.05766093°N	84.07158179°E	July 22, 2023; 14:00 onwards
2.	Syaulibazar	A2	28.07161909°N	84.05979463°E	July 21, 2023; 14:00 onwards
3.	Crusher Plant, Kotre	A3	28.07445424°N	84.06951173°E	July 22, 2023; 15:00 onwards
4.	Lila Chowk,	A4	28.08866249°N	84.04039134°E	July 21, 2023;

S.N.	Location	Symbol	Latitude	Longitude	Monitoring Date and Time
					14:00 onwards

(**Source:** Air Quality Report, 20280)

Figure 2.1: Sampling point of air quality monitoring

Noise Quality

The 24hrs Noise Level of Dulegaunda Chowk (N1), Syaulibazar (N2), Crusher Plant, Kotre (N3) and Lila Chowk (N4) of project area was monitored by using CENTER Sound Level Data Logger (Model No.: CENTER 322, Manufacturer: CENTER Technology Corp., Taiwan, Serial No.: 150500187). The noise level was measured simultaneously at all four sites during both day time and night time hours, in conjunction with air quality monitoring for the parameters Maximum Noise Level (Lmax), Minimum Noise Level (Lmin) and Equivalent Noise Level (Leq). The detail of noise level monitoring sites is given in **Table 2.2.**

Table 2.2: Sampling Detail of Noise Level Monitoring of Project Area

S.N.	Location	Symbol	Latitude	Longitude	Monitoring Date and Time
1.	Dulegaunda Chowk	N1	28.05766089°N	84.07158175°E	July 22, 2023; 14:00 onwards
2.	Syaulibazar	N2	28.07182319°N	84.06000336°E	July 21, 2023; 14:00 onwards
3.	Crusher Plant, Kotre	N3	28.07446032°N	84.06953514°E	July 22, 2023; 15:00 onwards
4.	Lila Chowk,	N4	28.08876299°N	84.04114810°E	July 21, 2023; 14:00 onwards

(**Source**: Noise Level Monitoring Report, 2080)

Figure 2.2 : Sampling points of noise level monitroing

Water Quality: Five Water sample (Three drinking water sample from household tap and two river water sample) were taken from the project area. Among of them three drinking water sample were taken from the household tap of Dulegauda (W1), Syaulibazar (W2) and Lilachowk (W3). And two water sample were taken from Seti River and Saraudi Khola, as they intersect Healthpost Chowk- Lilachowk Road (i.e. Road A) at Ch 00+900 and Ch 02+665 respectively. Water sample were collected from the approximately 100 meters downstream in both Seti River and Saraudi Khola. Thus collected water sample was anlazyed in E.G. Labs Pvt. Ltd., Gongabu, Kathmandu, Nepal. Water sampling Detail of project area is presented in **Table 2.3** below.

Table 2.3: Water Sampling Detail of Project Area

Type of Water	Symbol	Location	Latitude	Longitude	Sample Taken Date and Time
Drinking Water	W1	Dulegaunda Chowk	28.05766093°N	84.07158179°E	July 28, 2023
	W2	Syaulibazar	28.07161909°N	84.05979463°E	
	W3	Lila Chowk,	28.08866249°N	84.04039134°E	
River Water	W4	Saraudi Khola	24.0646778°N	84.06097223°E	
	W5	Seti River	28.07578098°N	84.06914465°E	

(Source: Water Quality Report, 2080**)**

Figure 1.3: Sampling point of water quality monitoring

Slope Stability: Based on the checklist, the unstable places in the project area were studied and listed by measuring the length, width, depth and activity etc. of the places. The latitude and longitude of unstable places were recorded using GPS.

Public Utilities: During field observation and walk through survey public utilities such as; Electric poles, public taps, drinking water tanks, Chautara etc. were noted and listed according to chainage using checklist.

Project Ancillaries Facilities: During field visit temporary land required for project anicillaries facilities such as labor camp, stockpiling sites, spoil disposal sites, Extraction sites etc were identified by direct observation and group discussion with concerned stakeholders. Checklist was used to generate information on project anicillaries facilities. Land required for project anicillaries facilities were noted with their geographical location and listed.

Land use: During field visit land use pattern for the proposed project were noted using GPS and measuring tape according to the checklist. The data from the field visit was analyzed through GIS and the area of different land use such as public land, agriculture land, residential area, forest area etc were measured.

Other: The study team conducted a group discussion with the local residents about the physical condition of the area, especially the waste management system, rock, soil, land slide prone area, watershed and water condition in the river channel and collected information about the possible impact of the implementation of the proposal.

2.3.2 Collection of data related to biological environment Survey

Biological survey was carried out by inventory as well as walk through survey throughout the direct impact areas, key informant's interviews and focus group discussion were carried out. Data related to the biological environment were collected by the following method.

Flora: During the feild visit, entire trees within formation width (i.e. 9 m) of the proposed road were counted with their geographical location. In addition, the height of tree was calculated by using clinometer and diameter at breast height (dbh) was measured using dbh tape. The protected vegetation (rare, endangered, indigenous etc.) of the influence area as per IUCN Red Book, CITES Appendices and GoN list species were enumerated based on consultation with local people in the indirect impact areas of the project.

Fauna: Data of Wildlife bio-diversity (i.e. mammals, birds, fishes and reptiles), protected wild animals and wildlife habitats found in the project area was collected through review of data from secondary sources, direct observation, Key Informant's Interview and group discussion with concerned stakeholders. The protected wildlife species (rare, endangered, indigenous etc.) of the influence area as per IUCN Red Book, CITES Appendices and GoN list species were enumerated based on consultation with local people in the indirect impact areas of the project.

2.3.3 Collection of data related Socioeconomic and Cultural Environment

The elements related to the Socio- economic and cultural environment of the project area such as the population, health, education, drinking water and sanitation, livelihood, religious sites, cultural sites, tourist sites etc of the project affected areas were collected. The following methods was adopted to collect data related to social, economic and cultural environment.

Group Discussion:
During field visit, group discussion (including men, women, indigenous people, elected Bodies etc) program with concerned stakeholders was organized in Lila Chowk of Ward no. 12, Ward office of Ward no.9 and Ward office of Ward no. 4 of Shuklagandaki Municipality, Gandaki Province for collecting the concerns /issues regarding the proposed road-upgrading project. Minutes of focus group discussion was mentioned in Annex VII and the key issues were also shown in Annex VIII and Annex IX.

Focal Group Discussion:
During field visit, focal group discussion with women's group, children's group and indigenous people was organized in Gurung Gumba, Syaule Bazar, Ward No.9, Talbeshi Ma.Vi., Ghari, Ward No. 9 and Ward Office, Ward No. 9 of of Shuklagandaki Municipality respectively. The concerned issues regarding the proposed road-upgrading project. was collected. Minutes of focal group discussion and identified key issues was mentioned in Annex VII and Annex IX.

Key informant's interview: Key informant's interview was conducted during the field visit to collect information on socio-economic and cultural activities of the project area. The ward level checklist was designed to collect information on basic demographic and migration patterns, food sufficiency and cropping patterns, existence of user's group/committees, public facilities and infrastructure, labour force availability, existence of archaeological and religious sites etc. Information of key informant is given in Annex X

2.4 Public Hearing

A 15 days' public notice was published from office of municipal excutive, Shuklagandaki Municipality, Tanahun on February 24, 2023 (i.e. 2079/11/12) for conducting public hearing program in project affected area. The same notice was pasted on the notice boards of Shuklagandaki Municipality, related ward offices of Shuklagandaki Municipality (i.e. ward no. 4, 8, 9 & 12), various community school buildings, health posts, sub-division forest office, community forest office and public places. According to published notice, a public hearing program was organized on March 10, 2023 (i.e. 2079/ 11/ 26) in Ward office, Ward no. 9, Shuklagandaki Municipality. Total 54 people (Male- 41 and Female- 13) was participating the public hearing program (Annex-VIII). During the program, the participants were informed regarding the project and its activities as well as draft ESIA report was presented. In addition, the participants were requested to express their opinions. Issues and suggestions from the concerned stakeholders of project affected area were noted down. Thus collected issues, opinions and suggestions were addressed and included in this report.

2.5 Data Analysis and Presentation

The collected information/data was analyzed using Arc Map Version 10.2, Autocad, MS-Excel, and GIS. The data/information obtained from primary and secondary sources was analyzed and presented in various maps, pictures and tables as required.

The amount of carbon emissions from the consumption of petroleum products in vehicles and machineries used during construction phase was determined as shown in **Table 2.4** below.

Table 2. 4: Conversion Table of Carbon Emission from fossil fuel combustion

S.N.	Petroleum Products	IPCC Unit	CO_2 emission per Gallon (Kg)	CO_2 emission per Liter (Kg)
1	Petrol	Gallon	7.78	2.311431713
2	Diesel	Gallon	10.21	2.697197926
3	LPG	Gallon	5.68	1.500497965
4	Kerosene	Gallon	75.2	19.86574777

(Source: IPCC Guidelines for National Green House Gas Inventories, 2006)

Equivalent Noise Level (Leq) of noise monitoring sites of project area was determined by using following formula:

$$\text{Leq} = 10log(\sum_{i=1}^{n} fi\ 10^{Li/10})dB\ (A)$$

Where,
fi= fraction of time for which the sound level persists
i= time interval
n= number of observations
Li= sound intensity

The methods adopted for water quality testing is presented in **Table 2.5**.

Table 2.5: Lab Analysis Methods of Water Quality Testing

S.N.	Testing Parameters	Test Methods
a.	Color	2120 B., APHA 23rd edition
B	Conductivity	2510 B., APHA 23rd edition
C	pH	4500 H+ B., APHA 23rd edition
D	Turbidity	2130 B., APHA 23rd edition
E	Ammonia	4500 NH_3 F., APHA 23rd edition
F	Chloride	4500-Cl^- B., APHA 23rd edition
G	Iron	3500-Fe B., APHA 23rd edition
H	Nitrate	4500 NO_3^- B., APHA 23rd edition
I	Total Hardness	2340 C., APHA 23rd edition
J	Arsenic*	3111 C., APHA, 23rd edition
K	Sulphate	4500-SO_4 E., APHA 23rd edition
L	Residual Chlorine	4500-Cl B., APHA 23rd edition
M	Manganese**	3111 C., APHA, 23rd edition
N	Fluoride	4500F- D., APHA, 23rd edition
O	E. Coli*	Eosin Methylene Blue Agar for Rapid Direct Count of E. coli, AJPH, 2011
P	Total Solids	2540 B. APHA 23rd edition
Q	Total Suspended Solids	2540 D. APHA 23rd edition
R	Total Dissolved Solids	2540 C. APHA 23rd edition
S	Dissolved Oxygen	4500-0 B., APHA 23rd edition
T	Chemical Oxygen Demand	5220 D., APHA 23rd edition
U	Biological Oxygen Demand	5210 B. 5-Day BOD Test, APHA 23rd edition

Tree volume was calculated by using following formula mentioned in Annex-9 of Forest Regulation, 2079.

$$\textbf{Tree Volume } (m^3) = \textbf{Stem Volume} + \textbf{Branch Volume}$$

$$\textbf{Stem Volume } (m^3) = \textbf{Exp } [a + b * \textbf{Ln}(d) + c * \textbf{Ln}(h)]$$

Where,

a, b र c = Parameter/ Values used for calculating stem volume according to tree species mentioned in Forest regulation, 2079 in Annex-9

d = diameter at breast height (i.e. 1.3 m above from ground level) (m)

h = Height of tree (m)

Branch Volume was calculated by using following formula mentioned in Annex-9 of Forest Regulation, 2079.

$$\textbf{Branch Volume } (m^3) = \textbf{Branch Ratio} * \textbf{Stem Volume}$$

Table 2. 6: Formula for calculating Branch Ratio according to diameter class

S.N.	Diameter Class	Branch Ratio (R)
1.	< 10 Cm	Small (s)
2.	10 Cm – 40 Cm	[(d-10)*m + (4०-d)*s]/ 30
3.	40 Cm – 70 Cm	[(d-40)*b + (7०-d)*m]/ 30
4.	> 70 Cm	Big (b)
Where, d = diameter at breast height, s, m र b = Values used for calculating branch ratio according to tree species mentioned in Annex- 9 of Forest Regulation, 2079.		

(**Source**: Forest Regulations, 2079)

2.6 Report Preparation and Presentation

Based on ESIA Template mentioned in Appendix – C of Environmental and Social Management Framework (ESMF) developed by Nepal Urban Governance and Infrastructure Project (NUGIP), this ESIA report was prepared

2.7 Stakeholder Analysis

A stakeholder analysis was carried out during the ESIA stage. The following activities were carried out during the analysis:

- Identified stakeholders of the sub-project
- Consulted stakeholders
- Incorporated feedback from the stakeholders into project design
- Incorporated recommendations and mitigation measures during construction and operation
- Involved stakeholders in stages of project implementation for ownership.

2.8 Assessment of potential environmental and social impacts

- Likely Beneficial Impacts
- Likely Adverse Impacts

2.9 Environmental and social screening

Every sub-project under the NUGIP is subject to an environmental and social screening process. The screening process establishes the level of environmental and social assessment required. The screening process intends to identify relevant possible environmental and social concerns as well as suggest any further investigation and assessment as necessary. Primarily, the

environmental and social screening exercise is undertaken to determine the key environmental and social issues/concerns and the nature and magnitude of the potential impacts that are likely to arise on account of the proposed sub-projects. The fundamental environmental and social issues to be identified were determined by the type, location, sensitivity and scale of the municipal investment and sub-grant intervention. The results were used to determine the need for detailed assessment and the extent and type of environmental and social assessment.

2.10 World Bank Safeguard Policies

The World Bank Safeguard Policy specifies project components which have inherent environmental risks on land, forest, air, water, location proximity to environmentally, socially and culturally important areas, sensitivity, potential impacts which may be irreversible or environment sensitive to changes, the scale and extent of environmental and social issues of the project, and the nature and magnitude of its potential environmental impacts.

2.11 Revision and modification of ESMP

The ESIA will be publicly disclosed and disseminated. Unexpected situations in the sub-project or component design would therefore be assessed and appropriate management measures will be incorporated by updating the ESMP. Such revisions will also cover any modifications introduced in the design of sub-project at any stage of the project. Also, based on the experience of application and implementation of such a framework, provisions and procedures would be updated as applicable and when required with due process.

CHAPTER- 3: ENVIRONMENTAL AND SOCIAL BASELINE

3.1 Physical environment

3.1.1 Physiography, Geomorphology and Geology

Physiographically, Nepal is divided into eight different zones. i.e. Terai, Siwalik, Dun Valley, Mahabharat Range, Midlands (hills), Fore Himalaya (Middle mountain), Higher Himalaya and Trans Himalaya (High Mountain). Each of the above zones has different altitude, topography, climate, soil type, geology and vegetation characteristics.

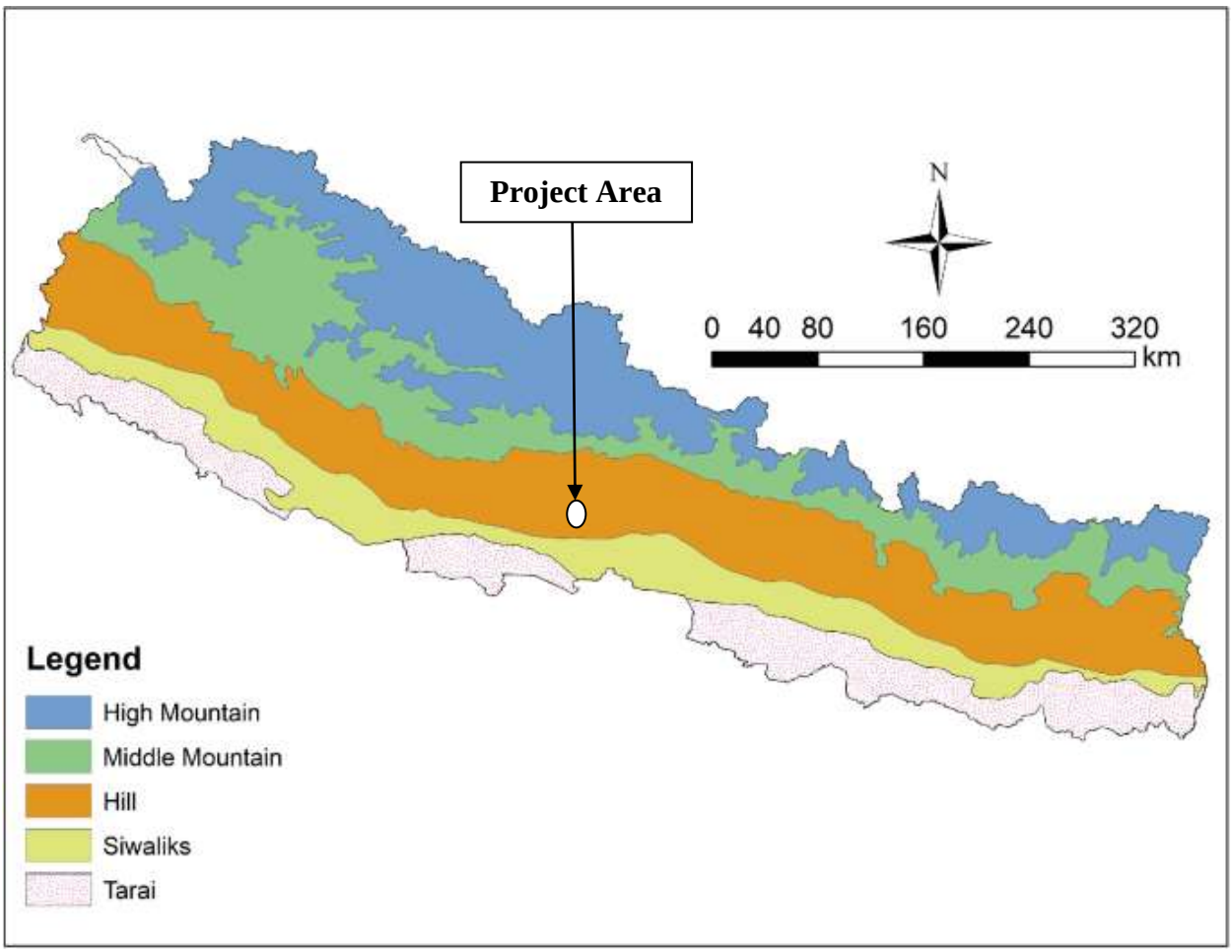


Figure 3.1: Physiographic Division of Nepal and project area

Shuklagandaki Municipality falls on Midlands. with an altitude ranging from 479m (Ch 01+080 of Road A) to 560m (Ch 06+769 of Road) above mean sea level and located between 28° 3'25.27"N and 28°05'18.11"N latitude and 84° 4'17.16"E and 84°02'25.78"E longitude. The project road passes through mostly hilly consisting of ordinary soil, boulder mixed soil and soft to medium rocks. The major rock types found in the Project area are schist, phyllite, gneiss, quartzite, granite and limestone.

Geologically, Nepal is divided into 5 different regions. They are Terai, Siwaliks, Lesser Himalaya, Higher Himalaya and Tibetan Tethys Himalaya. Geologically, Shuklagandaki Municipality falls in the Lesser Himalaya zone. The project area lies in Main Boundary Thrust (MBT). The road alignment follows the rocks of the Midland Group, Lesser Himalaya, Pokhara Formation. The rocks of Lesser Himalayan Zone have been transported southwards in several thrust slices. Generally, two types of sequences namely autochthonous and allochthonous can be distinguished in this Zone throughout the Himalayas. The both sequences of the Lesser

Himalaya mainly have unfossiliferous, sedimentary, and metasedimentary rocks such as slate, phyllite, schist, quartzite, limestone, dolomite, etc, ranging in age from Precambrian to Eocene.

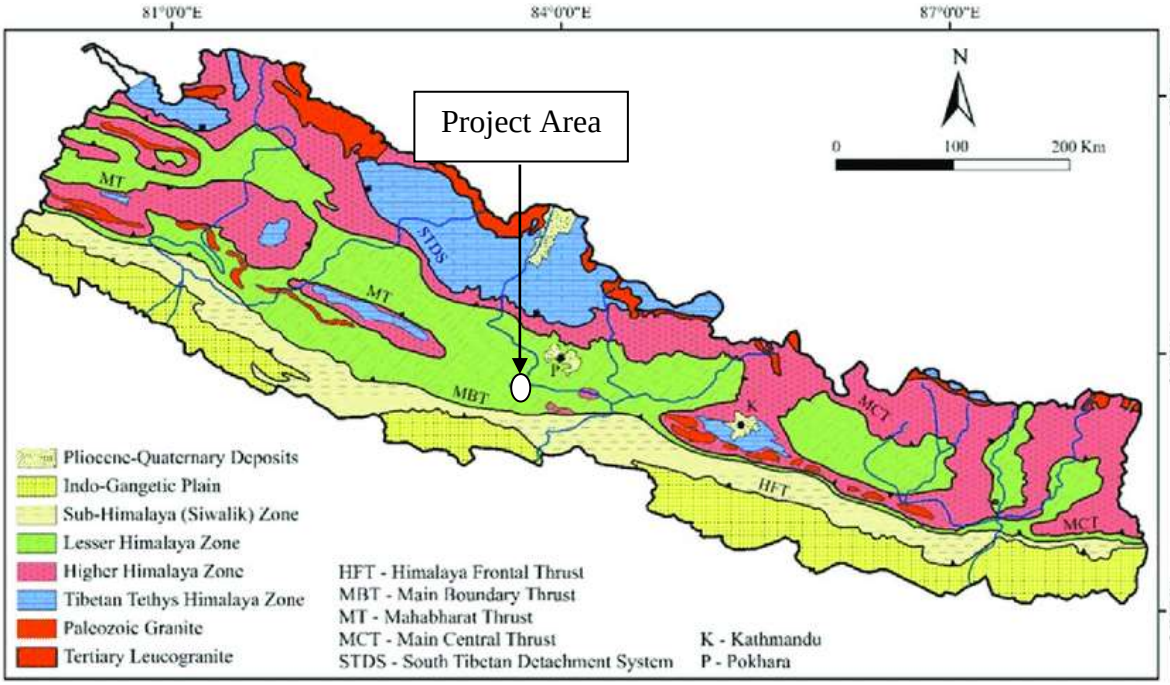


Figure 3.2: Geological map of Nepal

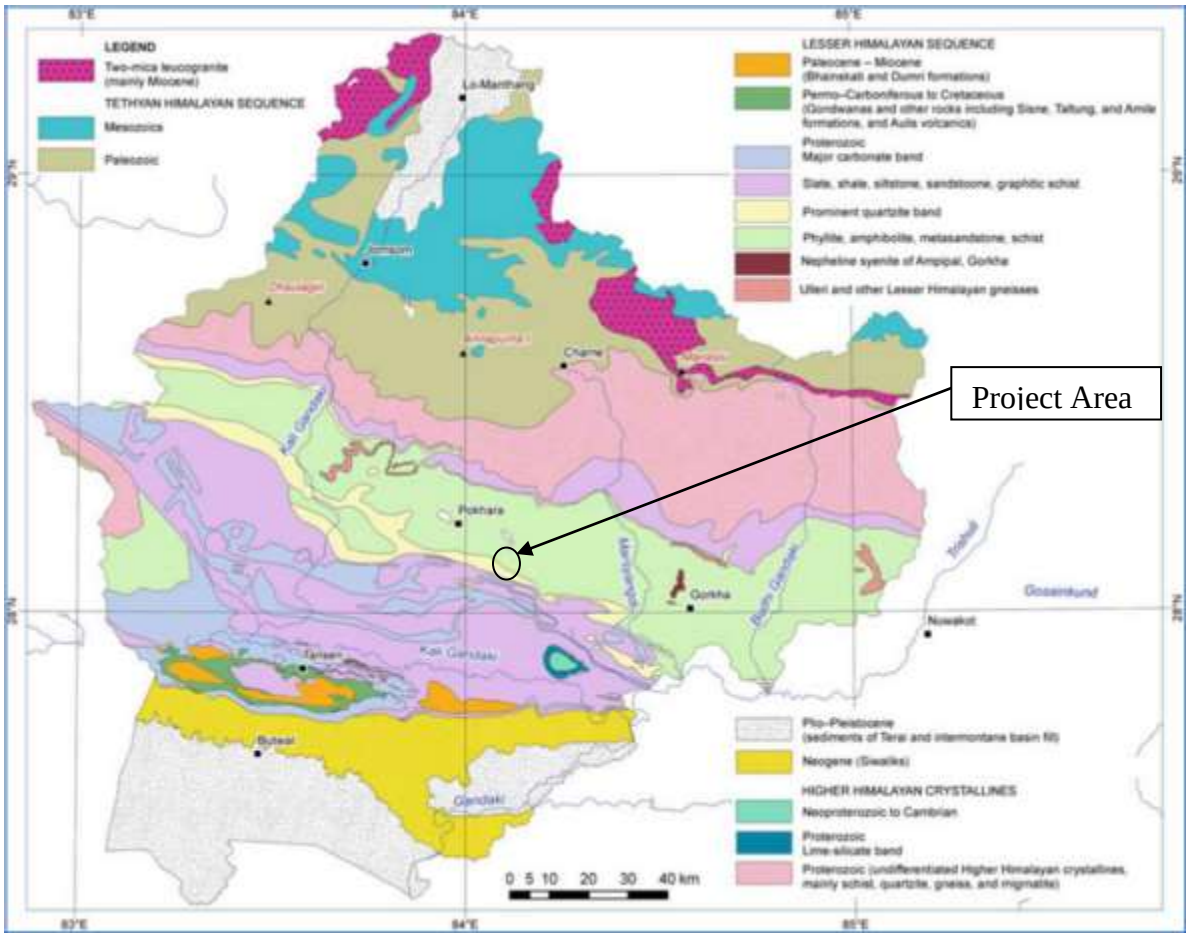


Figure 3.3: Simplified Geological Map of the Gandaki Region (Source: Detail Design Report of Improvement of Dulegaunda- Lama Gaun Road, Shuklagandaki Municipality, Tanahun, Gandaki Province)

There are also some granitic intrusions in this zone. Along the road section, the rocks of schist are also exposed along the road alignment. Road alignment is covered by the residual soil with

thick colluvial deposits. A good portion of the alignment covered by residual soil and colluvial deposits. At many locations bedrocks of phyllite can be seen along the road alignment.

3.1.2 Topography

The proposed road alignments lies in Gandaki Province, Tanahun District, Shuklagandaki Municipality, Ward no. 4, 8, 9 and 12. The project area is located towards northwest from Kathmandu and the northeast from the provincial capital of Gandaki province of Nepal. This municipality lies in midlands. Seti Rivers intersects proposed road aligments at Ch (Ch 01+250) and Saraudi Khola at Ch 03+040 & Ch 05+910. The major settlements lies within the proposed road alignments area B.P Chowk, Dulegauda, Healpost Chowk, Ghari, Syaule Bazaar, Talbeshi, Malebagar, Lila Chowk and Kutkute.

3.1.3 Climate and Hydrology

Shuklagandaki municipality falls on tropical climatic zone. This climate has three distinct seasons. Dry summer season begins in the month of March when the sun starts to move northward from the equator. It lasts till the middle of May. The mean minimum temperature reaches up to 17.75ºC and mean maximum temperature is nearly 30.45ºC. Rainy season starts from the month of May and ends in September. Winter season begins in the month of October and lasts till February as the sun moves southward from the equator. Higher temperature is observed in the month of April and it remains active till October. Extreme cold starts from November and last till February. The average annual rainfall is 1459.67 mm. November, December, and February are the driest month and most precipitation falls in July. The major rivers flowing within the project area are Seti River and Saraudi Khola.

Table 3. 1: Temperature and Rainfall of the Project Area

Year (AD)	Annual Temperature (^{0}C)			Average Precipitation (mm)
	Minimum	Maximum	Average	
2013	17.9	30.3	24.1	1940
2014	NA	NA	NA	1266.9
2015	NA	NA	NA	NA
2016	17.6	30.6	24.1	1172.1
2017	NA	NA	NA	NA
Average	17.75	30.45	24.1	1459.67

(Source: Environment Statistics of Nepal, 2019*)*

The hydrological catchment area of the project road covers about 6 sq.km including various rivers. The catchment zoning of the project area is presented in figure 3.4. The major rivers flowing within the project area are Seti River (Ch 00+980 of Road A) and Saraudi Khola (Ch 02+745 & Ch 06+330 of Road A). In existing condition, there are 2 bridges over Seti River (Ch 00+980 of Road A) and Saraudi Khola (Ch 06+330 of Road A) and one 4m span slab culvert over Saraudi Khola (Ch 02+745).

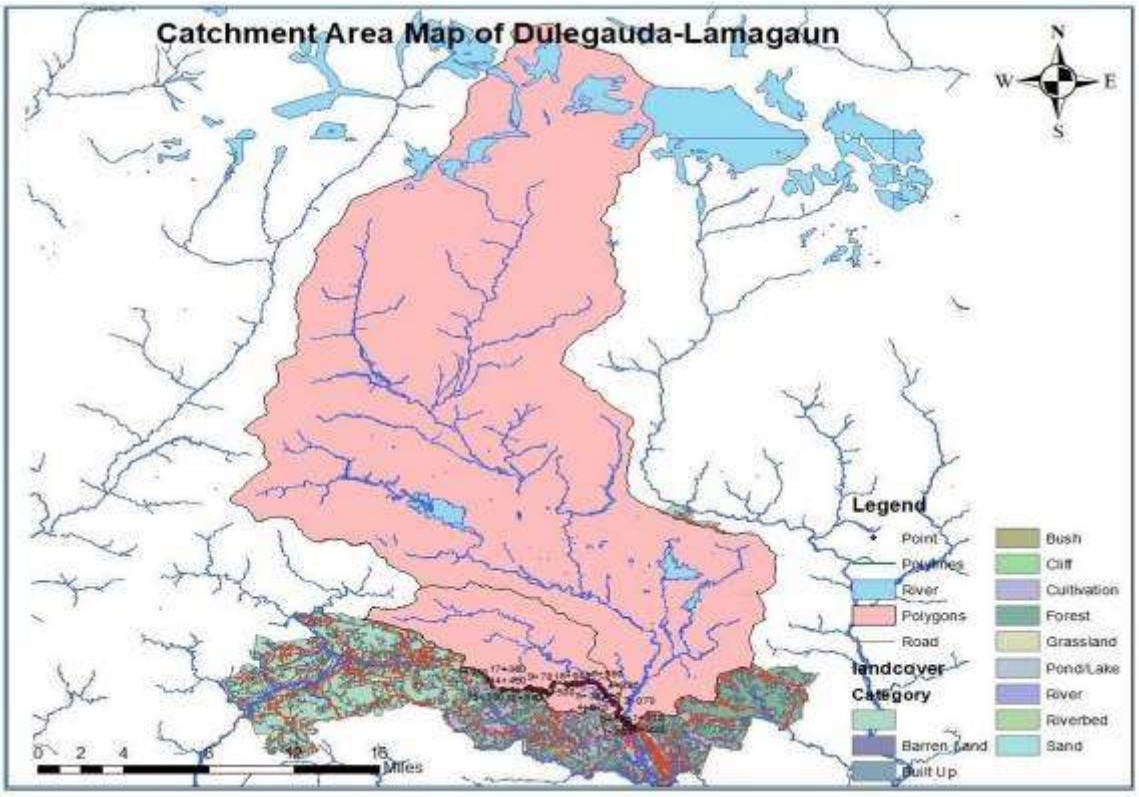


Figure 3.4: Catchment Area of Proposed Project Area (**Source:** Detail Design Report of Improvement of Dulegaunda- Lama Gaun Road, Shuklagandaki Municipality)

3.1.4 Seismicity of the Project Area

According to Earthquake hazard map of Nepal published by Nepal Seismological Centre, the Peak Ground Acceleration (PGA) for the project area has been taken as 0.38g. As the project area falls under Zone III of sesmic zone, the design for seismic forces should be done considering the project in Zone III. Earthquake hazard map of Nepal is shown in

Figure 3.5.

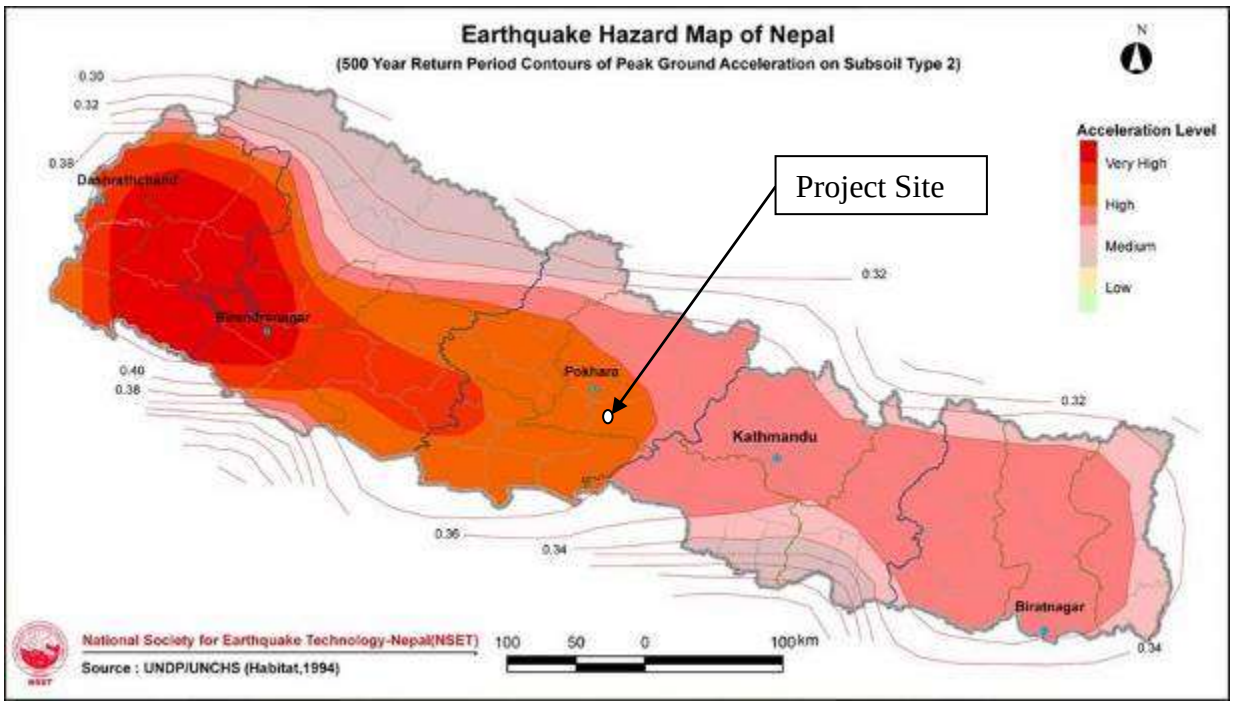


Figure 3.5: Earthquake Hazard Map of Nepal (**Source: UNDP/UNCHS, 1994**)

3.1.5 Land Use

In the Fiscal year 2072, Office of Municipal Executives, Shuklagandaki Municipality, Tanahun declared 10m Right of way (RoW) for proposed Dulegauda- Lilachowk Road and RoW land is in jurisdiction of Suklagandaki Municipality (Refer to Annex XIIIp). No extra land is required for the upgrading of Dulegauda- Lila Chowk Road. Almost all the land within RoW of proposed road section is in public use since many years. The Construction Work will be done in available width at the location where private structures have congested road width.

Table 3. 2: Land Use Description along Proposed Road Alignments

S.N.	Land Use Type	Name of Road	Chainage		Area Occupied by Existing Road (Ha)	Percentage (%)
			From	To		
1	Settlement	A	00+000	06+769	2.46	35.6
		B	00+000	00+453		
2	Cultivated Land	A	00+280	06+430	1.56	22.58
3	Public Land	A	00+280	06+630	2.8	40.52
4	River	A	00+980	06+375	0.09	1.3
Total					**6.91**	**100**

(Source: Field Survey, 2023**)**

3.1.6 Unstable Land

In the project area with hilly terrain, the maximum amount of sheet rock and red soil is found, where the risk of soil erosion and landslides is high. Due to soil erosion and landslides, it seems that the structures built on the road will be affected. The major unstable land along proposed road alignment is presented in table below.

Table 3. 3: Potential Landslide/ Debris Flow Sites

S.N.	Chainage	Location Name	Rock Type	Land Use	Stability Problem
1.	Ch 00+480 – 00+980 of Road A (28.0539^0N/84.0702^0E)	Seti Road, Ward no.4, Shuklagandaki Municipality	Limestone	Public Land	Landslide, Minor
2.	Ch 05+430 – 05+480 of Road A (28.0842^0N/84.0493^0E)	Malebagar, Ward no.9, Shuklagandaki Municipality	Limestone	Cultivated Land	Landslide, Minor
3.	Ch 06+030 – 06+375 of Road A (28.0883^0N/84.0454^0E)	Kamero Mato, Ward no. 9, Shuklagandaki Municipality	Phyllite	Public Land	Landslide, Minor

(Source: Field Survey, 2023**)**

3.1.7 Air Quality

The recorded value of designated air quality parameters derived from both field sampling and laboratory analysis of Dulegaunda Chowk (A1), Syaulibazar (A2), Crusher Plant, Kotre (A3), and Lila Chowk (A4) is presented in **Table 3.4.**

Table 3.4: Air Quality Data of the Project Area

Parameters	Units	NAAQS	Result			
			A1	A2	A3	A4
TSPM	$\mu g/m^3$	230, 600*	163.4	116.8	386.3	132.1
PM_{10}	$\mu g/m^3$	120	58.8	54.5	162.8	46.5
$PM_{2.5}$	$\mu g/m^3$	40	18.6	16.3	68.6	14.3

Parameters	Units	NAAQS	Result			
			A1	A2	A3	A4
SO_2	µg/m^3	70	5.2	2.6	7.2	6.7
NO_2	µg/m^3	80	8.2	5.5	13.4	5.2
CO	µg/m^3	10000	<1000.0	<1000.0	<1000.0	<1000.0

Note: * - Permitted limit for TSP for crusher industry (**Source**: Air Quality Report, 2080)

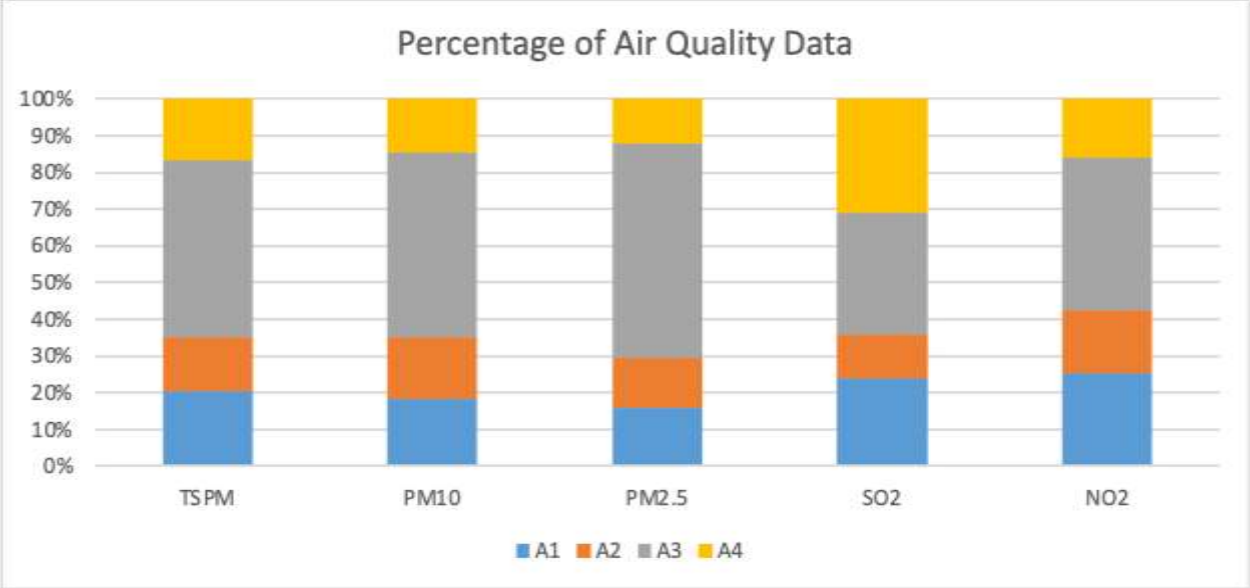


Figure 3.6 Graphical presentation of air quality data

The measured parameters at points A1, A2, and A4 fall within the limits set by the national ambient air quality standard for the year 2069. At point A3, the concentration of total suspended particulates (TSP) complies with the recommended limit for the crusher industry. However, for other measured parameters, the standard does not provide permissible limits. Specifically, the concentration of PM_{10} and $PM_{2.5}$ at point A3 exceeds the limits set by the National Ambient Air Quality Standards (NAAQS). The graphical representation of the data can be observed in Figure 4 of dust pollution that may affect the public health. The test report for the air quality is presented in the Annex IV.

The concentration of Total Suspended Particulate Matter (TSPM) exhibits considerable variation among the monitoring sites, with the highest value observed at site A1 (163.4 µg/m^3), followed by A4 (132.1 µg/m^3), and the lowest concentration at A2 (116.8 µg/m^3). Similarly, for Particulate Matter PM_{10} the highest concentration occurs at A1 (58.8 µg/m^3), while the lowest is at A4 (46.5 µg/m^3), and A2 shows a concentration of 54.5 µg/m^3. In contrast, the concentration of Particulate Matter $PM_{2.5}$ remains below half of the permitted limit at all sites, with values of 18.6 µg/m^3, 16.3 µg/m^3, and 14.3 µg/m^3 for A1, A2, and A4, respectively.

Furthermore, the concentrations of Sulfur Dioxide (SO_2) and Nitrogen Dioxide (NO_2) are well below the National Ambient Air Quality Standards (NAAQS) permitted limit, measuring less than 10.0 µg/m^3 at all monitoring points. Additionally, the concentration of Carbon Monoxide (CO) is below the permitted limit, even falling below the detection limit.

At the Crusher plant site (A3), the observed TSPM concentration is significantly higher, reaching 386.3 µg/m3 but below than the permitted limit for the crusher industry. Although concentrations of PM_{10} and $PM_{2.5}$ at this site exceed the permissible limits as per the national ambient air quality standard, the primary concern for the crushing plant revolves around TSPM. It is crucial for the contractor to take proactive measures to control and maintain TSPM levels within the allowed limit of 500.0 µg/m^3. On a positive note, concentrations of SO_2, NO_2, and CO at the crushing plant remain well below the prescribed limits for ambient air quality.

3.1.8 Water Quality

Five water samples (Three drinking water sample from household taps and two water sample from river) were collected and analyzed for quality analysis in reference to drinking water and surface water parameters. Drinking water is distributed to households in the vicinity of Dulegaunda Chowk through the management of a local water supply users committee. The source of the water is from Saraudi Khola and undergoes treatment before being supply. The residents of Syaulibazar receive drinking water through the source of Arsandi Khola, located approximately 5 km away from the settlement. The primary drinking water supply for Lila Chowk is derived from Simsuara spring, situated approximately 3 kilometers away from the settlement area. The water quality data of drinking water sample from the household tap of Dulegauda (W1), Syaulibazar (W2) and Lilachowk (W3) are tabulated and assessed with respective guideline values. The drinking water quality data are mentioned below.

Table 3. 5: Driking Water Qulaity Data within the Project Area

Parameters	Unit	NDWQS	Result		
			W1	W2	W3
Colour	-	5 (15)	<0.1	<0.1	<0.1
Turbidity	NTU	5 (10)	<1.0	<1.0	<1.0
Electrical Conductivity	µS/cm	1500	447.0	109.0	165.0
pH	-	6.5 - 8.5	7.5	8.12	7.8
Taste and Odour	-	NO	NO	NO	NO
Total Hardness	mg/l as $CaCO_3$	500	150.0	20.0	<2.0
Chloride	mg/l	250	16.0	12.0	12.0
Ammonia	mg/l	1.5	0.06	<0.02	0.04
Nitrate	mg/l as NO_3	50	0.88	<0.02	0.13
Sulphate	mg/l	250	<1.0	<1.0	<1.0
Total Solids	mg/l	-	289.0	69.0	102.0
Total Suspended Solids	mg/l	-	<1.0	<1.0	<1.0
Total Dissolved Solids	mg/l	1000	289.0	69.0	102.0
Fluoride	mg/l	0.5 - 1.5	0.02	0.07	0.03
Iron	mg/l	0.3 (3)	<0.01	<0.01	<0.01
Manganese	mg/l	0.2	<0.02	<0.02	<0.02
Arsenic	mg/l	0.05	<0.01	<0.01	<0.01
Free Residual Chlorine	mg/l	0.1 - 0.5	<0.1	<0.1	<0.1
E.Coli	CFU/100 ml	Nil	22	0	34

Note: NO denotesNot objectionable (**Source**: Water Quality Report, 2080)

Above result shows that the physical and chemical characteristics of all the samples (W1, W2 and W3) were found to be within the acceptable limits set by the National Drinking Water Quality Standards (NDWQS). However, it is important to note that the samples did not contain detectable levels of free residual chlorine, and two of them (W1 and W3) were found to be contaminated with E. Coli, rendering the water unsafe for consumption. It is crucial to recognize that during the construction phase, the water resources in the area might be susceptible to further deterioration, impacting water quality. Therefore, it is imperative to implement preventative measures and ensure the safety of the drinking water. To address the issue of E. Coli contamination, various methods can be employed at the household level, such as chlorination, SODIS (Solar Water Disinfection), or boiling. These methods can effectively control E. Coli and make the water safe for consumption. Implementing these measures will safeguard the health and well-being of the residents in the affected areas. The water quality data of Saraudi Khola (W4) and Seti River (W5) are tabulated and assessed with generic standard that disposal of any waste in the surface water sources. The laboratory analysis data have been tabulated below.

Table 3.6: River Water Quality Data within the Project Area

Parameters	Unit	Generic Standard	Result	
			Saraudi Khola (W4)	Seti River (W5)
Colour	-	-	<0.1	<0.1
Turbidity	NTU	-	<1.0	<1.0
Electrical Conductivity	µS/cm	-	108.0	407.0
pH	-	5.5- 9.0	7.83	7.11
Total Hardness	mg/l as $CaCO_3$	-	<2.0	112.0
Chloride	mg/l	-	10.0	13.0
Ammonia	mg/l	50.0	<0.02	0.29
Nitrate	mg/l as NO_3	-	65.0	0.51
Total Solids	mg/l	-	65.0	280.0
Total Suspended Solids	mg/l	200.0	<1.0	<1.0
Total Dissolved Solids	mg/l	-	65.0	280.0
Dissolved Oxygen		-	8.3	8.7
BOD		100	4.4	5.2
COD		250	6.7	8.8
Iron		-	<0.01	<0.01
Total Chlorine	mg/l	1	<0.1	<0.1

(**Source**: Water Quality Report, 2080)

In accordance with the applicable generic standard, the water samples from both rivers demonstrate compliance. The concentrations of BOD and COD in both samples are significantly below the permissible limits, indicating the absence of pollution in the river water. This observation is further supported by the level of Dissolved Oxygen. Moreover, the absence of suspended solids and the pH level falling within the acceptable range further affirm the favorable water quality. Additionally, the ammonia concentration is within the acceptable limits. Other parameters also indicate that the water quality is in its natural state. However, during the construction phase, it is crucial to exercise preventive measures to avoid any increase in pollutant concentrations. If there is a need to discharge effluents into the rivers, it is imperative to treat the water beforehand, or preferably, prohibit such discharges altogether.

3.1.9 Noise Quality

The 24hrs Noise Level of Dulegaunda Chowk (N1), Syaulibazar (N2), Crusher Plant, Kotre (N3) and Lila Chowk (N4) of project area was monitored. The hourly equivalent noise level during the day hours is below 75.0 dBA in all the measured points except crusher plant. The equivalent noise level during 14:00 - 15:00 and 15:00 - 16:00 are 76.2 dBA and 77.4 dBA respectively, exceeding the permitted limit. Similarly, the night hours' equivalent noise level complies with the permitted limit of 70.0 dBA. According to Nepal Rajpatra, Kartik 13, 2069, the permissible noise levels for industrial area are 75.0 dBA during the day and 70.0 dBA during the night. The monitored minimum noise level (Lmin), Maximum Noise Level (Lmax) and nquivalent noise level (Leq) of all four sites is presented in Annex IV. The equivalent noise level recoreded at each site is presented in **Table 3.7** below.

Table 3.7: Equivalent Noise level (Leq) of the project area

Hours	Time	Leq : Equivalent Noise Level (dBA) (Monitored in July, 2023)			
		N1 (Monitored in July 22)	N2 (Monitore in July 21)	N3 (Monitored in July 22)	N4 (Monitored in July 21)
06:00 - 07:00	Day	51.3	48.2	51.2	49.3
07:00 - 08:00		51.8	49.5	58.6	48.8
08:00 - 09:00		54.4	49.2	66.3	51.2
09:00 - 10:00		57.6	51.7	68.4	51.6
10:00 - 11:00		58.2	51.4	67.2	52.2

Hours	Time	Leq : Equivalent Noise Level (dBA) (Monitored in July, 2023)			
		N1 (Monitored in July 22)	N2 (Monitore in July 21)	N3 (Monitored in July 22)	N4 (Monitored in July 21)
11:00 - 12:00		61.5	51.8	71.8	52.1
12:00 - 13:00		55.3	54.2	72.5	50.2
13:00 - 14:00		62.1	53.4	68.7	53.5
14:00 - 15:00		54.4	55.7	76.2	51.5
15:00 - 16:00		56.3	54.2	77.4	52.4
16:00 - 17:00		55.7	53.5	74.2	53.9
17:00 - 18:00		53.3	53.1	68.8	51.3
18:00 - 19:00	Night	53.6	53.6	54.4	50.3
19:00 - 20:00		50.1	49.4	53.3	51.8
20:00 - 21:00		48.8	51.1	54.8	49.9
21:00 - 22:00		46.5	51.5	49.5	48.5
22:00 - 23:00		49.6	47.7	47.7	47.3
23:00 - 00:00		48.4	49.1	48.8	47.8
00:00 - 01:00		47	48.4	49.6	43.9
01:00 - 02:00		48.5	48.6	48.7	43.5
02:00 - 03:00		49.1	50.8	45.2	45.7
03:00 - 04:00		48.8	49.4	49	49.8
04:00 - 05:00		51.4	48.6	51.9	49.6
05:00 - 06:00		53.6	48.8	53	50.3

(**Source**: Noise Level Montoring Report, 2080)

3.1.10 Existing Public Utilities along the road alignment

54 eletrical pole, one transformer and one Pratikshyala (Area- 3 m^2) in Lila Chowk, Three Chautara of 30.53 m^3 (2 Chautara in Sayaule Bazar - 24.53m^3 & Chautara in Shaankhad 6 m^3), 36.25 m^3 boundary wall (Health Post Boundary Wall- 27.5 m^3 & Gurung Gumba Boundary Wall- 8.75 m^3) and 32.75 m3 stone masonry wall of Tibetian camp lies within the formation wide of proposed road. The detail of public utilities is given in **Table 3.8.** (Annex V).

Table 3. 8: Public Utlities within the proposed Road alignment

S. N.	Chainage		Public Utility						
	From	To	Telephone Pole (No.)	Electric Pole (No.)	Transformer (No.)	Chautara (m^3)	Boundary Wall (m^3)	Stone Masonary Wall (m^3)	Pratikshyalaya (m^2)
I) Road A (Dulegauda- Khaireni Healthpost- Lilachowk Road)									
2	00+000	00+980		8			27.5		
3	01+080	02+030	1	16				32.75	
4	02+030	02+745		0					
5	02+795	04+080		3		24.53	8.75		
6	04+080	06+330		18		6			
7	06+375	06+769		3					3
Total			**1**	**48**	**1**	**30.53**	**36.25**	**32.75**	**3**
II) Road B (BP Chowk – Khaireni Healthpost Road)									
	00+000	00+453		6					
Grand Total (A+B)			**1**	**54**	**1**	**30.53**	**36.25**	**32.75**	**3**

(**Source:** Field Visit, 2023)

3.2 Biological Environment

3.2.1 Forest

There is no forest within direct impact area of proposed road alignments.

3.2.2 Flora

There are all together 19 trees (Sissau- 18 and Pipal- 1) within the formation width of proposed road alignment of Road A. The total tree volume of 18 Sissau tree (dbh ranges from 10 Cm to 25 Cm and height ranges from 8m to 15m) and one pipal tree (dbh-5 Cm & height- 15m) is 3.69m^3. All 19 trees lie in public land. The details of trees species found within the formation width are listed in Annex VI of this report.

3.2.3 Fauna

The details of the major wild animals found in the project area are as follows.

3.2.3.1 **Mammal**s

According to local residents, the dominant mammals found within public land owned by Panchamuni Ma.Vi. are Jungle cat, Jackal, Monkey, Yellow Throated Marten, Squirrel and Indian Crested Porcupine hare. The detail of Mammals found within the project area is presented in **Table 3.9**.

Table 3. 9: Mammals Species found around the Project Area

S.N.	Local Name	English Name	Scientific Name	Conservation Status		
				GoN	IUCN	CITES
1	Ban Biralo	Jungle cat	*Felis chaus*		LC	II
2	Syal	Jackal	*Canis aureus*		LC	III
3	Lokharke	Squirrel	*Funambuıus pennant*		NT	
4	Malsapro	Yellow Throated Marten	*Martes flaviguıia*		NT	III
5	Dumsi	Indian Crested Porcupine	*Hystrix indica*		LC	I
6	Baandar	Monkey	-			
7	Kharayo	Rabbit				

Where, Gon : P= Protected; **IUCN:** LC= Least Concern, NT= Near Threatened, VU= Vulnerable; **CITES Appendices** : I: Appendix I, II: Appendix II, III: Appendix III (**Source:** Field Visit, 2023/ National Park and Wildlife Conservation Act, 2029/ www.iucnredlist.org / www.cites.org/eng/search)

3.2.3.2 Birds

The Dominant bird reported in the project area are Black Kite, Egyptian Vulture, Little Egret, Cattle Egret, Common Sandpiper, Common Kestrel, Red Junglefowl, Black Frankolin, House Crow, Common Myna, Plain Martin etc. The major bird species recorded in the project sites and their conservation status are presented in table below.

Table 3. 10: Birds Species reported in Project sites

S.N.	Local Name	English Name	Scientific Name	Conservation Status		
				GoN	IUCN	CITES
1	Kalo Chil	Black Kite	*Milvus migrans*		LC	II
2	Seto Giddha	Egyptian Vulture	*Neophron percnopterus*		VU	II
3	Sano Seto Bakulla	Little Egret	*Egretta garzetta*		LC	

S.N.	Local Name	English Name	Scientific Name	Conservation Status		
				GoN	IUCN	CITES
4	Gai- Bakulla	Cattle Egret	*Bubulcus ibis*		LC	
5	Chanchale Shudshudiya	Common Sandpiper	*Actitis hypoleucos*		LC	
6	Baudaie	Common Kestrel	*Falco tinnunculus*		LC	
7	Luiche	Red Junglefowl	*Gallus gallus*		LC	
8	Kalo Titra	Black Frankolin	*Francolinus francolinus*		LC	
9	Ghar Kaag	House Crow	*Corvus splendens*		LC	
10	Rupi	Common Myna	*Acridotheres tristis*		LC	
11	Bhitte Gauthali	Plain Martin	*Riparia paludicol*		LC	
12	Kalo Chibe	Ashy Drongo	*Dicrurus leucophaeus*		LC	
13	Bhangera	Sparrow	*Passer domesticus*		LC	
14	Thople Dhukur	Spotted Dove	*Streptopelia chinensis*		LC	
15	Tame Dhukur	Oriental Turtle dove	*Streptopelia orientalis*		LC	
16	Kalij	Kalij Pheasant	*Lophura leucomelanos*		LC	III
17	Koeli	Common Cuckoo	*Cuculus canorus*		LC	
18	Kalo Kaag	Large-billed Crow	*Carvus macrorhynchos*		LC	
19	Seto Tiktike	White Wagtail	*Motacilla alba*		LC	
20	Jalewa	Great cormorant	*Phalacrocorax carbo*		LC	
21	Nauli Chari	Great Barbet	*Megalaima virens*		LC	
22	Patsiune Fisto	Common Tailorbird	*Orthotomus sutorius*		LC	
23	Julphe Jureli	Himalayan Bulbul	*Pycnonotus leucogenys*		LC	
24	Ghar Gauthali	Barn Swallow	*Hirundo rustica*		LC	

Where, IUCN: LC= Least Concern, VU= Vulnerable; **CITES Appendices** : II: Appendix II, III: Appendix III (**Source:** Field Visit, 2023/ www.iucnredlist.org / www.cites.org/eng/search)

3.2.3.3 Reptiles

The different types of reptiles reported in the project area are King Cobra, Common Cobra, Hill Krait, Green Pit Viper, Himalayan Pit Viper, Trinklet snake etc. The conservation status of reptiles found in the project area are presented in **Table 3.11** below.

Table 3. 11: Reptiles reported in the project Area

S.N.	Local Name	English Name	Scientific Name	Conservation Status		
				GoN.	IUCN	CITES
1	Raj Goman	King Cobra	*Ophiophagus hanmah*		VU	
2	Goman	Common Cobra	*Naja naja*		LC	II
3	Pahadi karet	Hill Krait	*Bungarus bungaroides*		LC	
4	Hariyo Sarp	Green Pit Viper	*Trimeresurus gramineus*		LC	
5	Bhyagute Sarp	Himalayan Pit Viper	*Gloydius himalayanus*		LC	
6	Lekhali Daline Saap	Himalayan Keelback	*Rhabdophis himalayanus*		LC	
7	Singare sarpa	Trinket snake	*Coelognathus helenae*		LC	
8	Chepaaro	Changeable Lizard	*Calotes versicolor*		LC	

Where, IUCN: LC- Least Concern, VU- Vulnerable; CITES: II- Appendix II (**Source: Field Visit, 2023**, / www.iucnredlist.org / www.cites.org/eng/search)

3.2.3.4 Fish

According to local residents, the major fish species found in Seti river and Saraudi Khola are Asla, Bam, Gardi, Chiple Faketa, Lahare Budhuna, Katle, Bagahi etc. The major fish species recorded in the Seti River and Saraudi Khola are presented in **Table 3.12** below.

Table 3. 12: Fish Species found in Seti River and Saraudi Khola

S.N.	Local Name	English Name	Scientific Name	Conservation Status		
				GoN.	IUCN	CITES
1	Faketa	Barred Baril	*Barilius barila*		LC	
2	Dhawai	Indian Carplet	*Amblypharyngodon Microlepis*		LC	
3	Pothi	Moustached danio	*Danio dangila*		LC	
4	Gardi	Kalabans	*Labeo dero*		LC	
5	Stone Carp	Stone Carp	*Psilorhynchus Pseudecheneis*		VU	
6	Asala	Snow Trout	*Schizothorax nepalensis*		CR	
7	Baam	Spiny eel	*Mastacembelus armatus*		LC	
8	Chiple Faketa	Indian Hill Trout	*Barilius bendelisis*		LC	
9	Lahare Buduna	Annandale garra	*Garra anmandalei*		LC	
10	Katle	Copper mahseer	*Neolissochilus hexagonolepi*		VU	
11	Bagahi	Devil catfish	*Bagarius bagarius*		VU	

Where, IUCN: LC- Least Concern, VU- Vulnerable, CR- Critically Threatened (**Source**: Field Visit, 2023/ www.iucnredlist.org)

3.3 Socio-economic and Cultural Environment

Socio-economic overview

The road project Dulegaudha - Lila Chowk is being implemented in Shuklagandaki Municipality of Tanahunn district. The municipality was formed on 18 May 2014. It was formed by merging three Village Development Committees: Dhorphirdi, Dulegaunda and Khairenitar. And further more Thaprek, Raipur and Phirphire VDC are merged on 5 March 2017. The project area of this proposed project is located in Shuklagandaki Municipality, Tanahun District, Gandaki Province that connects Prithivi Highway to the Dulegaudha and BP chowk of Ward no. 4, Shuklagandaki Municipality.The municipality is surrounded by Myagde Rural municipality and Vyas municipality in the East, Bhimad municipality and Myagdi rural municipalities in the south, Syangja district in the west and Kaski and Syangja district in the North.

Details of settlements within the project area

The proposed road alignment passes through major settlements like BP Chowk, Pulchowk, Ghari, Syaule Bazar, Malebagar, Lilagau and Kutkute of Shuklagandaki Municipality.

Table 3. 13: Details of settlements within the project area

Name of Municipality	Ward No	Name of Settlements	Name of Road	Chainage	Distance from the Project Site
Shuklagandaki Municipality	4	BP chowk	B	Ch 00+000- 00+453	The project passes through the ward
	4	Dulegauda	A	Ch 00+000- 00+070	
	4	Healpost Chowk	A	Ch 00+000- 00+200	
	8	Pulchowk, Tibetan Camp	A	Ch 00+750- 01+950	
	9	Syaule Bazaar,	A	Ch03+450-05+550	

Name of Municipality	Ward No	Name of Settlements	Name of Road	Chainage	Distance from the Project Site
		Shaankhad, Malebager			
	12	Lila Chowk	A	Ch 06+550- 06+700	

*(**Source**: Field Survey, 2023)*

Existing private property

There are 10 private structures (4 Store Shed made of Cement block and CGI Sheet, single side wall of one toilet made up of cement block, one cow shed, one goat shed, 1.8 m^3 compound wall of one house, 4 m^3 cemented finished surface of a house) lies within the RoW. The private structures were constructed before declaration of Right of Way (i.e. 10m) of Dulegauda-Lilachowk Road in 2072 by Office of Municipal Executives, Shuklagandaki Municipality, Tanahun. Road design has been customized and construction work will be carried out within available width at these 10 locations. The detail of chainage where the road width has been narrow down to avoid private structures is presented in the **Table 3.14.**

Table 3.14: Detail of chainage where road width has been narrow down.

S. N.	Chainage	Name of House Owner	Location	Side	Type	Construction work will be carried within the road width (m)
I) Road A (Dulegauda- Khaireni Healthpost - Lilachowk Road)						
1	00+910	Krishna Raj Pandit	Suklagandaki Mun.-4, Pulchowk	Left	Store Shed	4.1
2	01+265	Non-title Holder	Suklagandaki Mun.-9, Tibetian Camp	Right	Un-used Shed	4.5
3	03+560	Gum Bahadur Gurung	Suklagandaki Mun.-9, Syauli Bazar	Right	Compound Wall	6.8
4	03+580	Gum Bahadur Gurung	Suklagandaki Mun.-9, Syauli Bazar	Left	Cement Block Hut	6.5
5	03+625	Gyan Shree Gurung	Suklagandaki Mun.-9, Syauli Bazar	Right	Toilet	7
6	04+370	Shambhu Thapa	Suklagandaki Mun.-9, Shaankhad	Right	Shed	7
7	06+700	Rajan Hamal	Shukalagandaki-12 , Lilachowk	Left	Cow Shed	6.3
8	06+720	Rajan Hamal	Shukalagandaki Mun.-12 , Lilachowk	Left	Goat Shed	7
9	06+765	Krishana Nepal	Shukalagandaki Mun.-12 , Lilachowk	Right	Store Shed	6.5
II) Road B (BP Chowk- Khaireni Healthpost Road)						
10	00+180	Gum Bahadur Kc	Suklagandaki Mun.- 4, BP Chowk	Left	Cemented finished surface	3.2

3.3.4 Demographic details

The proposed project lies in Shuklagandaki Municipality of Tanahunn District in Gandaki Province of Nepal. The total population of the district, according to the National Population and Household Census, 2021 is 3,21,153 and the number of households is 88,583. The average family size of the district is 3.63, which is less than that of the national average (4.37). The total population of Shuklagandaki Municipality is 55,620 and total household is 15,272. The average household size of the municipality is 3.64 which is higher than that of district household size (3.63). The National Population and Household Census, 2021 census gave a total population of 16,600 individuals with 7,784 males and 8.816 females in 4,499 households of Indirect Impact Area (i.e. Ward no. 4, 8, 9 and 12 of Shuklagandaki Municipality). The average household size of project affected area is 3.69. The sex ratio of male to female is 88.29 on average in the municipality. The total population of The demographic details of project affected area are shown in **Table 3.15** and **Table 3.16**

Table 3. 15: Demographic details of Shuklagandaki Municipality

Local Body	Household	Population			Average Household Size	Sex Ratio
		Male	Female	Total		
Shuklagandaki Municipality	15,272	25,890	29,730	55,620	3.64	87.08

(**Source**: National Population and Household Census, 2021)

Table 3. 16: Demographic details of the project affected area

Ward No.	Household	Population			Average Household Size	Sex Ratio
		Male	Female	Total		
4	1320	2303	2499	4802	3.64	92.16
8	1723	2855	3411	6266	3.64	83.7
9	805	1448	1671	3119	3.87	86.65
12	651	1178	1235	2413	3.71	95.38
Total	**4,499**	**7,784**	**8,816**	**16,600**	**3.69**	**88.29**

(**Source**: National Population and Household Census, 2021)

3.3.5 Population by five-year age groups

The project affected area has highest number of population (i.e. 1576) under age group 20- 24 years and lowest number of population (i.e. 21) under age gropu 95 + years.

Table 3. 17: Population by five-year age groups

Age Group	Ward No. 4	Ward no. 8	Ward no. 9	Ward no. 12	Total
All Ages	4802	6266	3119	2413	16600
00-04 Yrs.	314	449	233	136	1132
05-09 Yrs.	397	552	257	153	1359
10-14 Yrs.	406	567	251	170	1394
15-19 Yrs.	485	627	306	200	1618
20-24 Yrs.	463	607	301	205	1576
25-29 Yrs.	451	521	262	196	1430
30-34 Yrs.	419	477	244	166	1306

Age Group	Ward No. 4	Ward no. 8	Ward no. 9	Ward no. 12	Total
35-39 Yrs.	415	417	186	153	1171
40-44 Yrs.	317	397	155	125	994
45-49 Yrs.	264	337	164	116	881
50-54 Yrs.	217	346	193	137	893
55-59 Yrs.	169	265	164	157	755
60-64 Yrs.	137	225	129	147	638
65-69 Yrs.	105	172	93	128	498
70-74 Yrs.	100	132	76	96	404
75-79 Yrs.	71	91	46	58	266
80-84 Yrs.	39	45	29	41	154
85-89 Yrs.	21	19	13	22	75
90-94 Yrs.	9	17	4	5	35
95+ Yrs.	3	3	13	2	21

(**Source**: National Population and Household Census, 2021)

Population aged 5 years and above by literacy status

According to the National Population and Household Survey, 2021, 86.7 % of the population (Male – 92.57%, Female- 81.84%) over 5 years of age in Shuklagandaki Municipality is literate. The literacy rate of project affected area is 86.2%. The details regarding literacy are presented in the table below.

Table 3.18: Population aged 5 years and above by literacy status

Ward No.	Population aged 5 years & above	Population who			Not stated	Literacy Rate
		Can read & write	Can read only	Can't read & write		
4	4488	4020	7	455	6	89.57
8	5817	5068	73	671	5	87.12
9	2886	2452	3	409	22	84.96
12	2277	1793	8	468	8	78.74
Total	**15468**	**13333**	**91**	**2003**	**41**	**86.20**

(**Source**: National Population and Household Census, 2021)

Description of households by type of roof

According to the National Census and Household Survey, 2021, out of 4,499 households in the project affected area (Ward No. 4, 8, 9 and 12 of Shuklagandaki Municipality), the maximum number of households have Reinforced cement concrete (RCC) roof (i.e. 57.64%). The details of the households according to the roof structure type are presented in the table below.

Table 3.19: Description of Households according to roof structure

Ward No.	Roof of the house						Total
	Galvanized sheet	RCC	Thatch / straw	Tile	Stone/ slate	Others	

Ward No.	Roof of the house						Total
	Galvanized sheet	RCC	Thatch / straw	Tile	Stone/ slate	Others	
4	168	1142	1	0	8	1	1320
8	565	1131	2	6	18	1	1723
9	489	266	12	1	35	2	805
12	552	54	13	0	32	0	651
Total	**1774**	**2593**	**28**	**7**	**93**	**4**	**4499**
%	**39.43**	**57.64**	**0.62**	**0.16**	**2.07**	**0.09**	**100**

(**Source**: National Population and Household Census, 2021)

Description of Households by main source of drinking water

According to the National Census and Household Survey, 2021, out of 4,499 households in the project affected area (Ward No. 4, 8, 9 and 12 of Shuklagandaki Municipality), it was found that maximum households (58.5 % of households) use tap water distributed from pipes inside the house premises for drinking. Based on the main sources of drinking water, the household details of the project area are presented in the table below.

Table 3. 20: Description of Households according to main source of drinking water

Ward No.	Main source of drinking water								Total
	Tap/piped water (within premises)	Tap/piped water (outside premises)	Covered well/kuwa	Uncovered well/kuwa	Spout water	River /stream	Jar / bottle	Others	
4	861	54	1	40	3	0	360	1	1320
8	1327	138	24	79	113	8	20	14	1723
9	287	502	5	6	0	1	1	3	805
12	157	367	1	16	106	2	0	2	651
Total	**2632**	**1061**	**31**	**141**	**222**	**11**	**381**	**20**	**4499**
%	**58.50**	**23.58**	**0.69**	**3.13**	**4.93**	**0.24**	**8.47**	**0.44**	**100**

(**Source**: National Population and Household Census, 2021)

Description of Households by usual source of lighting

Out of 4,499 households in the project affected area, it was found that maximum households (98.73 % of households) use electricity as the source of lighting.

Table 3. 21: Description of Households by usual source of lighting

ward	Usual source of lighting				Total
	Electricity	Solar	Kerosene	Others	
4	1319	1	0	0	1320
8	1696	22	2	3	1723
9	788	6	6	5	805
12	639	8	3	1	651
Total	**4442**	**37**	**11**	**9**	**4499**

%	**98.73**	**0.82**	**0.24**	**0.20**	**100**

(**Source**: National Population and Household Census, 2021)

Description of households by type of fuel usually used for cooking

According to National Population and Household Census, 2021, it was found that 70.68 % of the households in the project affected area use Liquefied Petroleum gas, 27.21% of the households use firewood and the remaining 2.11 % of the households use other fuel for cooking.

Table 3. 22: Description of households by type of fuel usually used for cooking

ward	Type of fuel				Total
	Wood/ firewood	Liquefied Petroleum gas	Bio gas	Others	
4	32	1276	9	3	1320
8	385	1296	39	3	1723
9	316	453	35	1	805
12	491	155	4	1	651
Total	**1224**	**3180**	**87**	**8**	**4499**
%	**27.21**	**70.68**	**1.93**	**0.18**	**100**

(**Source**: National Population and Household Census, 2021)

Description of households by type of toilet facility

According to National Population and Household Census, 2021, out of 4,499 households in the project affected area (Ward No. 4, 8, 9 and 12 of Shuklagandaki Municipality), it was found that maximum households (85.86%) were using flush toilets with septic tanks. It seems that 0.42% of the households in the overall project affected area do not have toilets at all.

Table 3. 23: Description of households by type of toilet facility

Ward	Type of toilet used				Without toilet facility	Total
	Flush toilet (public sewerage)	Flush toilet (septic tank)	Pit toilet	Public toilet		
4	8	1311	1	0	0	1320
8	37	1437	238	3	8	1723
9	1	608	167	23	6	805
12	12	507	127	0	5	651
Total	**58**	**3863**	**533**	**26**	**19**	**4499**
%	**1.29**	**85.86**	**11.85**	**0.58**	**0.42**	**100**

(**Source**: National Population and Household Census, 2021)

Details of castes and religious communities residing within the project area

The majority of castes/ethnic groups that inhabit in the project area are Magar, Gurung, Brahmins, Chhetri, Kami, Newar, Damai/Dholi, Kumal, Gharti/Bhujel, Sarki and Ghale. There are also Shiva Temple, Durga Temple, Radhakrishna Temple, Mokshyadham, Buddhist Gumba, Stupa, Mosque and Churches. The indigenous people in project area are Magar, Gurung, Brahmins, Chhetri, Kami, Newar, Damai/Dholi, Kumal, Gharti/Bhujel, Sarki and Ghale etc.

Table 3. 24: Details of ethnic, religious communities and religious sites residing within the project area

Name of Local Level	Name and Ward No.	Caste/Ethnic groups	Religious denominations	Religious places
Shuklagandaki Municipality	All Shuklagandaki Municipality	Magar, Gurung, Brahmins, Chhetri, Kami, Newar, Damai/Dholi, Kumal, Gharti/Bhujel, Sarki and Ghale	Hindu, Buddhist, Christian, Prakirti and other	Gurung Gumba

(**Source**: Municipality Profile, 2075)

Details of cultural practices of the castes living within the project area

There is diversity in the cultural practices of the castes within the project area. Cultural festivals like Dashain, Tihar, Chhath, Ram Navami, Shivaratri, Maghi, Buddha Jayanti, Eid, Moharram, Christmas are celebrated in this region which is inhabited by different castes and religions.

Table 3. 25 Details of the cultural practices of the castes living within the project area

Name of Local Level	Name and Ward No.	Cultural Rituals
Shuklagandaki Municipality	All Shuklagandaki Municipality	Dashain, Tihar, Teej, Maghi, Holi, Buddha Jayanti, Eid, Moharram, Christmas etc.

(**Source**: Municipality Profile, 2075)

Details of the educational level of the residents within the project area

In Literate population aged 5 years and above (i.e. 45,146), 20.9 % of the population have obtained Lower Secondary Education.

Table 3. 26: Educational level of the residents living within the project area

Name of Local Level	Name and Ward No.	Educational Level	Total number of passes Population	Percentage of Educational Level
Shuklagandaki Municipality	All Shuklagandaki Municipality	Early Chilhood	1,607	3.6
		Primary Education	11,149	24.7
		Lower Secondary	9,421	20.9
		Upper Secondary	3.025	15.6
		S.E.E. or Equivalent	5,423	12.0%
		+2 or Equivalent	6,274	13.9%
		Graduate	1,734	3.8%
		Post Graduate equivalent & above	646	1.4 %

(**Source**: National Population and Household Census, 2021)

Details of educational institutions falling within the project area

The number of basic schools is highest in the settlements within the project area while the number of higher secondary schools and colleges is low.

Table 3. 27: Details of educational institutions within the project area

Type of Educational Institutions	Number

	Community	Private	Total
Childhood Development Center	39		**39**
Basic School (Class 1- 5)	41	4	**45**
Basic School (Class 6- 8)	4	4	**8**
Secondary School (Class 1- 10)	8	4	**12**
Higher Secondary School (Class 1- 12)	8	6	**14**
Campus	2		**2**

(**Source**: National Population and Household Census, 2011)

Table 3. 28: Schools lies in and nearby Project Area the road alignment

S.N.	School Name	Location	Distance from Project Site
1	Shree Panchamuni Dev Secondary School	Shuklagandaki Municipality, Ward No. 4	630 m east from Ch 00+000 of Road C
2	Tall Beshi High school	Shuklagandaki Municipality, Ward No. 9	200 m South from Ch 03+690 of Road A

(Source: Field Survey, 2023***)***

Employment and income status

The main occupations of the residents living within the project area are agriculture, animal husbandry, trade, government jobs and foreign employment. Although some people have gone to the Gulf countries for employment, most of them have moved to different cities of India. Most of the people are found to be running small and medium enterprises at the local level and working for a daily wage while the income of urban dwellers is higher and those living in rural areas are lower.

Condition of infrastructure

Most of the ward offices in the project affected area are in concrete buildings and some ward offices are under construction. It was found that there were paved roads, gravel roads and unpaved roads, paved bridges connecting one village to another and some bridges were under construction. There are local clubs in different wards. Similarly, access to electricity was extended to all households and poles and trees were used for power transmission lines. Most of the people used mobile phones for communication facilities.

Roads and its types

The project affected areas have paved, unpaved and gravel roads. In the rural areas, road construction and leveling work is being done and concrete bridges are being built on small and big rivers.

Value of land

While there are cheap lands in rural areas within the project affected areas, the price of land is also increasing due to increasing population density in urban areas.

Public facilities

Most of the ward offices in the project affected area are in concrete buildings and some ward offices are under construction. There were paved and unpaved roads, paved bridges connecting one village to another and some bridges were under construction. There are local clubs in different wards. Similarly, access to electricity has reached all the households, most of the people are using mobile phones towards communication facilities.

Migration Status

In order to get basic amenities in urban areas, to trade, to run small and medium scale industries, to find daily employment opportunities and to make a living by farming in the fertile lands. There are many people come from Rural area of Tanahun district into Dulegauda of Shuklagandaki Municipality.

Market and its position

Dumre, Damauli, and Pokhara are the main markets for most of the residents living in the project affected areas and goods are being procured at wholesale prices from the same market and transported from the local bazaars and grocery stores to the rural areas. Locally produced food, vegetables, pulses, oilseeds, goats, chickens, fish, etc. are sold in the local market on a daily and weekly basis.

Table 3.29: List of temples, resting areas and other community owned properties

S.No.	Ward No	Name	Type	Distance from Project Site
1	Ward No 4	Khairenetar community Hospital	Hospital	10 m from Ch 00+000 of Road A
2	Ward No 9	Dhorbarahai Mandir	Temple	3.8 Km from Ch 01+850 of Road A
3	Ward No 9	Bastala View Tower	Tourism Place	2.5 Km from Ch 01+850 of Road A
4	Ward No 9	Gurung Gumba	Temple	10 m from Ch 03+850 of Road A

(Source: Field Survey, 2023***)***

CHAPTER 4- LEGAL AND REGULATOTY FRAMEWORK

4.1 Key applicable national environmental and social laws and regulations

A summary of applicable rules and regulations is provided under the Chapter 2 of the NUGIP ESMF. The sectoral and cross-sectoral guidelines and standards promulgated by the GoN in various periods are adequate to mainstream the environmental and social safeguard dimensions in the project preparation and implementation phases. This ESIA has given due attention on the above guidelines and standards in the identification and prediction of the project's impact and in the design of the mitigation actions and monitoring protocols.

The Constitution of Nepal provides local governments the autonomy to enact new laws in areas listed as their sole authority (Schedule-8, Constitution of Nepal). The GoN's applicable laws, regulations, guidelines, standards shall be followed during the construction and operation phases of the project.

4.2 List of National Policies, Rules, Laws, Regulations, Relevant to the Project (if construction activities triggers then it applies)

1. Constitution of Nepal
2. Ancient Monument Protection Act 1956
3. Aquatic Animal Protection Act 1961
4. Environment Protection Act 2019
5. Explosive Act 1961 as Amended
6. Forest Act 2019
7. Labor Act 2017
8. Child Labor Act (CLA) 2001
9. Labor Act 2017
10. Shuklagandaki Municipality's Environmental and Natural Resource Preservation Act 2077
11. Gender Equality Act, 2006
12. Land Acquisition Act, 1977 (and amendments 2010) and Land Acquisition Regulations, 1969
13. Local Government Operation Act 2017
14. Motor vehicle and Transport Management Act, 2049
15. National Foundation for the Development of Indigenous Nationalities Act 2002,
16. Plant Protection Act 2007
17. Public Road Act, 1974 and amendment 2010
18. Road Board Act 2059
19. Soil and Watershed Conservation Act, 1982 and Subsequent Amendment
20. Solid Waste Management Act 2011 and Solid Waste Management Rules 2013
21. Water Resources Act 1992
22. Environment Protection Rule 2020
23. Forest Rules 1995

24. Water Resources Regulations 1993
25. 20 Year Road Plan, 2059 –2079BS (2002-2022AD)
26. National Dalit Commission 2002
27. Forest Policy 2015
28. Land Acquisition, Resettlement and Rehabilitation0 Policy for Infrastructure Development Project 2014
29. National Biodiversity Strategy and Action Plan (NBSAP) 2014-2020
30. National Environmental Standards Information Booklet 2018
31. National Human Rights Action Plan 2005, National Women Commission
32. Public Works Directive 2002
33. Work Procedure to Provide Forest Area for other Purposes, 2006
34. EIA guidelines for human settlement and Urban Development Sector 1996
35. EIA guidelines for Road Sector 1994
36. National EIA guidelines 1993
37. Operational Guideline for mainstreaming GESI in MoUD

4.3 Environmental Standards of GoN

1. Generic Tolerance Limits for Industrial Effluent Discharged into inland Surface water, 2001
2. Nepal Vehicle Mass Emission Standard, 2012
3. Nepal Ambient Air Quality Standard, 2012
4. Drinking Water Quality Standard, 2005
5. Nepal Noise Level Standard, 2012
6. National Indoor Air Quality Standards, 2009

4.4 Relevant sectoral policies and guidelines prepared by DoR

1. Environmental Assessment in the Road Sector of Nepal, January 2000
2. Environment Management Guidelines, GESU/DoR, July 1997
3. Reference Manual for Environmental and Social Aspects of Integrated Road Development, MPPW/DoR, 2003
4. The National Transport Policy, 2001.
5. Land Infrastructure Development Policy 2004
6. Public Infrastructure Built and Operate Policy, (2000)

4.5 International Obligations Conventions Relevant to the Project

1. Convention on Biological Diversity, 1992)
2. Convention on the International Trade in Endangered Wild Fauna and Flora (CITES), 1975
3. United Nations Framework Convention on Climate Change, 1992
4. Gender-Related International Conventions (including Convention on Elimination of All Forms of Discrimination Against Women, CEDAW)

5. ILO Convention on Indigenous and Tribal Peoples, 1989 (No.169)
6. ILO Convention on Worst Forms of Child Labor (C182)

4.6 The World Bank Safeguard Policies

Table 4. 1: World Bank Safeguard Policies relevant to Project represents the World Bank Safeguard policies that are triggered in the sub-project environmental and social assessment.

Table 4. 1: World Bank Safeguard Policies relevant to Project

World Bank OP	Objective & Brief Description
Environmental Assessment (EA) OP/BP 4.01	An Environmental Assessment is conducted to ensure that Bank-financed projects are environmentally sound and sustainable, and that decision-making is improved through appropriate analysis of actions and of their likely environmental impacts. Any World Bank project that is likely to have potential adverse environmental risks and impacts in its area of influence requires an EA indicating the potential risks, mitigation measures and environmental management framework or plan.
Natural Habitats OP/BP 4.04	The Natural Habitats Policy is triggered by any project (including any subproject under a sector investment or financial intermediary loan) with the potential to cause significant conversion (loss) or degradation of natural habitats, whether directly (through construction) or indirectly (through human activities induced by the project). The policy has separate requirements for critical (either legally or proposed to be protected or high ecological value) and non-critical natural habitats. The Bank's interpretation of "significant conversion or degradation" is on a case-by-case basis for each project, based on the information obtained through the EA.
Forestry OP/BP 4.36	This policy is triggered by forest sector activities and other Bank sponsored interventions, which have the potential to impact significantly upon forested areas. The Bank does not finance commercial logging operations but aims to reduce deforestation, enhance the environmental contribution of forested areas, promote afforestation, reduce poverty and encourage economic development
Indigenous People OP/BP 4.10	This policy states that any development process under World Bank financing should fully respect the dignity, human rights, economies, and cultures of Indigenous Peoples (IPs). The project should engage in a process of free, prior, and informed consultation with IPs that should result in broad community support to the project by the affected Indigenous Peoples. There is no impact on the indigenous people (no impact due to project). However, it is responsibility of the project to communicate and disseminated the project related information to the indigenous people in the project areas. The project ensures that ensure that the IPs receive social and economic benefits that are culturally appropriate and gender and inter-generationally inclusive.
Physical Cultural Resources OP/BP 4.11	The Bank seeks to assist countries to manage their physical cultural resources and to avoid or mitigate adverse impact of development projects on these resources. This policy is triggered for any project that requires an EA.
Involuntary	Key objectives of the World Bank's policy on involuntary land acquisition

World Bank OP	Objective & Brief Description
Resettlement OP/BP 4.12	are to avoid or minimize involuntary resettlement where feasible, exploring all viable alternative project designs; assist displaced persons in improving their former living standards, income earning capacity, and production level, or at least in restoring them; encourage community participation in planning and implementing resettlement; and provide assistance to affected people regardless of the legality of land tenure. The policy covers not only physical relocation, but any loss of land or other assets resulting in relocation or loss of shelter; loss of assets or access to assets; loss of income sources or means of livelihood whether or not the affected people must move to another location. When the policy is triggered, a Resettlement Action Plan must be prepared. An abbreviated plan may be developed when less than 200 people are affected by the project. In situations, where all the precise impacts cannot be assessed during project preparation, provision is made for preparing a Resettlement Policy Framework. The Resettlement Action Plan / Resettlement Policy Framework must ensure that all the Bank's policy provisions detailed in OP 4.12 are addressed particularly the payment of compensation for affected assets at their replacement cost

CHAPTER 5 - ENVIRONMENTAL AND SOCIAL SCREENING, SCOPING, IMPACT IDENTIFICATION AND PREDICTION

5.1 Introduction

This chapter is on environmental and social impacts in terms of magnitude, extent and duration likely to occur during construction and operation phases. The issues are separated as beneficial and adverse environmental impacts, including direct, indirect, and induced impacts in the project influence area. The impacts will be related to activities to be carried out during construction of the project and the operation stage of the project. The operational phase impacts of the project will be associated with the activities carried out within the premises. In addition, closure and decommissioning phase impacts of the project are also highlighted. The impacts of the project during each of its life cycle stages (construction, operation and decommissioning) can be categorized into impacts on the biophysical environment, health and safety impacts and socio-economic impacts. The Environmental and Social Management Plan (ESMP) will have measures to avoid, minimize, mitigate, and compensate the adverse impacts and measures to enhance the beneficial impacts. Based on the Safeguard Policies OP/BP 4.01 and OP/BP 4.12 are triggered.

5.2 Impacts Area Delineation of the Project

Environmental impacts that cause due to project upgrading works and implementation on physical, biological, socio-economic and cultural aspects are defined as impacts components. Adverse and beneficial impacts are expressed on the basis of proximity of activity and magnitude of impact. Based on the environmental impacts of the project, the project affected areas are classified in **Table 5.1.**

Table 5. 1: Impacts Area Delineation of the Project

Category	Project Affected Areas
Direct Impact Area (DIA)	RoW (i.e. 20m) of proposed road and construction areas of project activities (Road alignment, camp facilities, stock piling areas, spoil disposal area, extraction sites, quarry sites, crusher operating area, bitumen heating zone etc)
Indirect Impact Area (IIA)	200 m on either side of the road outside the direct impact area, Shuklagandaki Municipality (Ward no. 4, 8, 9 & 12)
Zone of Influence (ZoI)	Shuklagandaki Municipality

5.2.1 Impacts as per the National EIA Guidelines Numerical Scale

A logical, simple and systematic approach has been adopted for impact identification, evaluation and prediction. The impact has been identified for physical, biological, socio-economic, and cultural environment of the project area. The following tools have been used for impact identification:

- Checklist
- Table format for loss of land, crop production, loss of public property and property of the project affected families
- Expert's judgment

Topographic map of the road alignment has been used in predicting the impacts of the proposed upgrading by analyzing the effect of project activities on the resources like existing infrastructures, rivers/rivulets, settlements, agriculture land, forest, etc present in the location.

The expert's judgment using past experiences of similar type of projects have been used to predict impacts. Wherever possible, impact predictions have been done quantitatively. Field inventories before project implementation provide the baseline condition of resources. The assessment of impacts is based on the baseline environmental conditions of the affected area with the project activities in relation to spatial and temporal aspects in terms of magnitude, extent and duration using various environmental prediction methods. The impact has been predicted over a specified period and within defined area. Consequences of environmental impacts were interpreted in terms of local, regional and national contexts. The significant positive and adverse environmental impacts associated with the project components have been identified considering the impact zone. The Nature, magnitude, extent and duration of the impacts which were categorized according to the National EIA Guidelines, 1993. The nature of impact was divided into direct and indirect, magnitude as high, medium and low, extent as regional, local and site specific and duration was divided into long term, medium term and short term. The project activities that directly affect the existing environmental conditions was considered as direct impacts and the project activities that indirectly affect the existing environmental conditions was considered as indirect impacts. Impacts that cannot be mitigated was considered to be of high magnitude, those that are partially mitigated are of moderate magnitude and those that can be fully modified was considered to be of low magnitude. The impact that is limited only within the direct impact area was considered site specific, the impact that will be up to the overall impact area was considered as local and the impact that will be outside the overall impact area was considered as regional Extent. Impacts lasting up to 3 years was considered as short-term, those lasting from 3 to 20 years as medium-term and those lasting more than 20 years as long-term. Numerical Scale mentioned as depicted in Error! Reference source not found. is used to analyze the impact of the proposed subproject. The combine score below 40 shall be termed as insignificant impact (IS). The scores ranging between 40 and 79 shall be termed as significant impact (S), scores ranging between 80 and 99 shall be termed as very significant (VS) and the scores above 100 shall be termed as highly significant impact (HS).

Table 5. 2: Impact Quantification

Magnitude		Extend		Duration	
High (H)	60	Regional (R)	60	Long term (LT)	20
Medium (M)	20	Local (L)	20	Medium Term (MT)	10
Low (L)	10	Site Specific (SS)	10	Short Term (ST)	5

(**Source***:* National EIA Guidelines, 1993)

5.3 Beneficial Impacts

The main Benefits of the proposed road will be access of highly equipped urban standard road which will be the milestone project leading to economic prosperity and increase in economic and social sector. With the highly facilitated transportation media, improvement in educational sectors (schools, colleges and universities), health sectors (health posts, clinics and hospitals), communication facilities etc would occur. More numbers of hotels, restaurants, groceries, shops, banks and other business-oriented activities will be increased ultimately aiding to the employment generation and economic prosperity of the people.

5.3.1 Employment opportunities and Source of Income

The construction works offers a wide range of works for unskilled and skilled labours. Local people would generate substantial income from unskilled and semiskilled job generated in the project. It is that estimated 53,700 mandays (skilled: 6,600 and unskilled: 47,100) will be required for the upgrading of proposed road in targeted time (i.e.10 months).

The impact is direct in nature, high in magnitude, local in extent and short term in duration.

5.3.2 Skill enhancement

The road construction activities need to employ large number of labour force during the construction period. One of the strategies of the road project is to give much emphasis for the employment of local people who are living along the road area and are supposed to be affected by the road project. These strategies not only provide employment opportunities to the local poor people but also supports in transfer of skills and technical know-how while working in construction works and inject money in rural economy. Moreover, the road construction activities also propose imparting income generation training program to the local poor. These skills will benefit the locals in getting long-term employment opportunity in other road construction projects in future.

The impact is indirect in nature, medium in magnitude, local in extent and long-term in duration.

5.3.3 Easy Access to different facilities and Mobility

Large number of labour force will be required for upgrading proposed road alignment during the construction period. One of the strategies of the road project is to give much emphasis for the employment of local people who are living along the road area and are supposed to be affected by the road project. Since the implementation of the proposal will be done with the involvement of the local community, new skills and techniques related to weaving wire mesh, laying stone walls, paving roads, various activities related to bioengineering, using new tools and vehicles related to construction work, etc. will be transferred and skills and technical knowledge will be developed. This will help in the upliftment of workers and their dependents.

This will be direct in nature, medium in magnitude, regional in extent and long term impact in duration.

5.3.4 Strengthening of economic-social aspects

Business opportunities are created during the construction and operation of the road for products and services such as basic building materials, construction equipment, laundry, clothing, food services, cleaning services, excavation, construction material supply, etc. Indirect economic impacts will also occur from increased demand for products and services due to the increased workforce in the area. Business opportunities are a positive impact to host communities which has a multiplier effect. The improved road condition will welcome more tourists into the area, which can help women and persons with disabilities to start their own business. The improved road surface of proposed road will ensure continued and smooth flow of products and commodities. It is envisaged that trade and business activities will be further promoted not only in the area but also expanded into others areas having links to this road. New market areas and settlements will develop, urbanization and industrialization will be possible in Pulchowk, Sayaule bazar, Malebagar and Lila Chowk and all this will lead to the regional development of the area

Thus, this impact will be direct in nature, high in magnitude, local in extent and long-term in duration.

5.3.5 Enhancement of social services

With the improved access to inputs and better transport services upon completion of proposed road upgrading, other social services will also open up in the areas including internet, education, health, communication, market, banking etc. in Pulchowk, Sayaule bazar, Malebagar and Lila Chowk Area. With these services available and given its reliability assured, local stakeholders may look for and stick to locally available services rather than seeking it to elsewhere

This will be direct in nature, medium in magnitude, regional in extent and long term impact in duration.

5.3.6 Rise of Land Value

The upgrading of road leads to appreciation of land values particularly near the market and settlement areas. The land price would increase due to the availability of reliable transportation facilities. There will be rapid increase in the commercial production of agricultural crops due to road accessibility, which is also a major factor to raise the land value. This activity would likely uplift the economic condition of the local people. Therefore, it is expected that the value of properties along the road will appreciate and this will most likely be translated into more income for the residents of the area.

This impact will be indirect in nature, medium in magnitude, local in extent and long term in duration.

5.4 Adverse Impacts - Physical Environment (Pre-Construction and Construction Phases)

5.4.1 Impact on public utilities

From the implementation of this project 54 eletrical pole (Ch 00+000 to Ch 07+065), one transformer and one Pratikshyala (Area- 3 m^2) in Lila Chowk, three Chautara of 30.53 m^3 (2 Chautara in Sayaule Bazar- 24.53 m^3 & Chautara in Shaankhad- 6m^3), 36.25 m^3 boundary wall (Health Post Boundary Wall- 27.5 m^3 & Gurung Gumba Boundary Wall- 8.75 m^3) and 32.75 m3 stone masonry wall of Tibetian camp will be affected. These public utilities need to be removes and relocated before construction activities in coordination with concern community.

Impact is direct in nature of low magnitude, site-specific in extent and short term in duration.

5.4.2 Slope Instability

During upgrading vegetated area need to move and some lands with exposed soil and unstable rock structure have to be cut. All activities increase the slope instability further thus triggering more soil erosion landslide and water logging problems. Three minor slope instabilities (Ch 00+480 – 00+800 and Ch 05+460 – 06+565) were observed along the proposed road alignment. Widening the formation width on such slopes increases the risk of large-scale landslide and slope failures. However, the engineering structures and bioengineering works along the alignment will ensure the stability of land.

Impact is direct in nature of low magnitude, site-specific in extent and short term in duration.

5.4.3 Impact due to Spoil Disposal

Unmanaged disposal of spoil may cause loss of organic fertile top soil of forest and agriculture lands. Not only that it will cause surface water pollution, dust pollution and blockage of natural drainage. Haphazard disposal of spoil can cause water pollution of Seti river and Saraudi Khola During site clearance, excavation in slope, foundation of structures an estimated 20,319.59 m^3 of spoil materials will be generated. If this spoil is not properly disposed, significant negative impacts are anticipated on public health, safety, and scenic beauty of the project area.

Impact from spoil and solid waste disposal will be direct in nature of low magnitude, site-specific in extent and short-term in duration.

5.4.4 Noise pollution

In order to complete the proposed project on time, 2 excavators for soil cutting and filling work, 1 asphalt plant, 1 asphalt paver, 1 grader, 1 water tanker, 2 vibratory rollers, 1 bitumen distributor, 1 concrete batching plant and other construction related devices (mixer, vibration roller, water browser, air compressor, mechanical broom etc.) will be used. It is estimated that noise pollution will be created in densely populated area like Inner market of BP Chowk, Pulchowk, Ghari, Syaule Bazar, Malebagar, Lila Gaun and in the surrounding areas due to increase of vehicular movements and operation of machinery equipment. for construction activities. It will also create noise pollution in nearby health post, school area and ward office. As a result, it seems that the health of local residents and workers engaged in construction work will be adversely affected.

Impact from spoil and solid waste disposal will be direct in nature, low in magnitude, site specific in extent and short-term in duration.

5.4.5 Air pollution

The main construction activities that cause air pollution are earthworks (excavation and dredging), asphalt plants operations etc. These activities generate dust, which directly affect the air quality. In addition, vehicles and machinery emit smoke and fine particles. These substances will increase the local air pollution significantly during the construction stage. Burning of fossil fuels will result air pollution due to emission of sulfur oxides (SO_x), nitrogen oxide (NO_x), carbon dioxide (CO_2) and particulates. It is estimated that 418.92 metric tons of carbon emission from combustion of fossil fuel used for construction activities.

The anticipated impacts on air will be direct in nature, low in magnitude, local in extent and of short-term in duration.

5.4.6 Water pollution

Proposed road upgrading activities also become a cause of risk to impair local water bodies. These activities include spoil disposal, solid waste disposal from camp site, accidental spillage of lubricants, diesel, mobile and hazardous materials in Seti River and Saraudi Khola and nearby water bodies during the construction phase could deteriorate the water quality. The dust and silt from the construction sites will also create water pollution of the receiving streams. If workers living in tents/camps do not have access to toilet facilities, open defecation may be practiced, which may contaminate water sources, causing health problems.

The anticipated impacts on water pollution will be direct in nature, low in magnitude, local in extent and of short-term in duration.

5.4.7 Impact of quarry sites

Unorganized and haphazard collection/excavation of river materials (stones, gravel and sand) and if it exceeds the materials collected by the river, it can cause various water-related disasters. Indiscriminate collection/excavation may increase the risk of flooding, bank erosion, and landslides in the areas around Kotre Khola. Similarly, during indiscriminate collection/excavation of construction materials, the river changes its course and inundates the settlements along the river banks and the surrounding agricultural land.

Impact is indirect, medium in magnitude, local in extent and short term in duration.

5.4.8 Impact due to Stockpiling of construction material

Construction materials such as sand, gravel, stone, boulders, chips, bricks, cement, etc. are required to be stored in large quantities for the proposed sub-project. Temporarily 0.48 ha of public land (Refer **Table 1.7** and **Figure 1.4**.) was identified for stockpiling of construction materials for the project. The small particles of the construction materials stored will be blown away by the wind and pollute the air around the project area. As well as the rain water will flow these small particles and pollute the nearby by agricultural land and water sources as well.

Impact is indirect, low in magnitude, site specific in extent and short term in duration.

5.4.9 Solid and liquid waste generation

Some quantities of solid waste will be generated as a result of clearances, excavations and the final construction of the selected road. Such waste will consist of plant debris, rock and soil, cement sacks, pieces of wire, pieces of iron, pieces of bricks, paint, and etc.as well as solid and liquid waste from labour camp. Such solid and liquid waste can cause surface and sub-surface water pollution, blockage of drainage systems etc. which directly affected on natural beauty and public health and safety as well as aquatic life.

Impact from Solid and Liquid waste generation is direct, medium in magnitude, site specific in extent and short term in duration.

5.5 Adverse Impacts - Physical environment (Operation Phases)

5.5.1 Slope instability

During the operation phase, heavily-loaded vehicles may frequently pass through this route to haul raw materials, which may result in the destabilization of the road. On top of that, natural erosion, inadequate or inappropriate drainage work, faulty construction may also damage the road.

The impact will be direct in nature, low in magnitude, site specific in extent and of short term in duration.

5.5.2 Water pollution

During operation phase, washing of vehicles in Seti river and Saraudi khola can cause water pollution. In addition, leakage of fuel, lubricants and hydrocarbons while washing the vehicles into those water bodies can cause hazardous to people, aquatic life and crops. Disposal of solid and liquid waste from the new developed settlements along road alignments into Seti river and Saraudi khola will cause water pollution.

The impact will be indirect in nature, low in magnitude, site specific in extent and of medium term in duration.

5.5.3 Air and Noise pollution

Upgrading of Dulegauda- Lilachowk road provides easy access to vehicles. There will be significant increase in the number of vehicles for transporting passengers and goods. The source of air pollution in this area will be the exhaust from the vehicles using fossil fuels and vehicle fumes from any other fuel powered mechanical equipment. This will result the degradation of air quality. After upgrading of proposed road into urban road standard vehicles drive at high speed and unnecessarily sound their horns. This is likely to increase the noise level and it may affect human beings and livestock.

The impacts associated with this will be of direct nature, low in magnitude, site specific in extent and medium term in duration.

5.5.4 Impact of labor camps, construction material storage sites and waste management sites

If the project ancillary facilities such as: labour camp, stockpiling sites and spoil disposal sites were not restored after the upgrading of proposed road project, it will create soil pollution and underground water pollution. It seems that the land occupied by the project ancillary facilities of the project will be changed.

Impact is direct, low in magnitude, site specific in extent and medium term in duration.

5.6 Adverse Impacts - Biological environment (Pre-Construction and Construction Phases)

5.6.1 Loss of Vegetation

During the construction period, it is reported that 19 individual trees (Sissau- 18 and Pipal- 1) containing 3.69 m^3 tree volume located in public land within the formation width (i.e. 10m) need to be felled down.

The anticipated impact will be direct of low magnitude, site specific in extent and short term in duration.

5.6.2 Impacts on aquatic life

During construction phase, washing vehicles, disposal of various chemicals, oil and lubricants, solid and liquid waste from labor camp and developing market area in Seti River and Saraudi Khola may cause water pollution and affect the aquatic animals found there. The labors involved in the construction works may be engaged in fishing in Seti River and Saraudi Khola during their free time.

The impact will be indirect in nature, low in magnitude, site specific in extent and short term in duration.

5.7 Adverse Impacts- Socio-economic and Cultural (Pre-Construction and Construction phases)

5.7.1 Impact on Occupational Health and Safety

During construction, labor and workers will be exposed to various risks and hazards. Air pollution might be one of the major factors for health hazard during construction; the potential impacts to health are related to respiration and eye diseases due to exposure to dust during construction. Similarly, accidents during construction work, lack of worker's safety measures likely to be caused health impact to worker group. Because of the engineering and construction activities including minor excavations, concrete work, and sub-base stone lying among others, construction workers will be exposed to risks of accidents and injuries. Such injuries can result from the hand tools and construction equipment and risk of vehicular accidents to local residents.

The impact will be direct in nature, high in magnitude, site specific in extent and long term in duration.

5.7.2 Road Safety Concerns and Health and Sanitation in Community

During construction phase, increased number of construction vehicles in places such as Pulchowk, Tibetian Camp, Syaulibazar, Malebagar and Lilachowk will be plying the road therefore due to pressure and mismanagement accidents may likely occur. The haphazard disposal of construction waste will adversely affect the sanitation environment in the area. The movement of trucks and other equipment in the project area during the works implementation will cause noise and dust if the works will be in dry weather. This noise and dust may also affect the businesses in the vicinity of the construction works.

Impact is direct, low in magnitude, site specific in extent and short term in duration.

5.7.3 Social Disturbance / Risk of SEA/SH and HIV AIDs

During the fiscal year 2079/ 080, the major crime cases related to GBV were found to be rape, attempt to rape, polygamy and child sexual abuse in Shuklagandaki Municipality. This project may lead to an influx of commercial sex workers into the township or lead to contractor workers and other personnel engage in risky sexual behavior that may lead to infections in HIV-AIDS or other sexually transmitted diseases.

Impact is direct, medium in magnitude, site specific in extent and short term in duration.

5.7.4 Limited access to Student, Elderly and Differently-able

During the construction phase mobility is going to be very limited for student, elderly and differently-able people. Their daily routine might get affected. During the construction phase the school going children, elderly and differently abled people might face problems in crossing the roads and walk in the side alignment of the road, especially in rainy season

Impact is direct, low in magnitude, site specific in extent and short term in duration.

5.7.5 Discrimination, child labor and forced labor

Various castes, classes and communities will be used as workers for various construction works of the project. There is a possibility of gender discrimination between men and women, class discrimination between the rich and poor, caste discrimination between the majority, minorities and backward castes and regional discrimination between the workers in the mountains, hills and plains in the employment and salary facilities available to the workers during the construction phase. It seems that women do not get equal employment opportunities in project activities due to their physical weakness and violence against women also occurs. Although Nepalese law prohibits child labor, the possibility of child labor being used in construction work is high. In addition, there is a possibility that child labor will be used in various trades, businesses and hotel businesses that will be operating due to the increase in economic activity around the project area during the construction phase.

Impact of discrimination and child labor is direct, low in magnitude, site specific in extent and short term in duration

5.7.6 Traffic Management Issues

The proposed road alignments is only one route to reach Prithivi highway and centre of Shuklagandaki Municipality from Pulchowk, Ghari, Syaule Bazaar, Talbeshi, Malebagar, Lilagau, Jaspur, Lama Gaun. During Construction phase, the flow of traffic along or near the proposed area will be affected.

Impact is direct, low in magnitude, site specific in extent and short term in duration.

5.8 Adverse Impacts – Socio-economic and cultural (Operation Phase)

5.8.1 Ribbon development and roadside land encroachment

During operation phase, new school, college, hospital, bank and financial institutions will be opened in densely populated area like Syaule Bazaar, Malebagar, Lilagau etc. Establishment of hotels, wholesale and grocery shops by encroaching roadside public land of those areas are common.

Impact is direct in nature, low in magnitude, site specific in extent and short term in duration.

5.8.2 Public safety issues

Fast driving temptation especially among the public transport drivers' following road upgrading to smooth road surface, may cause road accidents. These accidents are generally frequent occurring nature, which is associated with non-respect to speed limit and safety signs posted on the road stretches.

Impact is indirect in nature, high in magnitude, site specific in extent and long-term in duration.

Table 5. 3: Summarize beneficial impact assessment

S. N.	Impacts	Nature	Magnitude	Extent	Duration	Total Score	Level of Significance
1	Employment opportunities and sources of income	Direct	60	20	5	85	VS
2	Skill Enhancement	Indirect	20	20	20	60	s
3	Easy Access to different facilities and Mobility	Direct	20	60	20	100	HS
4	Strengthening of economic-social aspects	Direct	60	20	20	100	HS
5	Enhancement of social services	Direct	20	60	20	100	HS

S. N.	Impacts	Nature	Magni tude	Extent	Dura tion	Total Score	Level of Significance
6	Rise of Land Value	Indirect	20	20	20	60	S

Table 5. 4: Summarize adverse impact assessment

S.N.	Impacts	Nature	Magni tude	Extent	Durati on	Total Score	Level of Significance
A) Pysical Environment							
Pre-construction and Construction Phase							
1	Impact on physical infrastructures	Direct	10	10	5	25	IS
2	Slope Instability	Direct	10	10	5	25	IS
3	Impact due to Spoil Disposal	Direct	10	10	5	25	IS
4	Vibration and noise pollution	Direct	10	10	5	25	IS
5	Air pollution	Direct	10	20	5	35	IS
6	Water pollution	Direct	10	20	5	35	IS
7	Impact of quarry sites	Indirect	20	20	5	45	S
8	Impact due to Stockpiling of construction material	Indirect	10	10	5	25	IS
9	Solid and liquid waste generation	Direct	20	10	5	35	IS
Operation Phase							
1	Slope instability	Direct	10	10	5	25	IS
2	Water pollution	Indirect	10	10	10	30	IS
3	Air and Noise pollution	Direct	10	10	10	30	IS
4	Impact of labor camps, construction material storage sites and waste management sites	Direct	10	10	10	30	IS
B) Biological Environment							
Pre-construction and Construction Phase							
1	Loss of Vegetation	Direct	10	10	5	25	IS
2	Impacts on aquatic life	Indirect	10	10	5	25	IS
C) Socio-economic and Cultural							
Pre-construction and Construction Phase							
1	Impact on Occupational Health and Safety	Direct	60	10	20	90	VS
2	Road Safety Concerns and Health and Sanitation in Community	Direct	10	10	5	25	IS
3	Social Disturbance / Risk of SEA/SH and HIV AIDs	Direct	20	10	5	35	IS
4	Limited access to Student, Elderly and Differently-able	Direct	10	10	5	25	IS
5	Discrimination, child labor and forced labor	Direct	10	10	5	25	IS
6	Traffic Management Issues	Direct	10	10	5	25	IS

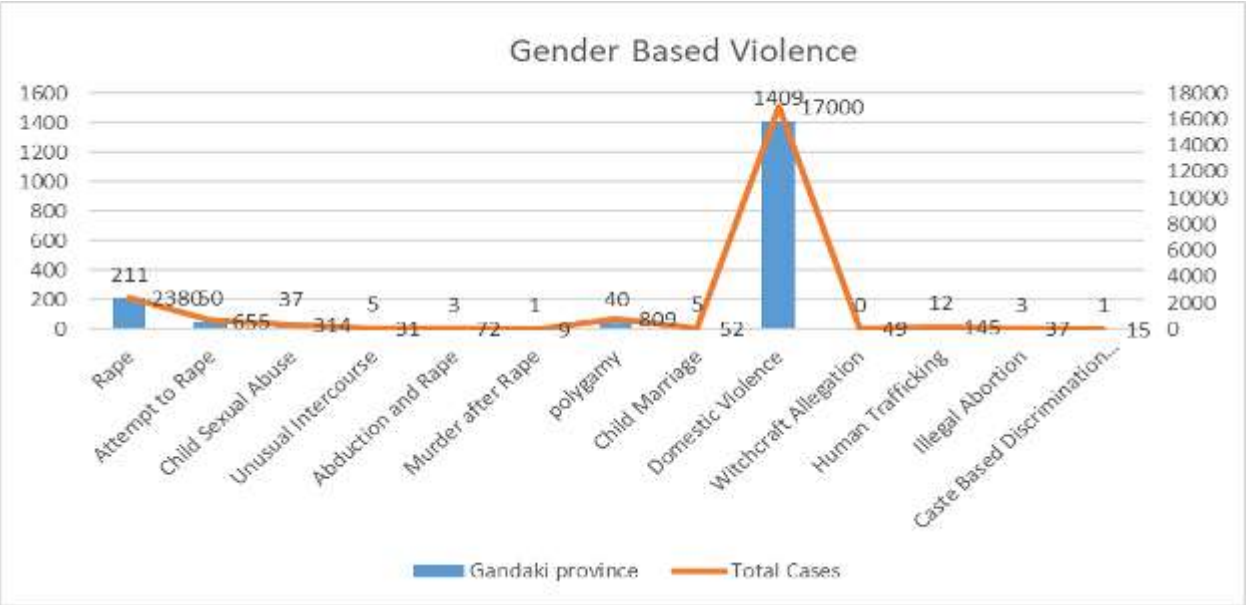
S.N.	Impacts	Nature	Magnitude	Extent	Duration	Total Score	Level of Significance
Operation Phase							
1	Ribbon development and roadside land encroachment	Direct	10	10	5	25	IS
2	Public safety issues	Indirect	60	10	20	90	VS

CHAPTER 6- SEXUAL EXPLOITATION AND ABUSE (SEA)/SEXUAL HARRASSMENT (SH) PREVENTION AND RESPONSE ACTION PLAN

6.1 SEA/SH - National Scenario

Gender-based violence ("GBV") is a pandemic that is globally and pervasive, despite decades of efforts to address it through the criminal justice, public health, education, and social welfare sectors. Under international human rights law, GBV includes intimate partner violence, sexual assault, and stalking and encompasses "physical, sexual, psychological or economic harm or suffering, threats of such acts, harassment." GBV respects no geographic, social or economic boundaries, although it poses especially complex challenges to Communities of Color and other marginalized populations.

During the fiscal year 2021/022, Domestic violence was considered as highest among all crime cases in Nepal. 17000 domestic violence cases were recorded in whole Nepal whereas 1409 cases of domestic violence were recorded in Gandaki Province. Domestic violence cases that covered 78.82 % of the Gender-based Violence crimes were registered highest in Madhesh Province and lowest in Karnali Province. In cases related to the sexual violence, 83.15 % of the accused/offenders were acquaintances and 64.22 % of the victim were girls. In the majority of Gender-based violence cases, victims and accused/offenders were from the background with lower educational qualification. Women and girls are the major victims while male are the major accused/offenders in cases related to Gender-based violence. Human trafficking cases were registered highest in Lumbini Province. Out of the overall trafficking cases, 50.24 % of the victim were women and 38.86 % of the victim were girls. Among the perpetrators, 73.88 % of them were male. (**Source**: NPH, 2022)



Figur 6.1: Gender Based violence national scenario (Source: NPH, 2022**)**

6.2 GBV and **Sexual Exploitation and Abuse (SEA)/Sexual Harassment (SH) in Project Area**

During the fiscal year 2079/ 080, the major crime cases related to GBV were found to be rape, attempt to rape, polygamy and child sexual abuse in Shuklagandaki Municipality. Detail of crime cases related to GBV and SEA/ SH in the project area is presented in **Table 7.1.**

Table 7.1: Detail of SEA/SH in project area

S.N	Crimes	Suklagandaki Municipality
1	Rape	3
2	Attempt to Rape	1
3	Polygamy	2
4	Child Sexual Abuse	1
Total		**7**

(**Source:** Area Police office, Belchautara, Tanahu 2079)

During the contruction phase, the project will give empashis to mitigate the Issues related to GBV/SEA/SH.

6.2.1 Mitigation measures

For mitigation of GBV, SEA/SH, during construction phase, the following activities should be planned and implemented which needs to be continue on operation stage also.

- Code of Conduct will be prepared and will be strictly implemented during construction phase.
- Awareness Program will be conducted to mitigate the issues realated GBV for labor and local community.
- Reduce labor influx by using local manpower and prioritizing eccentrically throughout the local ward, municipality, district, province and federal state. Training can be conducted to train or upgrade the awareness on SEA/SH risks.
- GBV/SEA/SH risks related to female workers by providing female labor-centric facilities such as separate female toilets, separate female camps, separate family camps and mother's rooms on the site.
- Separate room and toilet facilities will be provided for female labor
- SEA/SH grievances should be redirected to anti-harrasement cell of Shuklagandaki Municipality

6.4 SEA/SH/ GBV Risk Mitigation Action Plan

Awareness program to mitigate issuses related to rape case and child sexual abuse as well as awareness program for labor about GBV will be conducted in the project area. For conducting above mentioned program RS 5,00,000 is included in BoQ (AoC- 9.02) and condtractor will be responsible for the program The SEA/ SH/ GBV risk mitigation action plan through out the project period is presented in **Table 7.2**.

Table 7.2: SEA/SH/ GBV Risk Mitigation Action Plan

S.N.	Activities	2023			2024												2025						No.of Event	Participants	Remarks
		10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6			
1	Awareness Program to mitigate issuses related to rape case																						2	Labor and Local Community	
2	Awareness Program to mitigate issuses related to Child sexual abuse																						2	Labor and Local Community	
3	Code of conduct signing and understood																						7	Labor	
4	Awareness Program for Labor about GBV																						1	Labor	
5	Regular monitoring and reporting																								

CHAPTER 7- ENVIRONMENT AND SOCIAL MANAGEMENT PLAN

7.1 Background

This Environmental and Social Management Plan (ESMP) for the project identifies the principles, approach, procedures and methods that will be used to control and minimize the environmental and social impacts of all construction and operational activities associated with the project development that is intended to ensure that commitments made to minimize project's related environmental and social impacts are upheld throughout all project phases. The management and monitoring program will involve the following: a) collection and analysis of appropriate environmental social and cultural data; b) preparation of periodic reports including an annual environmental and social performance report to DUDBC and the WB and liaison with other relevant bodies (e.g. ministries, departments and relevant agencies); c) identification of unexpected environmental and social impacts; and d) formulation of mitigation measures for the unexpected negative impacts.

7.2 Implementation of Environmental and Social Management Plans

The mitigation measures will be integrated into project design and the agreements/contract documents. The project bid documents will include the implementation and reporting of the ESMP and contractor must follow it. The impact of the construction on the environment will be kept to a minimum and appropriate measures as brought out to in the ESMP are taken to mitigate any adverse effects during the construction. The Environment, Health, and Safety requirements of the construction contractor will be clearly spelled out in the contract document and the necessary cost will be included in the BOQ. The contractor is required to submit the Construction Environment and Social Management Plan (CESMP) along with Contractor's Environment, Health, and Safety Management Plan within 45 days of the commencement of the work. The client/consultant will review the Contractors CESMP and EHS plans and provide approval along with necessary improvements. The regular monitoring will be followed by the PIU/Environmental and Social Monitoring team. It is in this context, the construction contractor is required to provide 1) a sound working environment to all employees involved in the design and construction of road as per national legislations, standards, and guidelines. 2) Must ensure HSE objectives are met during the entire construction, 3) Prepare and submit ESMP plan during construction period of the project. The EHSMP should include; policy statement, roles and responsibilities, site regulations, risk management and hazard identifications, HSE trainings, PPE, Inspection and auditing, site security, medical care and first aid, 4) The contractor must ensure Environmental Management and Mitigations addressing ESMP and mitigation management as shown in Table 8.1 and 8.2. As all the ESMP costs and activities are included in the BoQ, the budgetary activities lie within the client's as well as contractor's responsibility. The DSC within the PIU, Project Management Support Team and Municipality are also responsible for the implementation of the mitigation activities and their monitoring. The public awareness campaign will be done through municipality and oversight by UDST

7.3 ESMP for Beneficial and Adverse Impact

The measures and actions proposed for augmenting the identified beneficial aspects Upgrading of Dulegaunda – Lila Chowk Road (7.22 Km), as well as proposing a set of mitigation and precautionary measures to minimize or set off the potential adverse impacts is outlined in **Table 8.1** and **Table 8.2**

Table 7. 1: Beneficial impacts of the project

S.N.	Impact	Enhancement/Mitigation Measure	Responsibility	Cost
1.	**Employment opportunities and Source of Income:** 53,714 workers (Skilled- 6,499 and Unskilled- 47,215)	▪ Local community especially poor, vulnerable groups, women will be given priority in construction based on skills and competence ▪ Ccontractor will coordinate with representative of disadvantaged and women group to employ those people, as many as possible	Contractor (DSC)	No additional cost
2.	**Skill enhancement:** Local labor will acquire opportunities to gain knowledge of new skills and knowledge on different construction activities and handling of vechicles and machineries	▪ Local communities especially poor, vulnerable groups, women will be given priority in construction work and their skills will be enhanced ▪ Organize skills enhancement training targeting the workers, local youths, women, vulnerable, disadvantaged and skills enhancement of project workers	DSC	NRs 3,00,000.00 (for the people in the direct influence area)
3.	**Easy Access to different facilities and Mobility:** Quick and easier access to Prithivi Highway, Dulegauda (Center of Shuklagandaki Municipality)	▪ Regular and emergency (during natural calamities) road maintenance will be done to ensure safe operation of the road ▪ Fixing the minimum transportation cost in agreement with DTO, transport entrepreneurs and local people	Municipality, Transport entrepreneurs and local people	Municipality will allocate certain amount of budget for regular maintenance of the road
4.	Environmentally friendly construction	▪ The upgraded road will have a cycle track which helps to promote the use of non-motorized vehicles and reduces carbon emissions	Municipality	No additional cost
5.	Maintaining open and green areas	▪ A Green Utility Zone (Greenery) will be provided under the road upgrading, with various trees which will provide shelter from the heat, will create cool surroundings, and will improve the aesthetics of the road. A green area separating the footpath and cycle lane is proposed throughout the alignment. The green area will have tree plantations at certain intervals.	Municipality	Include in project cost
6.	**Enhancement of social services:** Social services will also open up in the areas including education, health, communication, market, banking etc	▪ Regular and emergency (during natural calamities) road maintenance will be done to ensure safe operation of the road	Municipality, Transport Entrepreneurs and Local people	Municipality will allocate certain amount of budget for regular maintenance of the road
7.	**Rise of Land Value:** Price of land will be increase and there will be increase in land transaction for housing purposes	▪ Shuklagandaki Municipality will make rules and laws to regulate changing of agricultural land into settlement purpose.	Municipality	No additional cost

Table 7. 2: Adverse impacts mitigation measures

S.N.	Impact	Mitigation Measure	Responsibility	Cost
A. Physical Environment				
a) Pre-Construction and Construction				
1	**Impact on public utilities**: 54 eletric pole, one transformer and one Pratikshyala (Area- 3m^2) in Lila Chowk, three Chautara of 30.53 m^3 (2 Chautara in Sayaule Bazar- 24.53m^3 & Chautara in Shaankhad- 6m^3), 36.25 m^3 boundary wall (Health Post Boundary Wall- 27.5 m^3 & Gurung Gumba Boundary Wall- 8.75 m^3) and 32.75 m^3 stone masonry wall of Tibetian camp	▪ NEA has been consulted for relocation of 54 electric poles and one transformer, process should be completed prior to the beginning of the road construction. NEA has provided detail estimated cost including all component for re-routing of electric line work. ▪ Health post management committee will be consult for dismantaling and reconstruction of 27.5 m^3 boundary wall. ▪ Gurung Gumba Management Committee will be consult for dismantaling and reconstruction of 8.75 m^3 boundary wall removal of the health ▪ 32.75 m^3 stone masonry wall of Tibetian camp will be constructed in the co-ordination of concerned stakeholders of the tibetian camp ▪ one Pratikshyala (Area- 3m2) in Lila Chowk, three Chautara of 30.53 m3 (2 Chautara in Sayaule Bazar- 24.53m3 & Chautara in Shaankhad- 6m3) will be distmanled and reconstructed in co-ordination with concerned stakeholders, respective ward office of Shuklagandaki Municipality	Municipality/DSC and Contractor in coordination with Health post management committee, Gurung Gumba Management Committee and Provincial office of Nepal Electricity Authority (NEA)	Included Rs. 62,80,705 in BoQ (AoC- 2.05) of DPR
2	**Slope Instability**: Minor slope instabilities in Seti river road (Ch 00+480 – 00+980 of Road A), Cultivated Land of Malebagar (Ch 05+430 – 05+480 of Road A) and Kamero Mato (Ch 06+030 – 06+375 of Road A)	▪ Gabion walls and other retaining structure will be constructed	Contractor/ Municipality/DSC	Included Rs 4,46,30,659 in BoQ (AoC- 7) of DPR

S.N.	Impact	Mitigation Measure	Responsibility	Cost
3	**Impact due to Spoil Disposal:** Loss of organic fertile top soil of forest and agriculture lands, Water pollution of Seti and Saraudi, Dust pollution and blockage of natural drainage	▪ Excess spoils will be disposed in spaced, pre-approved tipping site in controlled manner. Spoil will be used for filling the pit of Talbeshi Secondary School's Playing ground and filling the Sundare Ground land nearby Ghumaaune Pool ▪ Disposal of excavated spoil into Seti Riiver and Saraudi Khola, fragile land, forest, and natural drainage will be prohibited. ▪ Spoil Disposal sites will be rehabilitated by provided with proper drainage, vegetation, and adequate protection against erosion. ▪ Spoil Disposal Sites will be fenced during the time of construction.	Contractor/ Municipality/DSC	Included Rs 2,00,000 in BoQ (AoC- 1.02) of DPR
4	**Noise pollution**: Use of heavy machinery and other construction activities	▪ Repair and maintenance of vehicles and machineries will be done regularly. ▪ Workers will be provided with appropriate ear muffs/plugs specially at crusher site ▪ Sensitive locations i.e., schools, hospitals, government offices etc. will avoided while placing the noise generating equipment. ▪ Work will be restricted to day hours (not in night time) specifically at urban and sensitive locations. ▪ Restrict activities with significant noise impacts to outside school ▪ Activities involving heavy machinery with significant noise impacts should be restricted to outside school hours..	Contractor/ DSC	Included Rs. 50,000 for the installation of informative signage boards in BOQ (AoC- 1.10) of DPR
5	**Air Pollution**: excavation and dredging activities generate dust in local air, asphalt plants operations, use of machineries and vehicles causes air pollution, 418.92 metric	▪ Road construction area shall be maintained damp by periodical spray of water. ▪ Repair and maintenance of vehicles and machineries will be done regularly. ▪ Delivery vehicles will be covered.	Contractor/PIU/DSC	Included Rs 2,00,000 for the air pollution monitoring and water sprinkling is mentioned in BOQ

S.N.	Impact	Mitigation Measure	Responsibility	Cost
	tons of carbon emission from combustion of fossil fuel	▪ Mixing equipment will be well sealed and equipped as per existing standards. ▪ All construction vehicles should comply with Motor Vehicles and Transportation Management Act as amended – mandatory Green Sticker. ▪ Provide temporary hoardings where required to minimize dust impact on locations of temples, health posts and schools. ▪ Provision of speed control measures in settlement and working areas to limit traffic speed. ▪ Dust emission and air pollution due to construction activities and operation of heavy equipment and movement of transporting vehicles, to mitigate the impacts water will be sprinkled along the proposed road alignment and nearby dust prone area and repair and maintenance of equipment and vehicles regularly. ▪ Air pollutant parameters (TSPM, PM10, Sox, NOx, Cox) will be monitored in 6 months' time interval during construction. Conforming NAAQS of Nepal.		(Aoc- 1.10) of DPR.
6	**Water Pollution :** spoil disposal, solid and liquid waste disposal from camp site, accidental spillage of lubricants, diesel, mobile and hazardous materials in Seti River and Saraudi Khola during the construction phase deteriorate the water quality	▪ Hazardous materials shall not be stored near surface waters sources ▪ Used lubricants and oils shall be collected and recycled or disposed off site. ▪ Plastic sheeting shall be placed under hazardous material storage area to collect and retain leaks and spills. ▪ Contaminated runoff from storage areas shall be captured in ditches or ponds with an oil trap at the outlet. ▪ Contaminated and worn plastic sheeting shall be packed into drums and disposed off site.	Contractor/DSC/ Municipality	The cost (Rs. 50,000) for Water Quality Test monitoring was mentioned in BoQ (Aoc-9.06) .

S.N.	Impact	Mitigation Measure	Responsibility	Cost
		▪ Water Quality (EC, PH, DO, TSS, Oil and Grease). Conforming WHO standards.		
7	**Impact of quarry sites and borrow pits**: Unorganized and haphazard collection/excavation of river materials causes various water-related disasters. In surrounding area of Kotre Khola. Excavation of soil for the base and sub-base material from cultivated and roadside adjacent land.	▪ Prepare a CESMP and include the details of quarrying activities including required quantity, locations and required mitigation within 45 days of commencement of works and submit to the PIU for approval. ▪ The construction materials will be brought from the established quarry sites located within or outside the municipality. So, the direct impact of quarries is not expected in this Subproject. ▪ The municipality in support of DSC will monitor the quality of quarrying material and state of quarry sites. ▪ The materials will be brought only from licensed vendors having environmental clearance. ▪ All the borrow pits excavated by the contractor will be rehabilitated after completion applying slope stabilization, land scaping and covering vegetation as appropriate.	Municipality/DSC, Municipality instructs the quarry operators to reinstate the established quarry sites as per agreed norms during environment clearance	No additional Cost will require, Covers by municipality/PIU DSC monitoring cost
8	**Impact due to Stockpiling of construction material** : Impairment in existing environmental condition, Air Pollution, Water Pollution, Soil Pollution	▪ Stockpile should not be located on water courses; should not be within 50m of schools, hospitals or public standpipes; and should not affect locals and their properties. ▪ Obtain written permission from landowners and local bodies for stockpiling on their land. ▪ Only barren land will be used for stockpiling and proper insulator cover and proper drain will be managed to store the chemical to avoid the leakage of chemicals. ▪ Stock of sand will be set wet to prevent it from blowing with the wind; water sprinkler will be used	Contractor	Rs 3,00,000 is mentioned in BoQ (AoC- 1.02) for the management of stockpiling sites)

S.N.	Impact	Mitigation Measure	Responsibility	Cost
		for this purpose. ▪ The places used for the stockpiling of construction materials will be cleaned promptly after the completion of the project. ▪ The area could be leased or rented based on price not lower than the prevailing market price.		
9	**Solid and Liquid waste generation:** Site clearances, excavations work, establishment operation of labor camp and stockpiling sites and construction activities generate solid & liquid waste	▪ Strongly prohibited to dispose of the sewage generated from the labor camp and the project site in Seti river, Saraudi Khola and nearby water sources ▪ Composting of organic waste generated from the camps will be disposed within the proposed camps ▪ Washing of vehicles in Seti river and Saraudi Khola will be discouraged ▪ Use of toilets in the labor camp will be enforced, Waste from toilets of camps should be managed properly (septic tank) ▪ Solid waste will be segregated into degradable and non-degradable, Collection and disposal of such waste according to the method adopted by Municipality, Burning of garbage will be completely prohibited, Efforts should be made to minimize such waste as far as possible through reuse, reduction, and recycling concepts, Sell waste paper to dealers ▪ Generated spoil will be disposed only at designated spoil disposal sites. Details of disposal sites will be confirmed during construction by the contractor and will be presented in the C-ESMP.	Contractor	No additional cost will be required. This will be the part of Contractor's Responsibility under Contractor Cost. This will be included in CESMP
b) Operation Phase				
1	**Slope instability**: Movement of heavily-loaded vehicles beyond the capacity of road, Inappropriate drainage work and faulty	▪ Rehabilitate it with bio-engineering treatments ▪ Road side tree plantation, construction of gabion wall and drainage system to mitigate possible inundation in the settlements along the project	Contractor/ Municipality	Included Rs 4,46,30,659 in BoQ (AoC- 7) of DPR

S.N.	Impact	Mitigation Measure	Responsibility	Cost
	construction in Seti Road (Ch 00+480- 00+980 of Road A), Cultivated Land of Malebagar (Ch 05+430 – 05+480 of Road A) and Kamero Mato (Ch 06+030 – 06+375 of Road A)	alignment, Ensure proper compaction as per design		
2	**Water pollution:** Washing of vehicles, Disposal of soild/ liquid waste from newly developed settlement nearby proposed road	▪ The operation of proposed work doesn't pose serious threat on water bodies; however, washing vehicles on fresh water streams will be avoided.	Drivers, Ward/ Local People	Municipality will monitor
3	**Air and Noise Pollution**: Increased in number of vehicles for transporting passengers and goods	▪ Regular monitoring of Vehicular emission with the coordination of District Transportation Office (DTO) ▪ There should be a consensus between municipality, District Transportation Office (DTO), Transportation Entrepreneur, and the local people regarding the operation of conditioned vehicles	DTO/ Transportation Entrepreneur/ Local People	Municipality Regular program during Operation
4	**Impact of labor camps, construction material storage sites and waste management sites :** Not restoring these sites Create soil pollution and underground water pollution	▪ The labor camp, stockpiling sites and waste management sites will be restored to their original condition.after the completion of the project	DSC/ Contractor	No additional Cost will require, Covers by municipality/PIU DSC monitoring cost
B. Biological Environment				
a) Pre-Construction and Construction Phase				

S.N.	Impact	Mitigation Measure	Responsibility	Cost
1	**Loss of Vegetation**: 19 individual trees (Sissau- 18 and Pipal- 1) containing 3.69 m3 tree volume within the formation width (i.e. 10m) need to be felled down	▪ Roadside plantation will be carried out @ 1:10 ration i.e., 190 seedlings of Mango tree and Camphor tree for felling down 19 trees. In addition, 10 seedling of native tree species will be planted by the project; thus, the total plantation will be of 200 seedlings. The seedlings will be replanted outside formation wide as far as practicable.	DSC/ Municipality/ Contractor	The cost for 200 seedling and tree guards is estimated @Rs 1500/tree, Rs 3,00,000 is mentioned in BOQ (AoC-9.04).
2	**Impacts on aquatic life:** washing vehicles, disposal of various chemicals, oil and lubricants, solid and liquid waste from labor camp in Seti River and Saraudi Khola and fishing by labors involved in the construction works may affect the aquatic animals	▪ Labors engaged in construction work will be completely prohibited for fishing using electricity and chemicals as well as disposing solid and liquid waste in Seti river and Saraudi Khola ▪ Washing of vehicles in Seti river and Saraudi Khola will be strictly prohibited.	Contractor	No additional Cost required
b) Operation Phase				
1	**Disturbances to wildlife**: Increased traffic flow and unnecessary blowing horn causes disturbances to birds and mammals found in public land owned by Panchamuni Ma.Vi. (Ch 00+480-00+830) and their movements in project area	▪ Unnecessary blowing of horn will be prohibited ▪ Informative. Signboards will be installed along proposed road alignment.	Municipality	Included Rs. 50,000 for the installation of informative signage boards in BOQ (AoC- 1.10) of DPR
C. Social Environment				
a) Pre-Construction and Construction Phase				
1	**Impact on Occupational Health**	▪ By following the regulations related to occupational	Municipality/ DSC/	Included Rs 3,18,000

S.N.	Impact	Mitigation Measure	Responsibility	Cost
	and Safety: Labor will be exposed to various risks and hazards, exposure to dust causing respiration and eye disease, loss of hearing due to noise pollution, , accidents during construction work due to lack of worker's safety measures	health and safety, the mentioned safety precautions and workers' health will be ensured ▪ Different types of personal protective equipment such as helmet, mask, gloves etc will be provided to the labors involved in construction work. ▪ Safe drinking water and gender – friendly toilets will be provided for labors ▪ First Aid Kit Box will be kept at the workplace ▪ Safety signs will be installed at working site to avoid the accidents. ▪ Drivers with authorized license holders will only be allowed for the operation of construction vehicles. ▪ Provision of insurance to cover physical damage to workers. ▪ Induction and refresher training to the workers will also be provided with insurance to cover physical damage to workers. ▪ The contractor shall provide reasonable working conditions and terms of employment, and in conformance to working conditions established by National law. During construction, temporary accommodations will be constructed by the contractor and will comply with national and international standards for quality, security, safety, and professional competency. ▪ Agreement with nearby health institution will be in place by the contractor. ▪ Contractor will be responsible to maintain the records of each and every accident and incidence and will make available to DSC/PCO/PMST as and when required.	Contractor	in BoQ (AoC-1.09) of DPR
2	**Road Safety Concerns and**	▪ Traffic management measures and information	Contractor	Rs. 2,00,000

S.N.	Impact	Mitigation Measure	Responsibility	Cost
	Health and Sanitation in Community : Movement of heavy vechicles for transportation of construction material causes accident, affect sanitation environment of the area etc.	signboards need to be placed with the precautionary measures ▪ Hapazard disposal of wastes from construction activities will be minimized through public awareness ▪ Safety signs will be installed. ▪ Sign boards with safety messages and warnings will be placed in local languages all along the alignment at the construction sites and at the trench excavation area. ▪ Zebra crossing will be constructed for Pedestrian in school area, market area and settlement area. ▪ Provide bus laybys and Bus Shelters. Bus laybys are provided at various locations where public buses or micro buses pull out of the traffic to pick and drop off passengers. ▪ Sewer Drainage: ▪ Development Stretch of 15 m of each cross-road will be developed under this project. ▪ Installation of Road markings at all major as well as minor intersections. Road Signs and Markings Road Markings has been provided as per Traffic Sign and Marking manual as per DPR ▪ Hand railing to be provided at box culverts and other required section ▪ Retaining/ Breast wall: Stone Masonry Retaining wall has been provided along the alignment where embankment is required ▪ Guard Rails and Safety Barriers: Guard Rails and safety barriers must be provided in places where serious damage to vehicle and people may occur when an out-of-control vehicle may leave the		Included in BoQ (AoC-1.01)

S.N.	Impact	Mitigation Measure	Responsibility	Cost
		roadway or hit other objects. ▪ The contractor will assign a safety supervisor and will monitor daily construction works in terms of health and safety. ▪ Awareness campaigns in the community and schools will be conducted		
3	**Social Disturbance / Risk of SEA/SH/ GBV:** Conflict between local residents and labors, Sexual exploitation and abuse (SEA)/sexual onstructi (SH), Gender-based violence (GBV) in workplace	▪ Carry out site management practice such as the fencing around work area and road signage ▪ Display appropriate signage for use during construction and implementation of the project to enhance awareness creation on the potential hazards of the onstru ▪ SEA/SH awareness raising activities, trainings and stakeholder engagements such as: • Community based-awareness program • School based awareness program • Awareness program for women and against the gender-based violence ▪ Providing female labor-centric facilities such as separate female toilets, separate female camps, separate family camps and mother's rooms on the site. ▪ Anti-harrasement cell will include mechanism for referring SEA/SH-related issues ▪ Formulating and adopting Code of conduct including sections on the safety of women and girls (CoC should be included in all contracts and training on CoC should be provided to all workers) ▪ CoC are understood through orientations and signed by workers	Municipality/ DSC, Contractor/ NGO/ CBO/ Local people/ Women's Forum	Rs.5,00,000 included in BoQ (AoC-9.02)
4	**Limited access to Student, Elderly and Differently-able:**	▪ Diversions, ramp and proper crossings will be available for elderly and differently-able people in	Contractor	No additional cost will be required (will

S.N.	Impact	Mitigation Measure	Responsibility	Cost
	Mobility is going to be very limited for student, elderly and differently-able people which affect their daily routine	the construction phase to ensure their mobility is not impacted during construction. Elderly people should have access to socialize and meeting people and family to nurture their mental need/health. ▪ The design should incorporate the disabled-friendly measures and will incorporate periodic maintenance.		be the part of Contractor's Responsibility under Contractor Cost)
6	**Discrimination, child labour and forced labour**: gender discrimination, class discrimination, caste discrimination, regional discrimination on employment and salary facilities available to the workers during the construction phase. As well as Child labor and forced labor might be occur	▪ Gender discrimination, class discrimination, caste discrimination and regional discrimination will not be done in terms of employment opportunities, wage rates and other service facilities. ▪ No child (below 16 years) and forced labor will be employed in project.	Contractor	No additional cost will be required.
7	**Traffic Management Issues**: Construction activities will disturb vehicles movement to Prithivi highway and centre of Shuklagandaki Municipality from pulchowk, ghari, syaule bazaar, talbeshi, malebagar, lilagau, jaspur, lama gaun	▪ Mobilization of equipment of materials will occur at night (between 6 PM – 9 AM) ▪ A detailed Traffic and Transportation Plan is to be contained in the Contractor Document ▪ Traffic Safety such as street lights, traffic control devices and other features shall be covered through "*Traffic Signs Manuals Vol-I and Vol II*" and "*Road safety manual*" published by the DOR. ▪ Conducting the road safety audit during construction and prior to opening for public ▪ Bus bays are one of the most crucial factors to be considered in market areas as well as settlement areas. ▪ Provision of alternative routes to ease the congestion and built up of traffic	Municipality/ DSC/ Contractor/ PIU (Contractor will submit the Traffic and Transportation Plan and approved by the PIU for effective monitoring)	This will be the part of contractor cost.
b) Operation Phase				

S.N.	Impact	Mitigation Measure	Responsibility	Cost
1	**Ribbon development and roadside land encroachment**: Establishment of hotels, wholesale and grocery shops by encroaching roadside public land might be occur	▪ The municipality will work with wards and local bazaar committees/groups to discourage encroachment into the RoW.	Municipality	Cost will be borne by municipality
2	**Public safety issues**: Traffic accidents and associated risks	▪ Raise awareness of traffic rules, pedestrian / cycle lanes and installation of speed bumps to control speed near pedestrian crossing areas ▪ Traffic management plan will be developed, especially along congested locations. ▪ Traffic control measures, including speed limits will be enforced strictly. ▪ Further encroachment and squatting within the ROW will be prevented. ▪ No school or hospital will be allowed to be established within 50 m of the road without permission from the planning authorities.	Municipality	Cost will be borne by municipality

7.4 Costs of Executing the Environmental and Social Management Plan (ESMP)

All proposed mitigation measures will be integrated in the project design so that these measures may automatically form part of the construction and operational phases of the project. The cost of executing the suggested mitigation measures such as of slope stabilization, awareness, waste management measures, shall be included in contractor's environmental and social plans, whereas the and tree plantation, etc. comes under the BoQ. The other remaining total cost for the ESMP is outlined in **Table 8.3**.

Table 7. 3: Cost of ESMP

S.N.	Impacts	Description	Amount (Rs)	Referance
A) Beneficial Impact Enhancement Cost				
1	Skill enhancement	Skill enhancement training (No. of Event- 2)	300000	AoC- 9.05
B) Adverse Impact Mitigation Cost				
a. onstruc Environment				
1	Impact on public utilities	Relocation of Public utilities	6280705	AoC- 2.05 & 9.01
2	Slope Instability	Construction of Retaining Structures	44630659	AoC- 7
3	Impact due to Spoil Disposal	Management of Spoil Disposal Sites	200000	AoC- 1.02
4	Noise pollution	Installation of Informative Signboards and Noise Level Monitoring during Construction Period (Frequency of Monitoring -3times)	50000	AoC- 1.10
5	Air Pollution	Water sprinkling Cost and Air Quality Monitoring Cost during Construction period (Frequency of Monitoring -3times)	200000	AoC- 1.10
6	Water Pollution	Water Quality Monitoring Cost during construction period (Frequency of Monitoring -3 times)	50000	AoC- 9.06
7	Impact due to Stockpiling of construction material	Fencing and Management Cost of Stockpiling Sites and labor camp	300000	AoC- 1.02
b. Biological Environment				
1	Loss of Vegetation	Plantation- Cost of tree guards and seedling	300000	AoC- 9.04
c. Social Environment				
1	Impact on Occupational Health and Safety	Cost of PPE and First Aid Kit	318000	AoC- 1.09
2	Road Safety Concerns and Health and Sanitation in Community	Cost of traffic safety measures	200000	AoC- 1.10
3	Social Disturbance / Risk of SEA/SH/ GBV	Awareness program and training to mitigate issues related to rape case and child sexual abuse, Awareness program for labour about GBV including	500000	AoC-9.02

S.N.	Impacts	Description	Amount (Rs)	Referance
		formulating and adopting Code of Conduct (No. of Events- 4)		
4	Information dissemination and stakeholder engagement	Stakeholder consultation including dissemination of project information and maintaining a functional GRM at the project level to address timely the project related greviances of community and other stakeholders	8,00,000	AoC– 9.03
Total			**5,34,29,364**	

7.5 Impact and Compliance Monitoring

Impact monitoring involves the monitoring of environmental and social changes and estimates inherent variation within the environment, identifies long-term trends in the natural system, and derives conclusions by making comparison against a standard or target. Compliance monitoring is carried out to understand the implementation status of environmental and social requirements as documented in the ESMP and is shown below.

Municipalities will report on the implementation of the ESMP(s) and on the status of compliance with the instruments on a regular basis as part of the trimester progress report (to the DUDBC). Information shall include: 1) measures taken in furtherance of the safeguard instrument, ii) conditions, if any, which interfere or threaten to interfere with the smooth implementation of the safeguard instruments; iii) any feedback under the GRM of the ESMF, and iv) remedial measures taken or required to be taken to address such conditions.

Table 7. 4: Selected monitoring indicators

Monitoring Sector	Parameters selected
Slope, stream protection	Effectiveness of slope protection, stream protection works
Socio-economic development in road alignment and ZoI	▪ Number of employment opportunities created ▪ Number of workers received training on enhancement of technical skills ▪ Change in transportation costs and time ▪ Number and type of enterprises, cottage industries established ▪ Change in status of basic services and utilities in the ZoI for e.g. education institutions, access to health infrastructures, water supply, energy status, trade and commerce ventures, shift in livelihood strategies among the populace from the ZoI ▪ Condition of affected infrastructures (if any) ▪ Occupational health and safety measures provided to workers ▪ Increase in number of people receiving social service facilities (school, health post) ▪ Increase in land value ▪ No. of accidents related to road ▪ State of settlement condition (no. of houses, shops, sanitation condition) ▪ Number and status of porter's livelihood

7.6 Monitoring activities and methods

Error! Reference source not found. Identifies the specific compliance monitoring activities. Phase-wise/chronological details are provided for the methods, schedules, responsible implementing agency and the responsible monitoring agency. Compliance monitoring refers

primarily to the pre-construction and construction stage of the project. The following government standards will be taken as reference for monitoring.

Table 7. 5: Impacts and monitoring of the project

Parameters	Verifiable Indicators	Verification methods	Monitoring locations	Schedule	Monitor agency	Cost
Change in Land Use	Changing Agricultural land, forest land, settlement area and barren land	Site observation, photos, discussion with communities	DIZ, IIZ and project affected wards	Continuous / construction (Yearly)	DSC	400000 (AoC- 9.06)
Quarrying of Construction Materials	Initiated erosion, changes in river regime, erosion by river systems, degradation of vegetation, water logging, waterborne diseases	Site observation, photos Records from local health centres	Quarry site areas	construction (Quarterly)	DSC	
Noise and dust pollution	Total Suspended Solid, Particulates, noise level	Visual inspection, measurement, and comparing baseline data,	construction sites and at sensitive spots	construction / operation (Quarterly)	DSC	
Use of bitumen storage, heating, spreading	Contamination of bitumen near water sources, land contamination	Visual inspection, measurement, comparison with baseline data,	construction sites	construction (Quarterly)	DSC	
Road safety measures	Speed controls, traffic signboards, ROW encroachment, Pedestrian/cycle lane and speed bumps	Observation, photos and interaction with local peoples	ROW	Yearly throughout the project cycle	DSC	
Road accidents	Type and number of accidents occurred Adequacy of occupational safety measures provided	Observations, photos, spot checks, interview with local peoples	Road alignment	Yearly throughout the project cycle	DSC	
Cultural, religious and historical sites	Cultural and religious infrastructure, people perception, practices	Records, observations, interview with local people	Project area	operation (Yearly for 2 years)	DSC	
Occupational and safety hazard	Safety equipment like helmets, globes, boots etc., insurance, potable water, basic first aid kit	Observation, records and interview with workers	camp and working area	construction (daily)	DSC	
Possible township/ribbon development along the road	Congestions to road users Number of accidents, ROW encroachment	Records, observations	Project Area	operation (Yearly for 2 years)	DSC	

The monitoring will be performed in active construction sites (road and other footprints which details are provided in annexes)

7.7 Monitoring Cost

There will be no cost for establishment of Environment and Social Monitoring Unit as the monitoring unit lies within PIU as a DSC. The social, gender and environment expert within the DSC will monitor environment and social components and cost will be provisioned under DSC contract. The DSC will also consider cost requiring items such as air, water and noise monitoring.

7.8 Institutional arrangements

The institutional setup plays a vital role in successful implementation of Environmental and Social Safeguards measures. The Ministry of Urban Development (MoUD), Nepal has setup a Project Coordination Office (PCO) under the Department of Urban Development and Building Construction (DUDBC) for NUGIP in Kathmandu. A Project Management and Support Team (PMST) will support the PCO in project implementation including ensuring compliance with environmental and social safeguards. A Project Implementation Unit (PIU) in each municipality is established for the implementation in the field. To ensure that the investment sub-projects are efficiently implemented, delivered on time, and completed in accordance with environmental and social safeguards requirements, technical assistance will be delivered through a Design and Supervision Consultancy (DSC). DSC will deploy engineering, procurement, E&S safeguards and other technical specialists to work closely with municipal engineers and other technical staff to design and supervise the implementation of the sub-projects in two clusters. The role of PIU/DSC includes implementation of ESMP, RAP, VCDP, etc. The PCO with support from PMST will review implementation support of environmental and social safeguard studies/ management plan prepared by PIUs/DSCs.

At subproject level, the contractor will be required to comply with the ESMP. Each municipality will need Environmental and Social Development (ESD) expert to review ESIA-ESMP, RAP etc. The E & S safeguard specialists of DSCs will regularly visit the subprojects to ensure project implementation in accordance to World Bank's safeguard standards and ESMP. The ESD will be a part of PIU. The role of DSC will also include ensuring compliance of pertaining laws, policies, regulation for all subprojects, coordination and liaising with government stakeholders as well as the World Bank with respect to various E&S issues. The PCO will have overall responsibility to ensure compliance with pertaining laws, policies, regulation for all sub projects, and development of sub-projects in sustainable way and allocation of fund for institutional capacity development. The reporting of the PMST on the monitoring and evaluation on the project's safeguard performance to WB is done internally by the PCO and externally by the WB experts.

Table 7. 6: Roles and Responsibilities of the Stakeholders in ESMP Implementation

SN	Stakeholder	Roles and Responsibilities	Time Schedule
1	World Bank	• Review and final approval of ESIA and ESMP • Review project design and contract documents, against approved ESMP measures and give comments for corrective actions • Review of periodic monitoring reports of project construction and operation and taking of necessary actions in case of non-compliance	Recommendations and implementation
2	PCO/PMST	• Review and approval of ESIA and ESMP • Give permission for Project Implementation as per ESMP • Review project design and contract documents,	ESMP approval Before contract bidding

SN	Stakeholder	Roles and Responsibilities	Time Schedule
		against approved ESMP measures and give comments for corrective actions • Ensure that contractor commitments under the ESMP are reflected in bidding documents • Monitoring subproject to ensure the implementation of ESMP • Review of periodic monitoring reports of project construction and operation and taking of necessary actions in case of non-compliance • Environment and social monitoring Report preparation and submission to the WB	As and when required construction and operation phases
3	PIU/Municipality	• Incorporate ESMP mitigation measures are incorporated in the final project design and tender documents of project construction and operation • Acquire necessary permits and approval for project construction and operation • Monitoring and record keeping regarding environmental measures and impacts. • Compilation of environmental monitoring and performance report and dispatch for review through proponent to stakeholders	Before construction During construction, and operation phase Monitoring every month during construction
4	DSC	• Elaborate ESMP, if necessary and assist field engineers on the site inspection before approval of CESMP • Supervision of baseline, compliance and impact monitoring of construction contractor's activities as per responsibilities in the contract document and advise the PIU for needed actions at the site in regular environmental management meetings. • Preparation of monitoring report as mentioned in ESMP with a list of compliance and non-compliance works with recommendations • Monitoring of contractor’s performance on meeting the provisions of tender documents and ESMP • Monitoring of the effectiveness of enhancement measures and mitigation measures	Pre-construction phase Regularly during construction phase (daily, weekly, monthly)
5	UDST	• Design Training, prepare training manual to include measures identified in ESMP • Provide training to DSC, PIU or Contractors to implement the training part included in the ESMP	During Construction Stage As per required

SN	Stakeholder	Roles and Responsibilities	Time Schedule
		• Prepare report	
6	Construction Contractor	• Prepare a detail CESMP for minimization of construction related impact and seek a prior approval • Provision of Environment Cum Safety Officer • Ensure all preparatory works are carried out as per the tender document • Implement mitigation measures as specified in ESIA, ESMP or as instructed by supervising engineer • First hand monitoring and record keeping of environmental mitigation measures implemented and their performance • Carry out all corrective actions or other instruction given by supervising engineers/DSC/PCO	Pre-construction phase Daily during construction phase Regularly during construction phase.
7	Affected Stakeholders	• Assist and provide suggestions to the PIU in the matters related to community	As and when required

7.9 Stakeholder engagement overview

Regular stakeholder engagement and consultations are necessary to ensure widespread and meaningful participation of key stakeholders with focus on the project affected people. Successful implementation of the subproject requires coordinated efforts of various stakeholders at different levels. Hence, communication and consultations at different levels were used as a tool to inform and educate stakeholders about the proposed project intervention.

There are two key objectives of effective stakeholder engagement and consultations. First, it is to keep all stakeholders informed of the project activities, and any potential beneficial and adverse impacts. Second, it is to ensure that stakeholders actively participate at all levels of the project cycle, to enable sharing of valuable local knowledge involvement in the development of mitigation plans to minimize the potential negative impacts of the project, and so are well equipped to take over the responsibilities of operation and management once the project phases out. These will ultimately contribute towards narrowing down the gaps between the project officials and beneficiaries, and to help create a conducive environment to mitigate against the adverse social and environmental issues through optimal cooperation from the project beneficiaries themselves. Community participation can be effective if local people are empowered. The method of community participation needs to be planned to reflect the community profile and nature of the project. Different communication methods are integrated together communicates the community as focus group discussions, meetings, and workshop. The plan ensures the following:

- Ensure local ownership
- Include different types of stakeholder's group in participation process
- Generate and respond to feedback

Public consultation and community participation helps to remove such uncertainty and at the same time help the project implementation with its methodology as well as work plan. It is assisted in the identification of the problems associated with the project, as well as the needs of the population likely to be impacted. This participatory process helps in reducing the public

resistance to change and enabling the participation of the local people in the decision-making process. The involvement of the various stakeholders ensures that the affected population and other stakeholders are informed consulted and are allowed to participate at various stages of project preparation. Different strategies have been adopted for communication/ consultation during implementation stages. Stakeholder engagement strategy outlines engagement through the project development phases and recommends a set of stakeholders' engagement activities to be carried out throughout the project development phases. This chapter also outlines the disclosure to be made and other communications to be made during the project cycle.

Various stakeholder consultations were held during the design of the subproject to understand project questions and concerns, and to incorporate any concerns and feedback into project design. A table of the stakeholder consultations held to date has been included at Annex IX. Stakeholder consultations including with vulnerable groups such as women's groups, and indigenous groups, and information dissemination will continue through project implementation as detailed further below.

7.10 Stakeholder Engagement Procedures and process

The subproject will draw on existing mechanisms and procedures established at the local level to carry out stakeholder engagements. The municipality forums will be the primary mechanism for engaging with stakeholders and community participation, to ensure that projects identified reflect local needs and priorities. Other mechanisms for community engagement and consultations include community-based user committees in construction supervision and operations and maintenance, as a social accountability and safeguard mechanism. The stakeholder consultations will draw on mechanisms already established at the local level. Where mechanisms for stakeholder engagement do not already exist, a mechanism elaborated below will be followed:

7.10.1 Stakeholder Mapping

The primary objective of stakeholder analysis is to map the stakeholders, their role, operational network, representation requirements and impact on type of activity in the project to strategically prioritize consultations with them. The stakeholder mapping is undertaken through formal and informal consultations and their interests concerned with the project activities should be identified throughout the project cycle. The stakeholders identified for the subproject are presented in **Table 8.7.**

Table 7. 7: Stakeholder roles and responsibilities

Level	Stakeholder	Roles and Responsibilities
Federal	MoUD, DUDBC, PIU	Facilitate the implementation of the subproject, coordinate with agencies, undertake monitoring and reporting to WB
	DoR, MoFE, (PIU)	Support coordination, and sectoral policy implementation
Local	Municipality, Ward Offices Tole Development Committees	Support the process of subproject selection, identify beneficiary and their needs, support coordination, support grievance and dispute resolution
	NEA, DFO, LRO, DoI DCC, Traffic Police, Water Users Committee	Provide specialized inputs on local conditions, permissions, technical input limitations and needs of the public, provide compensation estimation, provide required assistance during project implementation, and support monitoring
Subproject	Ward representative	Engage and participate in consultations, support in

Level	Stakeholder	Roles and Responsibilities	
Level	Associations) and All types of local user groups	project implementation	
	Extended users of the project		
PCO		Overall Monitoring and Coordination	Executing agency
PMST		To support PCO in monitoring and control ,will work as a helping hand to PCO, coordinate with the municipalities and DSCs of municipalities	Executing Agency
DSC (Design and Supervision Consultant)		Design and overall management of UDG contract in municipality Will help PIU of municipalities in overall design, contract management, supervision will coordinate with PMST	Consultant

7.10.1.1 Stakeholders Consultation

The stakeholder consultation conducted during preparation of ESIA are:

a) Focused group discussions (FGD)

During Field Visit, all together 3 focused group discussions were conducted. All together 29 people (Male- 9& Female- 20) were taking participants in focused group discussions. The detail of FGD conducted during field visit is presented in **Table 7.8..** Minutes of Focused group discussion is presented in **Annex VII.**

Table 7.8: Detail of Focused group discussion

Date	Consultation type	Composition of participants	Issues raised	Response from project
October 14, 2023	Child Group Discussion	Tallbeshi School, Ward No. 9, Shuklagandaki Mun. Total Participant-10 (Male-6 Female-4)	Dust control in construction time in market area	These issues of construction phase dust control and speed control are addressed in ESIA
October 15, 2023	Women Group Discussion	Syaule bazer ,Gurung Gumba, Shuklagandaki Mun., Ward No.9, Total Participant/ Female - 9	Boundary Wall of Gurung gumba within the formation width of proposed road in Syaule Bazar, Ward No. 9 should be reconstructed.	The project will carefully design the road considering the mitigation measures.
October 17, 2023	IPs Group Discussion	Syaule Bazar, Ward No. 9, Shuklagandaki Mun., Total Participant-10 (Male- 3 & Female-7)	Implementation of project should be done with minimum loss of the private house/property, private lands and public propert	The project will carefully design the road considering the mitigation measures. The process of preparing the safeguard documents will be expedited.

b) Key informant interview (KII)

During Field Visit, all together 2 key informant interview (Male-1 & Female-1) were conducted. The detail of KII conducted during field visit is presented in **Table 7.9.** Filled question answer format of Key informant interview is presented in **Annex IX.**

Table 7.9: Detail of Key informant interview (KII)

Date	Consultation type	Name, Position and address of Informant	Issues raised	Response from project
October 16, 2023	KII	Khem Bahadur Gurung (Male) Teacher, Syaule Bazar, Ward No. 9, Shuklagandaki Municipality	Dust Pollution	Issue will be address in ESIA
October 16, 2023	KII	Kamal Kauri Gurung (Female), Social Worker, Syaule Bazar, Ward No. 9, Shuklagandaki Municipality	Increase road accident.	Issue will be address in ESIA

c) Public consultations

During field visit 5 public consultations were conducted. All together 170 people (Male- 127 & Female- 43) were taking participants in public consultations. The detail of public consultations is presented in **Table 7.10**. Minutes of group discussion and Public Hearing is presented in **Annex VII** and **Annex VIII** respectively**.** .

Table 7.10: Detail of Public consultations conducted in the project area

Date	Consultation type	Composition of participants	Issues raised	Response from project
March 10, 2023	Public Hearing	Ward Office, Ward No. 9, Shuklagandaki Municipality, Total Participant-54 (Male-41 and Female-23)	• Footpath of 2/2 m on either side of the road in Malebagar, Ward no. 9, Suklagandaki Municipality should be constructed for pedestrains. • Implementation of project should be done with minimum loss of the private house/property, private lands and public property. • Boundary Wall of Gurung gumba within the formation width of proposed road in Syaule Bazar, Ward No. 9 should be reconstructed. • Proposed road should be constructed in Nepal Government's Road Standard and should be completed as soon as possible. • Quality of the work should be ensured • Quality road construction should be done and if possible, road should be constructed upto Lamagaun (17 Km) instead of Lilachowk (i.e. 7.22 Km).	The project will carefully design the road considering the mitigation measures. The process of preparing the safeguard documents will be expedited.
February 22, 2023	Group Discussion	Ward Office, Ward No. 4, Shuklagandaki Municipality, Total Participant-34 (Male- 27 and Female-Female-7, IPs- 18, Dalit-4)	• Bazar located inside the dhulegauda and shanti tol of Shuklagandaki Municipality 4, which are vulnerable to landslide and soil erosion should be protected by constructing suitable physical infrastructres below the bazar area adjoining to the proposed road. • Project should be implemented with minimum loss to the private property • Drinking water pipes of Dhulegauda water committee of about 200 m from Dhulegauda to B.P chowk should be protected while	The project assured that all the public infrastructures will be shifted prior the construction of road.

Date	Consultation type	Composition of participants	Issues raised	Response from project
			implementing the project.	
February 23, 2023	Group Discussion	Lila Chowk, Ward No. 12, Shuklagandaki Municipality Total Participant-35 (Male- 22, Female-13, IPs- 23, Dalit- 4)	• Waiting Place (Pratikshyala) of Lilachowk, Ward No. 12, Shuklagandaki Municipality should be relocate into a suitable place. • Road should be constructed without hampering the house and land of the local people of Lilachowk. • Cultivated Land adjoin to Ghumaune Bridge should be protected while constructing the road. • Road should be constructed with minimum loss to the private property Dhhor Talbeshi (Syaule Bazar Area). • Drinking water pipes should be well managed and if there are any damages during the construction phase, the project should look after it. • Spoil should be disposed in Sundare ground, Ward no. 12, Shuklagandaki Municipality . • Zebra crossing should be made in Lilachowk.	These issues of construction phase dust control and speed control are addressed in ESIA
February 24, 2023	Group Discussion	Shuklagandaki Municipality ward no.9 Total Participant-15 (Male- 10, Female-5, IPs- 10 , Other- 2)	• Suitable physical infrastructures should be constructed in area below Shanti tol of Ward no 9, Shuklagandaki Municipality as nearly 500 m area is vulnerable to landslide and soil erosion. • Spoil should be utilized in filling the pit of the playground of Talbeshi Ma.Vi., Ward no 9, Shuklagandaki Municipality and the area should be well managed after the construction phase of the project.	These issues of construction phase dust control and speed control are addressed in ESIA

Date	Consultation type	Composition of participants	Issues raised	Response from project
			• Construction materials should be stored in Public land just behind ward office, Ward No.9 and Labor camp should be established in public land just behind to Shiv Mandir, Malebagar, Ward No.9. • Boundary Wall of Gurung gumba within the formation width of proposed road in Syaule Bazar, Ward No. 9 should be reconstructed.	
October 13, 2023	Group Discussion	Suklagandaki Municipality, Ward No.9, Total Participants-32 (Male- 27, Female-5)	• Issues of 10 Private structures (Constructed before RoW declaration i.e. 10m by Office of Municipal Executive, Shuklagandaki Municipality in the Year 2072) lies within the construction width • Issues of Greviance	• Road width will be narrow down at such 10 locations where Private structures lies within the Construction width avoiding impact upon the structures. • Decision making of concerned stakeholders for the dismantaling of private structures lie in the formation width • Formation of Ward Level GRC
		Please insert the consultation done in the Divisional Forest Office of Shuklagandaki. It is always good to consult with stakeholder as for courtesy visit and to get suggestions from them for subproject preparation and implementation	•	•

Date	Consultation type	Composition of participants	Issues raised	Response from project
		irrespective of whether the road alignment passes through forested areas.		

7.11 Mechanism for Consultation

The consultation process envisages involvement of all the stakeholders at each stage of subproject planning and implementation. Involvement of the community is not limited to interactions with the community but also disclosing relevant information pertaining to the project tasks. Community participation is and will be ensured at all stages. Dissemination of project information to the community and relevant stakeholders will be carried out by the PIU. The community will be made aware of the project alternatives and necessary feedback will be obtained; other stakeholders will be involved in the decision making to the extent possible.

The outcome of consultations is incorporated as appropriate into the design and ESMP. As part of such consultations, the draft ESMP will be presented and explained to the people on the content and process of the implementation of the plans. Consultations with project affected persons and their profiling are conducted as per the requirements of ESIA, and preparation of the RAP.

7.11.1 Public/Community Consultation Plan

All consultations on social and environmental issues will be carried out during implementation of the project will be done in an inclusive manner, including vulnerable social groups (such poor household, caste, persons with disabilities, among others) and women. The budget allocations for for Stakeholder consultation as well as dissemination of project information is RS 8,00,000 included in BoQ (AoC– 9.03). Detail of the Project Consultation Plan are presented in **Table 7.11.**

Table 7.11: Project Consultation Plan

Objective and Target Goal	Method	Responsibility
I. Build Local Ownership		
Introduce Project DPR Report and its components	Group Meeting/Workshops	DPR Consultant/ PCO/Municipality
Maintain efforts for two-way communication with relevant stakeholders through the project	Face to face meeting with concerned stakeholders	PCO, Design Supervision Consultant, Ward Level Authority
II. Start Consultation Process with Potentially Affected Communities by construction and operation of road		
Identify communities to be potential affected by project	Electronic and face to face communication with relevant stakeholders and implementing agencies	PCO, DPR Consultant Municipality Ward Authority
Consult with community representatives and ensure that their concerns with the proposed project are addressed	Face to face meeting with community representative (includes social officer of Municipality, women's representative etc.) Meeting will take place following protocol for meeting (social distancing , wearing of masks by all the participants, use of hand sanitizers, conducting meeting in a open and ventilated places)	PCO, DPR Consultant Municipality Ward Authority
Ensure that the views and needs	Face to face meeting with affected	PCO, Design and

Objective and Target Goal	Method	Responsibility
of vulnerable segment (if required) of communities, including but not limited to poor, women, elderly, and are addressed by the subproject	communities' representative (including social officer of Municipality, women's representative etc.)	Supervision Consultant Municipality Ward Authority
III. Implementation Phase		
Maintain effective communication with PIU	Electronic and face to face communication with representative of relevant agency /organization	PCO, Design and Supervision Consultant Municipality Ward Authority
Raise awareness of project activities among potential beneficiaries	Media advertisements and targeted campaign	PCO, Consultant/ Municipality
Maintain consultation process with a potential affected communities and beneficiaries	Face to face meeting with affected communities' representative (including social officer of Municipality, women's representative etc.)	PCO, Design and Supervision Consultant Municipality Ward Authority
Monitoring and evaluation community involvement	Face to face meeting with affected communities' representative	PCO, Design and Supervision Consultant Municipality Ward Authority
Reports outlining progress of activities related to engagement and communication	Collation of progress report, self-evaluation by PCO	PCO
Agreement on operation and maintenance system	Electronic or face to face communication with relevant stakeholder Face to face meeting with local authority	PCO, Design and Supervision Consultant Municipality Ward Authority
Implementation of ESIA	The contractor will prepare the various stand-alone plans to comply with ESIA requirements by including all the stand alone plans, the contractor will prepare Contractor's Environmental and Social Management Plan (ESMP) and submit it to PIU. This requirements will be included in the contract BOQ	The requirements stipulated in ESIA shall be included in bid document of the contractor. The contractor will prepare the stand alone plans and submit it to the PIU before the construction begins and obtain approval. The standalone plan includes;

Objective and Target Goal	Method	Responsibility
		environment, health and safety management plan, traffic management plan, grievance redress plan, spoil management plan, emergency preparedness plan, camp management plan, labor management plan, air/water/noise management plan to name a few.

7.12 Information Disclosure

For the success of the project, all information about the proposed activities and their expected results will be publicly shared with the affected people and interested stakeholder. In collaboration with the relevant local authorities, NGOs and other community groups, the project will disclose all the relevant information in the various stages of project cycle. Agencies working for environmental and social aspects will also be informed about the ongoing and planed activities, to identify jointly appropriate protective or corrective measures. The following approaches will be adopted to make information accessible to all the concerned stakeholders throughout the project cycle.

- Mass Media: Use local media like newspaper, radio and TV.
- Meeting/Workshops
- Distribution of project documents: Certain project documents will be disclosed in Nepali (or other relevant local language). Project-related information materials will be distributed prior to each construction work to local officials, local people, stakeholders and other concerned offices like municipality, Ward, Tole Committee etc.

An Information Centre will be established at the municipality office during implementation to disseminate all the documents related to the project activities. Based on the public information disclosure policy, PCO and the municipality will unveil the information through its website. The budget allocations for for Stakeholder consultation as well as dissemination of project information is RS 8,00,000 included in BoQ (AoC– 9.03). The information dissemination plan for Dulegaunda – Lamagaun Road (Dulegaunda – Lila Chowk Section) project is presented in **Table 7.12**

Table 7.12: Information dissemination plan

Means of Communication	Timeline & Frequency	Responsibility	Resources
Municipality Website (project details, grievance mechanism)	At the start of the project which will be maintained throughout the project	PIU/ Information Officer	Information Officer
Newspaper and local Radio (project salient features, dates, grievance	Project implementation phase Weekly basis	PIU, municipality Information	Radio-program/ Talk show, FM

mechanism etc.)		Officer	Radio Clip
Project leaflets and Fact Sheet	Project details, Implementing agencies, project period - 2 times	PIU, Information Officer	Doubled sided color A4 500 copies
Face to face engagements - meetings, focus group discussion with relevant stakeholders including vulnerable groups such as women's groups and indigenous groups.	Project Main Activities, Financial Assistance, Implementing agencies, project period etc. 2 time in year	PIU, Information Officer	

7.13 Grievance redress

7.13.1 Grievance Redress Mechanism overview

A grievance redress mechanism is established to allow stakeholders including PAPs to raise any concerns or complaints, or to appeal any disagreeable decisions, practices and activities arising from the project including compensation for land and assets. Stakeholders will be made fully aware of their rights and the procedures.

7.13.2 Current Grievance Redress Processes

Currently all grievances including environmental and social issues are directly submitted to PMC's judicial committee (Nyayik Samiti). Nyayik Samiti is a three-member committee comprising the deputy mayor and two people from the executive committee or ward. The views of Environmental and Social Development Unit are taken in decision making process, if the judicial committee determines that is required. Grievances can also be submitted to District Administrative Officer (DAO) at District level or to Ward Chairperson at Ward Level. Beside judicial committee, PMC also has a separate kiosk to register gender-based grievances/cases. These mechanisms and procedures are not fully operational so need to be strengthened further to perform its role more effectively.

7.14 Proposed Grievance Redress Mechanism

Existing mechanisms for grievance redress at the local level will be drawn upon under the project to enable grievant to lodge issues, complaints, and requests for information, to help support and build the capacity of local governments.

7.14.1 Structure of the GRM

The project will follow the existing Grievance Redress procedures. Since existing grievance procedures are not fully operational, the following Grievance Redress Mechanism is proposed

The grievant should first raise any project-related grievances with the information office of the subproject, which will decide whether the grievance can be resolved by the ward or other mechanism. A dedicated person will be placed as a grievance officer to look after grievances issues. The person will refer the cases according to the nature of grievances to the concerned entities. The records shall be kept properly.

Ward Level grievance handling committee has been formed and Municipality Level grievance handling committee is to be formed within the project area to handle the grievances related cases during the time of construction. Ward level grievance handling committee consists of Ward Chairperson of Ward 9, Shuklagandaki Municipality as a coordinator, Ward Chairperson of Ward No. 4/8/12, Shuklagandaki Municipality as a member, female representative of ward member of Ward No. 9 as a member, representative from Bhaata Danda Tol Bikash Santha as a member, Ward Secretary, ward office of Ward No. 9 as a member and Sociologist or Environment Expert or Supervision Engineer of DSC as a member Secretary was formed in October 13, 2023/ Ashoj 26, 2080. (**Annex-.VII**) Municipality level grievance handling

committee consists of Mayor or Deputy Mayor of Shuklagandaki Municipality as a coordinator, chief administrative officer as a member, head of planning unit and focal person of NUGIP as a member, head of social development unit/ officier as a member and Team leader of DSC as a member Secretary. All complaints will be responded within two weeks at ward level. In case response is not received from ward level within 15 days, the complaint will be escalated to Municipality level.

Special project grievance mechanisms such as on site provision of complain hearings allows project affected persons to get fair treatment on time. The subproject will also handle issues regarding the compensation damages done during construction.

7.14.2 Processes of the GRM

Grievances shall be submitted through various mediums, including in person, in written form to a noted address, through a toll-free phone line or through direct calls to concerned officials, and emails. The PCO will appoint a person (Operator) at PCO- Kathmandu to receive such calls and online messages. The person (Operator) based on nature of complaint, will forward the same to the information office or ward committee. A ticket or a unique number will be generated for all such call, messages and letters. The complainant will follow up based that unique number with Operator at PCO-Kathmandu. All complaints will be responded within two weeks at any level. In case response is not received from 1stlevel within 15 days, the complaint will be escalated to next level. If complaint remains unaddressed at 1st and 2nd within maximum 30 days after registering the compliant, it will be elevated to 3rd level at PCO level. The PCO within 7 days of time should instruct the concerned person at PMC level to arrange for a hearing within maximum 5 days of time. Effort will be given by all levels of GRCs to conduct hearing and resolve the concern at their level up to the satisfaction of complainant within the stipulated timeframe. In case 1st and 2nd level GRCs are unable to resolve the concern up to the satisfaction of complainant, these GRCs' or Complainant may approach to 3rd level of GRC at PCO Level. After conducting hearing at any level of GRC, the decision will be communicated to complainant within maximum 30 Days of time.

All local contact information and options for complaint submission will be available on site, on Toles, Wards, PMC Office, PCO on information boards and PMC websites. A half yearly report on Grievance Redress by the subproject project will be prepared and will be sent to PMC's GRCs by Wards' GRCs and ultimately to GRC of PCO. The PCO will forward the same to the World Bank.

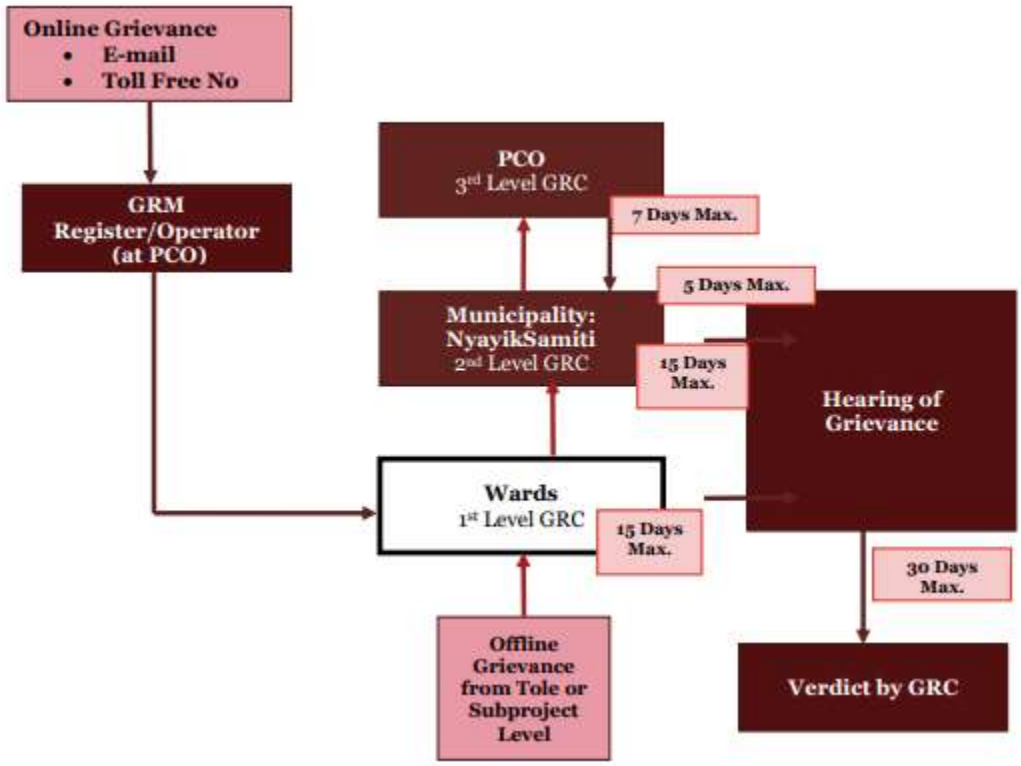


Figure 7.1. Grievance Redress Process

7.14.3 Further details of the GRM

The functions of grievance mechanism include redressing grievances of community / beneficiaries /project affected persons in all project respects, providing rehabilitation and resettlement assistance and related activities, and hearing grievances from workers involved in the project at any level or phase. The system should be established to report back to the concerned community or persons regarding the decision on the complaint. The grievances related to women should be dealt by women officer. As required, the social mobilizers will be recruited. GRC will deal/hear the issues related to Environment, R&R and individual grievances and will give its decision/verdict within 30 days after hearing the aggrieved person. The final verdict of the GRC will be given by the Head of GRC in consultation with other members of the GRCs and will be binding to all other members.

Potential grievances which may need to be addressed are listed below:

i. Rehabilitation & Resettlement and Compensation issue
ii. Loss of livelihood
iii. Access to resource /utility/facility
iv. Ambient air and noise Quality
v. Impact on water quality/resource
vi. Grievance from vulnerable community
vii. Gender related issues
viii. Grievances from workers
ix. Safety and risk repeated to project development

7.15 Other Mechanisms for Grievance Redress

All complainants have the option to approach court/judiciary or the World Bank's Grievance Redress Service in case he or she is not satisfied with the verdict provided.

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ANNEXES