Initial Environmental Examination

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Package No: W-05

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ABBREVIATIONS

2nd STWSSSP	Second Small Towns' Water Supply and Sanitation Sector Project
A.D.	Anno Domini
ADB	Asian Development Bank
AIFC	Average Incremental Financial Cost
AM	Accountability Mechanism
AP	Affected Person
ATP	Ability To Pay
BDS	Bulk Distribution System
BoQ	Bill of Quantities
B.S.	Bikram Sambat
BWF	Barbed Wire Fencing
CAPP	Community and Public Participation
C-EMP	Contractor's Environmental Management Plan
CFUG	Community Forest User's Group
CITES	Convention on International Trade in Endangered Species of Wild Fauna & Flora
CLBW	Chain Link Boundary Wall
Coliform P/A	Coliform Presence/Absence
CSA	Concerned Sector Agency
DCC	District Coordination Committee
DI	Ductile Iron
DMA	District Metered Area
DPH	Dosing Pump House
DRTAC	Design Review and Technical Audit Consultant
DS	Distribution System
DSMC	Design, Supervision and Management Consultant
DWSSM	Department of Water Supply and Sewerage Management
EARF	Environmental Assessment and Review Framework
EIA	Environmental Impact Assessment
EIRR	Economic Internal Rate of Return
EMP	Environmental Management Plan
EMR	Environmental Monitoring Report
ENPHO	Environment and Public Health Organization
EO	Environmental Officer
EOCC	Economic Opportunity Cost of Capital
EPA	Environment Protection Act

EPR	Environment Protection Rules
ES	Environmental Specialist
ESA	Environmental Safeguard Assistant
ESE	Environmental Safeguard Expert
FEDWASUN	Federation of Water Supply and Sanitation Users Committee Nepal
FGD	Focus Group Discussion
FIRR	Financial Internal Rate of Return
FRP	Ferro Reinforced Plastic
GH	Guard House
GI	Galvanized Iron
GoN	Government of Nepal
GRM	Grievance Redress Mechanism
HDPE	High Density Polyethylene
HHs	Households
HRF	Horizontal Roughening Filter
IBAT	Integrated Biodiversity Assessment Tool
ICESCR	International Covenant on Economic,Social & Cultural Rights
ICG	Implementation Core Group
IP	Indigenous People
IUCN	International Union for Conservation of Nature
IEE	Initial Environmental Examination
JICA	Japan International Cooperation Agency
JV	Joint Venture
LGs	Local Groups
Ltd.	Limited
MoFE	Ministry of Forest and Environment
MoWS	Ministry of Water Supply
MWSS	Manufacturer Waste Scrap Shingles
NAAQS	National Ambient Air Quality Standards
NCDC	Namsaling Community Development Centre
ND	Nominal Diameter
ND	Not Detected (In Test Reports)
NDWQS	National Drinking Water Quality Standard
NEPAP	National Environment Policy & Action Plan
NGO	Non Governmental Organization
NRs.	Nepalese Rupees
NRCS	Nepal Red Cross Society

NTFP	Non Timber Forest Products
NVMES	Nepal Vehicles Mass Emission Standards
NWSC	Nepal Water Supply & Sewerage Corporation
OD	Outer Diameter
ODF	Open Defecation Free
O&M	Operation and Maintenance
PAF	Project Affected Families
PE	Polyethylene
PID	Project Information Datasheet
PMO	Project Management Office
PMQAC	Project Management and Quality Assurance Consultants
PN	Nominal Pressure Rating
PPHA	Population Per Hectare
PPTA	Project Preparation Technical Appraisal
PTW	Permit To Work
PSC	Project Steering Committee
RCC	Reinforced Cement Concrete
RDSMC	Regional Design Supervision Management Consultant
REA	Rapid Environmental Assessment
RL	Relative Level
ROW	Right of Way
RPMO	Regional Project Management Office
RVT	Reservoir Tank
SB	Sedimentation Basin/Settling Basin
SDG	Sustainable Development Goal
SEAM-N	Strengthening of Environmental Adminstration & Management-Nepal
SPS	Safeguard Policy Statement
SS	Site Specific
SSF	Slow Sand Filter
SSO	Social Safeguard Officer
STWSSSP	Small Towns' Water Supply and Sanitation Sector Project
TDF	Town Development Fund
TNTC	Too numerous To Count
ToR	Terms of Reference
TSTWSSSP	Third Small Town Water Suppy & Sanitation Sector Project
USD	United States Dollar
UWSSP	Urban Water Supply and Sanitation (Sector) Project

VDC	Village Development Committee
WHO	World Health Organization
WN	Ward Number
WOV	Wash Out Valves
WSP	Water Safety Plan
WSSDO	Water Supply and Sanitation Divisional Office
WTP	Water Treatment Plant
WUA	Water Users' Association
WUSC	Water Users' and Sanitation Committee

WEIGHTS AND MEASURES

amsl	Above mean sea level
dBa	decibel audible
ha	hectare/s
Kg/sq.cm	Kilogram per square centimeter
km	kilometer/s
Kph	kilometer/s per hour
m	meter/s
Kph	kilometer/s per hour
lps	liter per second
m	meter/s
m^3	cubic meter/s
mg/l	milligram/s per liter
mm	millimeter/s
NTU	Nephelometric Turbidity Unit
PPHA	Population Per Hectare

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EXECUTIVE SUMMARY

Introduction

1. Ilam town project is one of the projects proposed under UWSSP which is currently being prepared to support further GoN's continuing efforts to provide water supply and sanitation services to selected urban municipalities of Nepal. In support of GoN's endeavor, the Asian Development Bank (ADB) funded this Urban Water Supply and Sanitation Sector Project (UWSSP).
2. During field study, it has been identified that the existing water supply system is said to be about 82 years old. Despite having been rehabilitated and expanded four times, the system is still not able to meet the current water demand. The quality of sand in SSF of the existing WTP is said to be poor which results in ineffective operation of WTP. The study also shows that the existing disinfection unit is also not in operation. It is observed that the existing distribution pipelines are very old and unable to supply water in sufficient quantity in many areas. This compelled people to take direct connections with the service reservoir. As a result, numerous distribution mains entangled with each other can be observed to be laid all along the project town.
3. The existing system has been serving only 3 wards of the project town that includes WN 6, 8 & 9 which belongs to 6 wards of the former Ilam municipality. Other wards have been using tap water through locally managed sources. However, some of the wards, located at the foothill of the project town, are deprived of tap water, and these areas are generally dependent on spouts and water from the river. The study shows that the existing system is supplying water only for 1.5 hours a day on an alternate day. Moreover, the frequent breakdown of system has made the supply system unreliable. The proposed project expects to improve the existing water supply condition of the project town through provision of effective WTP, well managed distribution mains, continuous supply service and expanded service area.
4. ADB and GoN require all projects to undergo environmental assessments. All projects funded by ADB must comply with the Safeguard Policy Statement (SPS) 2009 which will ensure the following mentioned points:
    - The projects are environmentally sound,
    - The projects are designed to operate in compliance with applicable regulatory requirements,
    - These projects are not likely to cause any significant environmental, health, or safety hazards.
5. According to ADB's REA Checklist, the proposed project falls under 'Category B' that requires IEE study only. On the GoN side, the statutory requirement that has to be adhered to is the Environment Protection Act (1997), and Environment Protection Rules (1997) with latest amendments (2017). Based on EPR Schedule 1, the Project falls within the threshold of activities under (H) drinking water sector that indicates that the project requires IEE only. This IEE fulfills the policy requirements of both ADB and GoN.

Policy, Legal and Administrative Framework

6. The IEE study requires study of the concerned Policy, Legal & Administrative Framework to analyze their compliance with the project construction activities. The major

environmental act, rules, plan, policies, guidelines that are relevant for IEE study of this project includes;

a) Major Law, Acts & Rules: i)Constitution of Nepal; ii) Environmental Protection Act (EPA), 2053 B.S. (1997 A.D); iii) Environmental Protection Rules (EPR), 1997 AD, and its amendments in 2017 A.D.

b) Plans, Policies & Strategies: i) National Environmental Policy & Action Plan (NEPAP), 2050B.S. (1993 A.D.); ii) Water Resources Strategy, 2059 B.S. (2002) A.D.; iii) Rural Water Supply and Sanitation Sectoral Strategic Action Plan (Unofficial Translation), 2060 B.S. (2004 A.D.); iv) Rural Water Supply and Sanitation National Policy and Rural Water Supply and Sanitation National Strategy, 2060 B.S. (2004 A.D.); v) National Water Plan, 2062 B.S. (2005 A.D.); vi) National Urban Policy, 2063 B.S. (2007 A.D.); vii) National Urban Water Supply & Sanitation Sector Policy, 2065 B.S. (2009 A.D.); viii) Updated 15-yr Development Plan for Small Towns Water Supply and Sanitation Sector, 2066 B.S. (2009 A.D. and Amendments in 2015A.D.); ix) National Water Supply & Sanitation Policy, 2071 B.S. (2014 A.D.); x)Land Acquisition, Rehabilitation and Resettlement Policy, 2015 A.D.; xi) Land Use Policy, 2072 B.S. (2015 A.D.); xii) National Urban Development Strategy, 2074 B.S. (2017 A.D.); xiii) National Forest Policy, 2075 B.S. (2019 A.D.); xiv) Fourteen Three Years Plan (2073/74- 2075/76); xv) Fifteenth Plan Approach Paper, 2076/77-2080/81 and xvi) National Environmental Policy,2076 B.S. (2019 A.D.)

c) Laws & Acts: i) Essential Goods Protection Act; 2012 B.S. (1955 A.D.); ii) Aquatic Animal Protection Act, 2017 B.S. (1961 A.D.) with Amendments (2055 B.S. (1997 A.D.)); iii) Town Development Act , 2045 B.S. (1988 A.D.); iv) Water Resource Act, 2049 B.S. (1992 A.D.); v) Forest Act, 2049 B.S. (1993 A.D.) with amendments 2055 B.S. (1999 AD.); vi) Land Acquisition Act,2049 B.S. (1993 A.D.); vii) Child Labor Prohibition and Regulation Act, 2056 B.S. (2001 A.D.); viii) Water Supply Management Board Act, 2063 B.S. (2006 A.D.); ix) Solid Waste Management Act, 2068 B.S. (2011 A.D.); x) Labour Act, 2074 B.S. (2017 A.D.); xi) Local Government Operation Act, 2074 B.S. (2017 A.D.) and xii) Land Use Act, 2076 B.S. (2019 A.D.)

d) Rules & Regulations: i) Solid Waste (Management & Resource Mobilization) Rules, 2044 B.S. (1987 A.D.) & Amendments 2049 B.S. (1992 A.D.); ii) Water Resource Regulations, 2050 B.S. (1993 A.D.); iii) Forest Regulations, 2051 B.S. (1995 A.D.); iv) Drinking Water Regulations, 2055 B.S. (1998 A.D.); v) Solid Waste Management Rules, 2070 B.S. (2013 A.D.) and vi) Labor Rules, 2075 B.S. (2018 A.D.)

e) Guidelines & Manuals: i) National EIA Guidelines, 2049 B.S. (1993 A.D.); ii) WHO Air Quality Guidelines, Global Update, 2061 B.S. (2005 A.D.); iii) WHO Guidelines for Drinking Water Quality, Fourth Edition 2073 B.S. (2017 A.D.); iv) National Noise Standard Guidelines, 2068 B.S. (2012 A.D.); v) Guidelines for Community Noise by WHO, 2055 B.S. (1999 A.D.) and vi) "Working procedure for the use of national forest for national priority projects, 2074"

Approach & Methodologies

7. The IEE study has been carried out in accordance with the requirements of the ADB's Safeguard Policy Statement (SPS 2009) and environmental requirements of GoN i.e., EPA (1997) and EPR (1997 with amendments 1999, 2007 & 2017). The methodology adopted to carry out this IEE study involves;

a) Literature Review/ Desk Study: Relevant Maps & Reports including Feasibility Report, DEDR & DDR and other related published articles were reviewed to collect secondary information regarding the proposed project.

b) Impact Area Delineation: On the basis of literature review and field study, the Impact Area Delineation is carried out to determine the area of the project area affected by the proposed project activities.

c) Field Study: The field study was conducted to collect baseline information on physico-chemical, biological, and socio-economic conditions of the core and surroundings areas of the project town.

d) Stakeholder & Public Consultation: This has been carried out to acknowledge any kind of suggestions and to acquire the required information regarding the proposed project from the interested stakeholders. The information acquired was integrated in the identification of anticipated environmental impacts.

e) Impact Identification, Prediction & Evaluation Method: This method is carried out through simple checklist & questionnaire method and through professional judgement to determine adversity of the anticipated impacts. The study has followed the procedures outlined in the approved ToR and has covered the issues delineated therein.

Description of the Project

8. The proposed project will extend the distribution system to new areas of Ilam municipality (complete areas of wards 6 & 7 and partial areas of wards 8 & 9) which are not covered by the existing system. These areas are the core areas of Ilam municipality where the demand of water is very high. Along with the proposal of construction of new components, the proposed project will involve rehabilitation works of the existing system through rehabilitation of Slow Sand Filter, Water proofing of existing WTP and Construction of new RVT by demolishing 4 existing service reservoirs at Shikharnagar. Hence, the proposed project is an extension of the existing system. This Project has been conceptualized as a totally gravity surface water system. The overall concept has been developed with distribution system comprising of Bulk Distribution System (BDS) and Distribution System (DS). The entire distribution network is to be supplied from multiple (ten) reservoir system. All the water treatment plants will act as main distributors. The total supplies of the sub-systems have been divided in to these ten reservoirs in order to manage RVT wise demand

9. Two new sources have been proposed for this project that includes Rate Khola and Mewa Khola. Along with this, two existing sources viz., Gitang Khola and Bhandi Khola will be used for this project. Hence, altogether, four intakes will be used for the proposed project. Similarly, the proposed project will also have one water treatment plant comprising 2 nos. of new sedimentation tanks in corresponding routes of Rate & Mewa Khola, 8 nos. of new HRF near existing WTP site and one rehabilitated existing SSF. Although the water quality test results as given in Appendix 7 shows that the quality of Gitang Khola and Bhadi Khola is almost same, the treatment provision has been proposed for Gitang Khola only because our study shows that Bhandi Khola is well protected spring source and does not require any treatment. Then, there will be about ten service reservoirs that include six new and four existing RVTs, in this project. The cumulative capacity for these reservoirs will be about 1392.50 cum. The main water supply components of the proposed project

include Intakes, Transmission Mains, Water Treatment Plant, Service Reservoirs, Bulk Distribution Mains, Distribution Mains, River Crossings, House Connections, Guard Quarter, Boundary Wall and Appurtenances (Valves, Chambers, Flow Meters & Fire Hydrant). This project also covers construction requirements like Land Requirement, Energy Requirement, Human Resource Requirement, Worker's Camp, and Stockpiling Site etc. The proposed project will also have sanitation components that includes three public toilets at Dhobi Dhara, Tundikhel and Adarsha Krishi Bazaar areas.

Description of the Environment

10. This IEE study requires information on the existing environment of the project town to identify the susceptibility of the environmental aspects of the project town towards the anticipated environmental impacts of the proposed project. Regarding this, the secondary information of the existing environment was collected through literature review during desk study. However, the secondary information is not sufficient for IEE study. Hence, the field study was carried out to collect primary information on the existing environmental aspects.
11. Regarding this, details on various physical environmental aspects like Landforms & Topography, Land Use Pattern, Geology & Soil, Water Resources, Climate, Air Quality, Acoustic Environment, Landslide Susceptibility etc. and biological features like Flora, Fauna, Protected Areas & Community Forest Areas were collected through simple checklist, REA checklist, professional judgement and interaction with the locals & the concerned bodies during field study. No existence of protected areas as well as community forest areas within the project area was observed during the field study.
12. Similarly, details on water quality of the water sources to be used for the proposed project were collected through sampling process followed by water quality tests on approved laboratory. The test result shows that the water samples taken from four sources viz; Gitang Khola, Bhandi Khola, Rate Khola and Mewa Khola have all the required parameters within the permitted value of NDWQS.
13. During field study, details on the socio-economic environment that includes Demographic Features, Caste/Ethnic Groups, Economic Features, Education & Skills and Community Infrastructures were collected through simple questionnaire method followed by household survey and interaction with the locals. Regarding this, Willingness to Pay for Monthly Tariff, Willingness for Up-front Cash Contribution and Affordability has also been assessed. As per the sampled household survey, 100% of 140 sampled HHs and 98.03% of total 2798 HHs expressed willingness to pay for monthly water tariff and to contribute for up-front cash contribution respectively. This indicates their demand for the proposed project to get rid of their acute water shortage problem. The survey also shows that 7.7% (215) of 2798 HHs fall under poor category and only 10.5% (293) of 2798 HHs expend less than Rs. 7,500 per month. Hence, this indicates the affordability of the community in terms of monthly income level and the expenditure level.

Anticipated Environmental Impacts

14. The analysis on the information collected during field study helps to identify and predict the likely environmental impacts that may result from the proposed project. These predicted impacts are then evaluated using Scoring matrix as per National EIA Guidelines, 1993 to determine the nature, extent and magnitude. This evaluation will further help to propose the appropriate mitigation measure for each impact.

15. The anticipated environmental impacts have been mainly categorized into two viz., Beneficial Impacts and Adverse Impacts on the basis of its negative and positive significance. This has been further categorized into four impacts that includes i) Impact on Physical Environment, ii) Impact on Biological Environment, iii) Impact on Chemical Environment and iv) Impact on Socio-economic Environment, based upon the effects on the existing environment. These impacts have been sub divided into three categories based upon the project phase that includes i) Design Phase, ii) Construction Phase and iii) Operation Phase.
16. Here, Beneficial Impacts includes Employment Generation, Skill Enhancement, Local Trade & Business Opportunities, Improved Health & Hygiene, Increased Economic Opportunity and Social Empowerment. Similarly, Adverse Impacts includes Soil Erosion, Noise Pollution, Impacts on Air Quality, Surface Water Quality, Generation of Solid Waste & Waste water from the construction site & worker's camp, Accidental Leakage or Spillage of Stored Fuel/Chemicals, Land Use Pattern, Disruption to Natural Drainage, Haphazard Disposal of Dismantled Debris, Impacts on Water Bodies, Impacts on Flora & Fauna, Impact on Aquatic Life, Forest fire, Forest Encroachment, Impact on Water Quality of nearby rivers, Impact of Quality of water stored in the reservoir, Structural Instability, Workers & Community Health & Safety Hazards, and Damage to the existing Utilities, Traffic Congestion, Disruption to Local Vendor's Business, Occupational Health & Safety Hazards, Delivery of Unsafe Water, Impact of Sustainability of Works etc.
17. The mitigation & augmentation measures for each & every adverse as well as beneficial impacts mentioned above have been proposed. If these proposed mitigation measures are effectively implemented, no such significant environmental problems have to be encountered during the construction & operation period of the proposed project. Likewise, various suitable augmentation measures have also been proposed to to maximize the anticipated beneficial impacts.

Analysis of Alternatives

18. Analysis on the alternatives of the proposed project is another important process of IEE study that will help to assess the feasibility of the project in regard to technical, environmental & social aspects. Primarily, this involves two alternatives that includes "Without Project" or "Do-nothing" Alternative and "With Project" Alternative. The limitation of "Without Project" Alternatives regarding continuous water supply system, treatment system and susceptibility to water borne diseases leads to opt for "With Project" Alternative. With Project Alternative has been analyzed by envisaging the likely benefits of the proposed project. The analysis shows that the proposed project is designed to provide convenient access to reliable, adequate, safe and potable water supply to 21,433 populations as per base year 2019 A.D. There is requirement of about 150 sqm area of Gumba Danda Community Forest for the construction of RVT1 and small guard house in this project. During the "With Project" Alternative analysis, "With No Forest Alternative" has also been studied to determine whether the use of this community forest area could be avoided for the construction of those project components or not. This study shows that there are no other possible options which do not include Community Forest area.
19. This "With Project" Alternative analysis shows that three alternatives have been proposed for the design of the proposed project. All these three alternatives belong to gravity systems with similar service areas and structures from WTP to distribution network. The analysis shows that all of these three alternatives are technically, environmentally and

socially feasible. The main difference between these three alternatives is in use of different sources with different transmission pipelines. This analysis also involves assessment of the most cost-effective, reliable and efficient system that can serve the design population. This analysis also shows that the capital cost of the alternative II is lower than other two alternatives. Hence, Alternative II has been selected as the best alternative for the project which involves two existing sources (16 lps from Gitang Khola and 4 lps from Bhandi Khola) and two new sources (10 lps from Rate Khola and 10 lps from Mewa Khola).

Environmental Management Plan

20. Preparation and Implementation of the environmental management plan (EMP) is another essential process of the IEE study.The main purpose of EMP is to ensure that the activities are undertaken in a responsible and non-detrimental manner. Similarly, the other objectives of EMP are as follows:
    - providing a proactive, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on-site;
    - guiding and controlling the implementation of findings and recommendations of the environmental assignment conducted for the project;
    - detailing specific actions deemed necessary to assist in mitigating the environmental impacts of the project and in enhancing beneficial impacts; and
    - ensuring that safety recommendations are complied with.
21. The total estimated local level monitoring and mitigation cost for the project is NRs. 1,500,000.00.

Information Disclosure, Consultation & Participation

22. Stakeholder Consultation and Community Participation is an essential process in project preparation. It is the process of engaging stakeholders and affected people. This process involves Key Informant interviews, On-site discussions with WUSC, and Random Field Interviews of stakeholders. Prior to the stakeholder's consultation, stakeholder analysis and mapping of stakeholders were carried out to identify the potential stakeholders and their roles towards the implementation of the project. The potential stakeholders were then involved in consultation to disseminate information related to the project, to collect their views & suggestions and to prioritize their concerns regarding the project. This will continue throughout the implementation of the projects and operation period. To facilitate the stakeholder consultation, PMO & ICG will maintain good communication and collaboration with WUSC and the Municipality.

Grievance Redress Mechanism

23. The Project-specific grievance redress mechanism (GRM) is also an essential process of the IEE study which is meant for persons seeking satisfactory resolution to their complaints on the social and environmental performance of the projects under UWSSP. The mechanism, developed in consultation with key stakeholders, will ensure the following mentioned points;
    (i) the basic rights and interests of every person adversely affected by the social and environmental performance of a Project are protected; and
    (ii) their concerns are effectively and timely addressed

This GRM involves setting up the Grievance Redress Committee (GRC) at the municipality level. The GRC will comprise of the following mentioned members:

(1) WUSC Secretary;

(2) RPMO Engineer;

(3) RPMO social /environmental (as relevant) officer,

(4) Representative of affected persons,

(5) RDSMC's safeguards specialist (social/environment as relevant),

(6) a representative of reputable and relevant CBO/SHG/organization working in the project area as invitee, and

(7) Contractor's representative

Monitoring & Reporting

24. PMO & RPMO will be responsible for environmental monitoring & reporting. RPMO will monitor and measure the progress of EMP implementation. RPMO will submit a monthly monitoring and implementation reports to PMO, who will take follow-up actions, if necessary. PMO will submit semi-annual monitoring reports to ADB. ADB will review project performance against the MoWS's commitments as agreed in the legal documents. ADB will monitor projects on an ongoing basis until a project completion report is issued. Along with this, Ministry of Water Supply (MoWS) as well as Ministry of Forests & Environment (MoFE) under Government of Nepal will also undertake monitoring process through random field visits to review the project performance.

Conclusion

25. In conclusion, the IEE study shows that the proposed project is not an environmentally critical undertaking. The proposed project, its components, are not within or adjacent to environmentally sensitive areas. The few adverse impacts of high magnitude during construction will be temporary and short-term (i.e., most likely to occur only during peak construction periods). The proposed project will bring about the following mentioned benefits:

(i) Access to reliable supply of safe and potable water;
(ii) Promotion of good hygiene and sanitation practices and reduced health and safety risks;
(iii) Liberation from the hardship for continuous drinking water supply for years and
(iv) Enhanced community health, improved quality of life and safe communities as outcomes.

26. Hence, there are no significant negative impacts of the proposed project, and the classification of the project as Category "B" is confirmed as per ADB and as Schedule -1 is confirmed as per Environment Protection Rules, 2054 (1997) and 2017 (Latest Amendments). No further special study or detailed environmental impact assessment (EIA) needs to be undertaken to comply with ADB SPS (2009) and Environment Protection Rules, 2054 (1997) of Nepal.

I. INTRODUCTION

A. Name and Address of the Individual Institution Preparing the Report

i. Name of the Proposal

1. The Name of the Proposal is Ilam Water Supply & Sanitation Project

ii. Name and Address of the Proponent

2. The Project proponent, the Urban Water Supply and Sanitation (Sector) Project (UWSSP) of the Department of Water Supply and Sewerage Management (DWSSM) is the proponent (Implementing Agency). The Ministry of Water Supply (MoWS), Government of Nepal, is the executive agency.

Name of Proponent

Project Management Office
Urban Water Supply and Sanitation (Sector) Project
Department of Water Supply and Sewerage Management
Ministry of Water Supply
Government of Nepal

Address of the Proponent:

Panipokhari, Kathmandu
Tel: 977 1 442388, 977 1 4412348
Fax: 977 1 4413280
E-mail: info@UWSSP.gov.np
Website: www.UWSSP.gov.np

iii. Consultant Preparing the Report

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B. Background

3. Prior to three projects (STWSSSP), (SSTWSSSP) & TSTWSSSP, currently, ADB and GoN are working together to provide water supply and sanitation services to selected urban municipalities of Nepal through Urban Water Supply Sanitation (Sector) Project (UWSSP) in accordance with the updated 15-year Development Plan for Small Towns and the National Urban Development Strategy. The Project will support Nepal in expanding access to community managed water supply & sanitationin 20 project

municipalities by drawing on experiences and lessons from three earlier projects funded by ADB. UWSSP will be implemented over a five-year period (indicative implementation period is 2018 to 2023) and will be supported through ADB financing using a sector lending approach. This project has the following outputs: i) Improved Water Supply and Sanitation Infrastructure in Project Municipalities and ii) Strengthened Instittutional and Community Capacities.

4. Department of Water Supply and Sewerage Management (DWSSM) is the implementing agency whereas the Ministry of Water Supply is the executing agency. The project will assist in implementing a part of the 15-year Development Plan for Small Towns Water Supply and Sanitation Development in the country and about 20 Small Towns will be covered by this project.

5. In this context, the Eastern Regional Design Supervision and Management Consultants (ERDSMC), joint venture of TAEC Consultants P. Ltd. and Integrated Consultants Nepal (P.) Ltd. has been assigned to provide services on detailed design of seven towns namely; Birendranagar (Chitwan), Katahariya (Rauthat), Lalbandi (Sarlahi), Katari (Udaipur), Diktel (Khotang), Bhojpur Bazaar (Bhojpur) and Charikot (Dolakha) Town Projects. In addition, Ilam (Ilam), Brihat Bhanu (Tanahun), Panchkhal (Kavre), Kanchanrup (Saptari), Rampurtar (Okhaldhunga) and Deurali Hupsekot (Nawalpur) are assigned for the preparation of DEDR report.

6. The project has many stakeholders such as the WUSC, Project Management Office/ DWSSM, DRTAC, Town Development Fund (TDF), and Regional Design Supervision and Management Consultants (RDSMCs), RPMO. There is a need for effective co-ordination among the various stakeholders. In this context, the consulting team especially the major members of the Consultants' Team including the Team Leader, socio-economist and design engineer responsible for detailed design has been responsible for maintaining co-ordination with all the stakeholders involved in the project.

7. Both the GoN and ADB policies require that the environmental implications of individual developments needs to be taken into account in the planning and decision-making process, and that action is taken to reduce the adverse impacts to acceptable levels. This is done through the environmental assessment process, which has become an integral part of lending operations and Project development and implementation.

C. Sub Project Selection Criteria Based on Environmental Assessment and Review Framework

8. This EARF has been prepared in accordance with ADB SPS and Government of Nepal Environment Protection Act (EPA) 1997 and Environment Protection Rules (EPR) 1997, as amended in 1999 and 2007. This EARF will provide guidance on subproject selection, screening and categorization, information disclosure and consultation, assessment, planning, institutional arrangement, and processes to be followed in the formulation and implementation of subprojects during project implementation. The proposed project has strictly followed the criteria mentioned in EARF. The ***Table I-I*** given below depicts the complaince matrix of the subproject selection criteria as per EARF.

Table I-I: Compliance Matrix on the subproject selection criteria in the EARF

Sub project	Sub project Components	Subproject Selection Criteria	Compliance Status	Remarks
A. General Criteria				
Water Supply	Intake - deep tube wells - borehole well - surface water intake structure	Located at least 30m upstream of any sanitation facilities. Where this cannot be maintained, the design and implementation will ensure that (i) septic tanks will be sealed to make them water tight and emptied as per the design requirements	Complied	There is no human settlements nearby the proposed sources.
		Intake of the source is; (ii) appropriate borehole case and screen are installed; and (iii) a test pit is established, and water quality monitoring is conducted regularly (at least once every quarter)	Complied	Water quality test has been conducted. Refer Appendix 7
	Water reservoirs such as overhead tanks (OHT), ground level service reservoirs (GLSR), etc.	Infrastructure, such as OHT, GLSR, etc. will be located considering high flood level in floodplains	Complied	As per design report, the proposed ground service reservoir has been designed and located considering high flood level in floodplains
	Water pipes	All pipes are designed to be constructed underground.	Complied	All the proposed pipelines have been proposed to be laid underground.
	Water treatment plant (WTP)	No WTP is established in floodplains	Complied	The location of the proposed WTP has no chance of occurrence of flooding events.
Sanitation	Public Toilets	Located in, or adjacent to, a frequently used public area on the WUA or municipality land with no or minimum involuntary resettlement/ social impacts	Complied	The proposed public toilet is located at Dhobi Dhara, Tundikhel and Adarsha Krishi Bazaar areas with no involuntary resettlement/ social impacts
		If the municipality doesn't have adequate capacity, the WUA has agreed to manage the public toilet on behalf of the municipality until the municipality has adequate capacity	Not applicable	The local authority will manage and operate the proposed public toilets.
		Septic tanks will be designed as per national standards and codes to allow for maximum retention of septage (minimum 3 years) and water sealing.	Complied	As per design report, the septic tank has been designed as per national standards and codes

Sub project	Sub project Components	Subproject Selection Criteria	Compliance Status	Remarks
		Toilets will be established at least 30m downstream of the drinking water source, and not in floodplains or flood prone areas. Where this cannot be maintained, the design and implementation will ensure that (i) septic tanks of the toilets will be sealed to make them water tight and emptied as per the design requirements; (ii) appropriate borehole case and screen are installed; and (iii) a test pit is established, and water quality monitoring is conducted regularly (at least once every quarter).	Complied	As it has already been mentioned above that public toilet is proposed at Dhobi Dhara, Tundikhel and Adarsha Krishi Bazaar areas, there will be no interference of the proposed public toilets on the drinking water sources.
		An O&M plan is developed providing details on the frequency and responsibility for collection and disposal of septage at approved site, and commitment to provide minimum operational staff and operate the facilities sustainably is given by WUAs or municipalities.	Complied	All the responsibilities of O & M of the proposed public toilet belong to the local authority.
		Hygiene promotion campaign and educational program is developed to promote open defecation free (ODF) in the towns, and WUA or municipality commits to implementing it.	Complied	This type of awareness programs is included under capacity building programs.
B. Specific Environment Safeguard Criteria				
General	All subprojects	not directly affect environmentally protected areas, core zones of biosphere reserves, highly valued cultural property	Complied	• Appendix 1-Rapid Environmental Assessment Checklist and No Mitigation Scenario (Scoping Checklist) for Ilam WSSP • Appendix 3: Proximity Report generated by ADB on Ilam Town
		not be located in the following ecologically sensitive areas: wildlife/bird sanctuaries, national parks, tiger reserves, elephant reserves, conservation reserves, core zone of biosphere reserves, centrally protected monuments or critical habitat (as defined in ADB Safeguard Policy Statement or SPS);	Complied	Appendix 1-Rapid Environmental Assessment Checklist for Ilam Water Supply & Sanitation Project
		not be deemed highly complex and sensitive in accordance with ADB SPS	Complied	As per table II-6, no such complexity and sensitivity has been observed.

Sub project	Sub project Components	Subproject Selection Criteria	Compliance Status	Remarks
		not cause damage/destruction, removal, alteration or defacement of adjacent or nearby structures/monuments and sites of international, national and local significance. Subprojects with component activities near (within 50 m from) such sites shall have prior coordination with the Department of Archaeology	Complied	Appendix 1-Rapid Environmental Assessment Checklist for Ilam Water Supply & Sanitation Project
		Only involve activities that follow all applicable government laws, rules and regulations	Complied	The proposed project activities follow the concerned government laws, rules and regulations which has been described briefly in the Table II-I.
		Not include and/or involve any activities listed in ADB's Prohibited Investment Activities List (Appendix 5 of ADB SPS). These activities do not qualify for ADB's financing	Complied	This has already been considered during screening process.
		Reflect inputs from public consultations	Complied	Various decisions regarding the proposed project have been made through some public consultation programs. The minutes of these programs is attached in Appendix 4.
		Corresponding initial environmental examinations (IEEs) prepared in accordance with this environmental assessment and review framework (EARF) and Safeguard Requirements 1 of ADB SPS; identified all the key potential environmental and social impacts and risks; and incorporated effective measures to avoid, minimize, mitigate of compensate for the adverse impacts into an environmental management plan (EMP) and project design.	Complied	IEE study has been carried out considering all the ADB requirements as well as GoN requirements. The IEE report has been prepared accordingly.

Sub project	Sub project Components	Subproject Selection Criteria	Compliance Status	Remarks
Water Supply	Water supply system	Construct, operate and maintain the water treatment facility in accordance with national requirements and internationally accepted standards to meet national water quality standards or, in their absence, World Health Organization (WHO) Guidelines for Drinking Water Quality	Complied	The proposed WTP has been designed as per national requirements and internationally accepted standards to meet national water quality standards or, in their absence, World Health Organization (WHO) Guidelines for Drinking Water Quality. Hence, the construction and O & M of WTP must be as per design.
		Ensure road access to water treatment plant, pumping stations and reservoirs/tanks for operations and maintenance activities	Complied	There is provision of road access to each proposed project components.
	Intake - deep tube wells - borehole well - surface water intake structure	Tube well sites and/or surface water intake locations will be fenced or have security provided to them	Complied	There is provision of Retaining Wall/Gabion Wall at the proposed intake site.
		For any tree to be cut, consider replacement of 1:25	Not applicable	No trees exist at the intake area.
	Water reservoirs such as overhead tanks (OHT), ground level service reservoirs (GLSR), etc	For any tree to be cut, consider replacement of 1:25	Not applicable	No trees will be cut except some clearing of bushes
	Water pipes	For any tree to be cut, consider replacement of 1:25	Not applicable	No trees will be cut except some clearing of bushes
		Will not involve use or installation of asbestos cement pipes	Complied	The proposed project involves only DI, PE & GI Pipes.
	Water treatment plant (WTP)	Include sludge management plan	Complied	EMP has considered this aspect.
		Locations will be fenced or have security provided to them	Complied	There is provision of boundary wall and the cost has been included in BoQ.

Sub project	Sub project Components	Subproject Selection Criteria	Compliance Status	Remarks
		Include in the operation and maintenance manual the allowable maximum quantity of chlorine that can be stored on-site at water treatment plants and/or chlorinator facilities.	Complied	EMP has considered this aspect and similarly, Appendix 6 also includes this aspect.
		Avoid noise impact due to pump and diesel generators operations by locating minimum of 50 m away from any premises used by people (house, shops).	Complied	EMP has considered this aspect.
		Store chemicals and fuel in appropriate tanks or containers, and regularly inspect them for wear or damage. Store chemical waste and used chemical products in a secure location, away from the well and dispose any product in an environmentally-friendly manner.	Complied	EMP has considered this aspect.

Source: EARF, 2018 and IEE Study 2018/019

D. Project Area Description

9. The Project area of Ilam Water Supply & Sanitation Project lies in Ilam Municipality, Ilam District, a hilly region in Province 1 of Nepal. The municipality lies between 26°54'00" N latitude and 83°56'25" E longitude with altitudes ranging from an elevation of 401m above mean sea level (amsl) at the riverbed to 1407m amsl at the top of Ilam hill. The main Ilam Bazaar lies at an altitude of 1228m amsl.

10. The term "Ilam" itself describes its topography as the word "Ilam" comprises two words derived from Limbu langauge – "I" (winding) and "Lam" (Way) which means winding way. The topography of Ilam is such that it has several winding paths crisscrossing on the way.

11. The project town is situated along the Mechi Highway which is on the way to Phidim, Panchthar District. It is about 518 km far from Kathmandu (Kathmandu-Khurkot-Charali-Ilam) and 73 km north of Charali, Jhapa. The nearest operating airport is Bhadrapur, Jhapa which is about 90km far from the project town, where daily flights are available.

12. Since Ilam is located in the middle mountain region, its climate is essentially warm temperate or sub-tropical. The temperature ranges from 6° to 31.5° Celsius. The average annual rainfall is 1545mm. The huge difference in altitude influences the variation in climate within the municipality.

13. The figure given below depicts the location of the proposed project area.

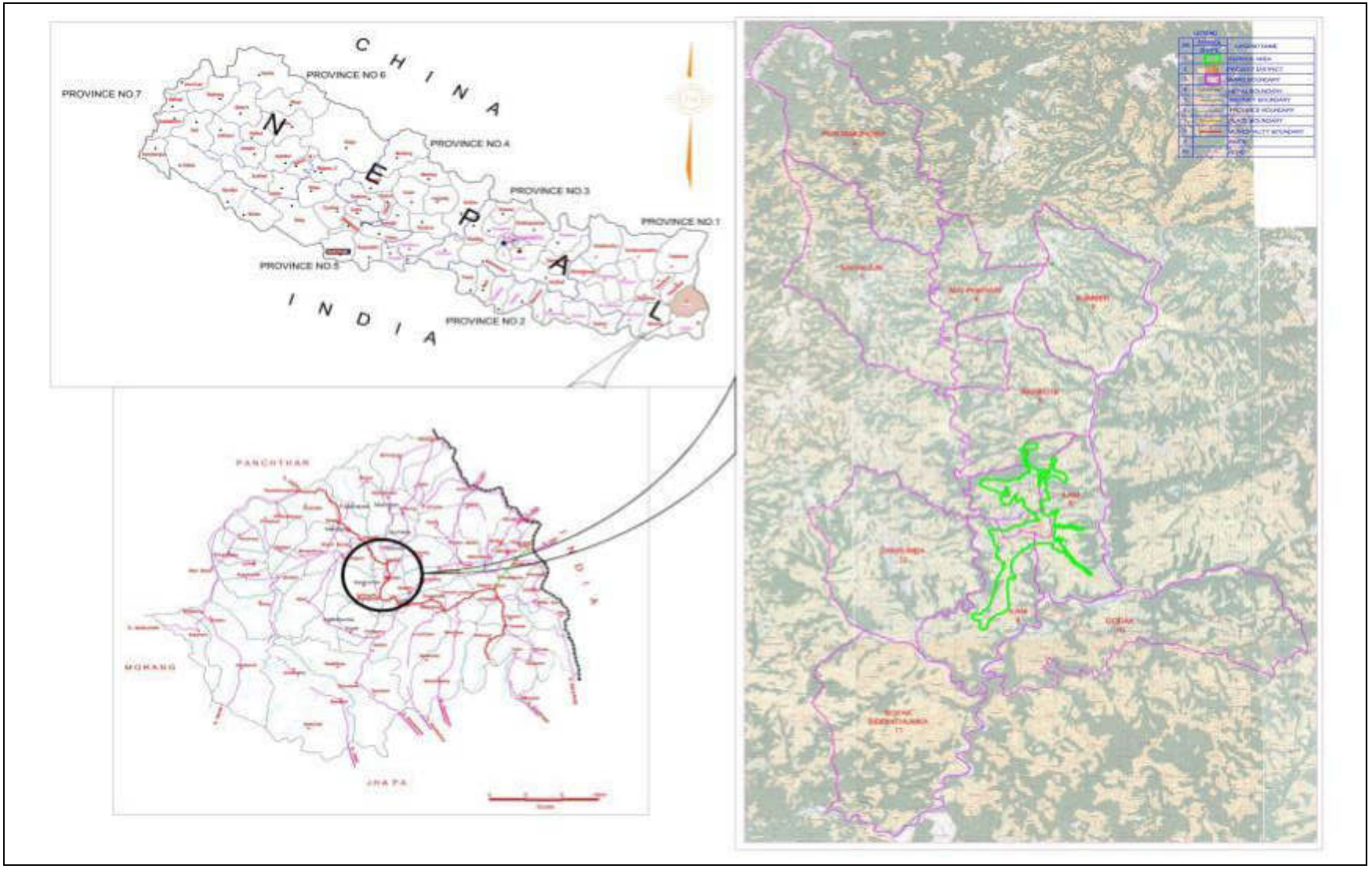

Figure I-I: Location Map of the Project Area

14. This figure given above shows that the project area belongs to Ilam Municipality of Ilam District of Province 1 of Nepal. The proposed project covers complete area of ward no.6 & 7 and partial area of ward number 8 & 9 of Ilam Municipality.

15. The project town was declared as Ilam Municipality in 1958 A.D. During Panchayat system (1960 A.D.) Ilam municipality was renamed as Ilam Nagar Panchayat. It was again renamed as Ilam Municipality in 1990 after the abolition of Panchayat System. In 2015, with the new constitution of Nepal, new Ilam municipality was reformed by merging former neighbouring four VDCs i.e., Godak, Soyak, Barbote, part of Maipokhari, Sumbek, Puwamajhuwa, part of Sangrumba, part of Siddhithumka and Sakhejung VDCs with former Ilam Municipality.

16. The following table gives brief details on the ward profile of Ilam Municipality:

Table I-II: Ilam Municipality Ward Profile

PresentWard Municipality	Former VDC/Municipality	Former Ward No.
1	Sakhejung VDC	WN 1 to 9
2	Sumbek VDC	WN 1 to 9
3	Puwamajhuwa VDC	WN 1 to 9
4	Barbote VDC	WN 4 & 5
	Maipokhari VDC	WN 1 to 3
5	Barbote VDC	WN 1-3,6-9
6	Ilam Municipality	WN 8& 9
7	Ilam Municipality	WN 1 & 2
8	Ilam Municipality	WN 6& 7
9	Ilam Municipality	WN 3 to 5
10	Godek VDC	WN 1 to 9
11	Soyak VDC	WN 1 to 9
	Siddhithumka VDC	WN 7
12	Sangrumba	WN 1 to 6

Source: Final District 1-75Corrected Last for Rajpatra (www.mofald.gov.np)

17. The ***Table I-II*** shows that the reformed Ilam municipality has been divided into 12 wards.The current wards 1 belongs to ward 1 to 9 of former Sakhejung VDC, ward 2 belongs to ward 1 to 9 of former Sumbek VDC, ward 3 belongs to ward 1 to 9 of former Puwamajhuwa VDC, ward 4 belongs to ward 4 & 5 of former Barbote VDC and ward 1 to 3 of former Maipokhari VDC, ward 5 belongs to ward 1 to 3 and 6 to 9 of former Barbote VDC, and ward 6,7,8 & 9 belong to wards 8 & 9, ward 1 & 2, ward 6 & 7 and ward 3 to 5 of former Ilam municipality. Similarly, ward 10 belongs to ward 1 to 9 of former Godek VDC, ward 11 belongs to ward 1 to 9 of former Soyak VDC and ward 7 of former Siddhithumka VDC and ward 12 belongs to ward 1 to 6 of former Sangrumba VDC.

E. Purpose of the IEE

18. The main purpose of IEE is to ensure the environmental sustainability of the project, to integrate environmental considerations into the project preparation process and to manage the environment during project implementation. All projects funded by ADB must comply with the Safeguard Policy Statement (SPS) 2009 to ensure that projects are environmentally sound, designed to operate in compliance with applicable regulatory requirements, and are not likely to cause significant environmental, health, or safety

hazards. The rapid environmental assessment using ADB's REA Checklist and Scoping Checklist has indicated that the Subproject is a Category B undertaking, requiring an IEE. On the GoN side, the statutory requirement that has to be adhered is the Environment Protection Act (1997), and Environment Protection Rules (1997 with Latest Amendments 2017). Based on EPR Schedule 1, the Subproject is within the threshold of activities under the water supply and sanitation sector that will require an IEE. This IEE fulfills the policy requirements of both ADB and GoN.

19. The IEE Report primarily:

i. Provides information on the Subproject and its environmental requirements;
ii. Provides the baseline physical, ecological, cultural and socioeconomic environments and resources in and surrounding the Subproject's area of influence;
iii. Identifies and assesses potential environmental impacts arising from the implementation of the Subproject;
iv. Recommends measures to avoid, mitigate, and compensate the adverse impacts;
v. Presents information on stakeholder consultations and participation during Subproject preparation
vi. Recommends a mechanism to address grievances
vii. Includes an environmental management plan.

F. Need for the Project

20. The existing water supply system is not able to meet even the current demand of Ilam municipality. The supply system is intermittent with about 1.5 hrs in a day. It is estimated that current water availability is only about 24 liters per day. However, considering the leakage & wastage, the actual availability may be much lower than this, which however was not measured.

21. According to five years periodic plan in 2010 prepared by Ilam Municipality, all wards have prioritized water supply as the topmost amenity to be provided for the Ilam municipality.

22. Being the district headquarters, the rental population of this project town constitutes more than half of the permanent population. Almost all district level government offices including security agencies are located in this service area. The city is quite popular among the domestic tourists. This indicates significant institutional & commercial demand of water. Shortage of water is a major constraint to further growth.

23. The existing system has a design, construction, and operation & maintenance deficiencies and requires upgrading and rehabilitation to meet the growing demand.Considering the water demand and condition of existing system, there is a need for a project to upgrade the existing water supply situation in the service area to meet growing demand for private connections and to make drinking water available to the people of service area throughout the year.

G. Rationale of the Project and IEE

Rationale of the Project

24. The rationale of the project is based on the increasing demand of the reliable project, hardship of people for safe drinking water, willingness to pay, affordability, public health impacts, policy committments and various other aspects.

Rationale of the IEE

25. The IEE study for the proposed project is needed to be studied from the environmental point of view as per EPA 1997 A.D. and EPR 1997 A.D., 2054 B.S. (Amendments 1999 A.D., 2007 A.D. and 2017 A.D.). The proposed project is intended to serve drinking water in complete areas of ward no.6 & 7 and partial areas of ward number 8 & 9 of Ilam Municipality.

26. The project is expected to benefit a base year population of about 21,433 populations (2019) & a design year population of 30,325 (2039) by providing a reliable and adequate supply of safe & potable water and by promoting good hygiene and sanitation practices through provision of construction of public toilets.

27. As per EPR 1997(Amendments 1999, 2007 & 2017 AD), IEE for any project shall be done if the project meets the criteria mentioned in the Schedule 1 (Pertaining to Rule 3) (Clause H) for drinking water projects of EPR 1997(Amendments 1999, 2007 & 2017 AD), only an IEE should be done. The regulation stated in Schedule 1 (Clause H) shall only be applicable if the proposal does not fall under the category "A" through (Clause H) of Schedule 2. Our study shows that the proposed project does not meet the criteria mentioned in Schedule 2 (Clause H) of EPR while the proposed project features meet the criteria mentioned in Schedule 1 (Clause H) of Environmental Protection Regulations 1997 with amendments 2017.

28. The following given table gives the brief details on fulfillment of the criteria for the requirement of IEE as per Schedule 1-Clause H of Environmental Protection Regulations 1997 with latest amendments 2017, by the proposed project.

Table I-III: Criteria for Requirement of IEE for Drinking Water Supply Projects as per Schedule 1 (Clause H) of Environment Protection Regulation 1997 with Latest Amendments 2017

S.N.	Condition described in the Act and Regulations	IEE Required as per the Regulation Schedule 1 (Clause	Conditions in the Project
1	Supply of water in dry season from surface water with a safe yield of	Up to 1 cusec and utilizing up to 50% of the available quantity	Within the Limit (The proposed existing sources Bhandi Khola & Gitang Khola has safe yield of 5 & 16 lps while new sources Rate Khola & Mewa Khola have safe yield 13 to15 lpswhich is within 1cusec i.e.,28.32lps)
2	Processing of Water Treatment	More than 25 liters per sec	Within the limit (Total Capacity of all WTPs is 41lps.)
3	Connection of New Source to supply water to existing water supply system for a population of	10,000 – 100,000	About 21,433 populations (2019) & design populations of 30,325populations (2039).

Source: EPR, 1997(Latest Amendments) & DEDR, 2018

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

29. The IEE study has followed the necessary policy, legal and adminstrative framework outlined in the approved ToR. However, some of them mentioned in ToR are updated in this IEE study.

A. Nepal's Environmental Policy, Legal & Administrative Framework

Constitution of Nepal

30. The Constitution of Nepal is the fundamental law of Nepal.

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

31. Besides this, the Government of Nepal has passed a series of environmental laws, policies and implementing regulations and standards. Among these, the basic legislations that provide the framework within which environmental assessment is carried out in Nepal are the:

Environmental Protection Act, 2053 (1997)

32. Environmental Protection Act (EPA), 1997, which requires a proponent to undertake IEE or EIA of the proposed project and have the IEE or EIA Report approved by the concerned sector agency, respectively, prior to implementation. This EPA:

(i) sets out the review and approval process of IEE and EIA Reports, that involve informing and consulting stakeholders;

(ii) stipulates that no one is to create pollution that would cause significant adverse impacts on the environment or harm to public life and health, or to generate pollution beyond the prescribed standards;

(iii) specifies for the Ministry in charge of environment (currently the MoFE) to conduct inspection of approved projects to ensure that pollution prevention, control or mitigation is carried out according to the approved IEE or EIA Report;

(iv) provides for the protection of objects and places of national heritage and places with rare plants, wildlife and biological diversity; and

(i) states that any person/party affected by pollution or adverse environmental impact caused by anybody may apply to the prescribed authority for compensation to be recovered from the polluter/pollution generator.

Environmental Protection Rules, 2054 (1997)

33. Environmental Protection Rules (EPR), 1997, and its amendments in 1999, 2007 & 2017 defines the implementing rule and regulations of the IEE/EIA process, elaborating the provisions in the EPA. The preparation, review and approval of IEE and EIA Reports are dealt with in Rules 3 to 7 and 10 to 14. Schedules 1 and 2 list down the projects of activities that are required IEE and EIA, respectively, as amended in 2017.

34. Other environmental policies, laws, rules, conventions & standards of Nepal that provide general context in the environmental assessment of water supply & sanitation works are presented in ***Table II-I***.

Table II-I:Other Relevant Environmental Act, Rules, Plan, Policies, and Guidelines of Nepal

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
i) Plans, Policies & Strategies			
National Environmental Policy & Action Plan (NEPAP)	2050B.S. (1993 A.D.)	Of its five objectives, most relevant to the Project are to (i) mitigate adverse environmental impacts; and (ii) safeguard national & cultural heritage & preserve biodiversity, within & outside protected areas.	The subproject will not encroach any physical & cultural heritage areas and will not affect biodiversity. EMP provides measures to mitigate anticipated adverse impacts.
Water Resources Strategy	2059 B.S. (2002 A.D.)	Among the ten strategic outputs of this strategy, third output focuses on Adequate Supply of and access to potable water and sanitation & hygiene awareness provided.	This provision will strengthen implementation capacity for the proposed project.
Rural Water Supply and Sanitation Sectoral Strategic Action Plan (Unofficial Translation)	2060 B.S. (2004 A.D.)	• This action plan has proposed "Environmental Aspects" as one of its major components. • This underscores the environmental aspects of all levels of plans and their implementation and consolidates them according to rules & policies to ensure the execution of development works.	Though this action plan has main focus on rural areas and the proposed project is for urban area, the IEE study has duly followed this strategic action plan as a reference.
Rural Water Supply and Sanitation National Policy and Rural Water Supply and Sanitation National Strategy	2060 B.S. (2004 A.D.)	Recognizes that all people have a right to access to basic water supply and sanitation services and that these services are necessary for socio economic development and to combat waterborne diseases	The proposed project ensures easy access to safe, reliable & potable water.
National Water Plan	2062 B.S. (2005 A.D.)	• This includes subsector-wise action programmes in water induced disasters, environmental action plan on management of watershed and aquatic ecosystem, water supply, sanitation and hygiene, irrigation for agriculture, hydropower development, industries, tourism, fisheries, and navigational uses, water-related information systems (Decision Support System for River Basin Planning and Management), legal frameworks, and institutional mechanisms • This also includes Environment Management Plan, a strategic document for the implementation of environmental protection measures (including downstream water pollution and groundwater quality,	This has been considered in IEE study

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
		erosion/landslide and sedimentation, water pollution and sanitation, effect on aquatic life and wetland ecosystem), monitoring (baseline, impacts, and compliance), environmental auditing and institutional and procedural arrangements.	
National Urban Policy	2063 B.S. (2007 A.D.)	The policy gives importance to environment conservation while carrying out urban development works and natural resource use; thus, supporting the required environmental conservation and protection in donor-assisted development projects.	The IEE study will meet the provisions of this policy.
National Urban Water Supply & Sanitation Sector Policy,	2065 B.S. (2009 A.D.)	The Policy requires the IEE or EIA of proposed WSS projects by the EPA/EPR to (i) incorporate consultations with key stakeholders, including endpoint users; & (ii) specify measures to mitigate environmental impacts before, during construction & operation, as well as corrective measures.	The IEE study will meet the provisions of this policy.
Updated 15-yr Development Plan for Small Towns Water Supply and Sanitation Sector	2066 B.S. (2009 A.D. and Amendments in 2015 A.D	The Plan emphasizes monitoring and evaluation as an important component of a project to determine the overall impact of a project.	EMP prescribes performance monitoring & evaluation to minimize the anticipated environmental impacts.
National Water Supply & Sanitation Policy	2071 B.S. (2014 A.D.)	One of the main objectives of this policy is to reduce urban and rural poverty by ensuring equitable socio-economic development, improving health and the quality of life of the people and protection of environment through the provision of sustainable water supply & sanitation service	The proposed project is also committed to provide safe, potable, reliable and adequate water supply service and to provide sanitation service through construction of public toilets.
Land Acquisition, Rehabilitation and Resettlement Policy	2015	• Contribute to overall development of the nation and its citizens by creating a conducive environment for implementation of infrastructure development projects • Facilitate timely execution (completion) of development projects by minimizing adverse impacts on economic, social and cultural aspects of affected families/people and the project area • Improve social and economic status of project-affected families by providing fair and adequate compensation, appropriate resettlement and rehabilitation assistances/	There is no issue of any kind of Land Acquisition, Rehabilitation and Resettlement in this project.

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
		allowances.	
Land Use Policy	2072 B.S. (2015 A.D.)	• The strategy 3 of Policy 2 has taken into account to maintain a balance between physical infrastructure development and environment. • The strategy 3 of Policy 10 focusses on adoption of principle of sustainable development in view of the impact of climate change during any construction and/or development works in order to keep balance between land, environment and development.	The proposed project will maintain balance between construction activities and environmental aspects of the project town.
National Urban Development Strategy	2074 B.S. (2017 A.D.)	• This strategy assesses the existing conditions of infrastructures, environment, economy and governance, establishes benchmarks and desirable standards. • It identifies prioritized strategic initiatives for investment in infrastructure and environment to realize the comparative advantages of urban areas.	The IEE study has duly followed this.
National Forest Policy	2075 B.S. (2019 A.D.)	It guides sub sectoral programmes relating to forests, plant resources, wildlife, biodiversity, medicinal plants, and soil and watershed conservation. It also covers periodic assessment and updating of information on forest resources of the country.	The proposed project does not have to deal with forest related adverse issues.
Fourteenth Plan (FY 2073/74-2075/76)	2073/74-2075/76	This plan has separate provision for water supply & sanitation sector. Regarding this, this plan intends to provide water supply & sanitation service to whole population for which it has its own strategy, working policy and expected positive outcomes through various development works in the field of water supply & sanitation service.	This proposed project falls under the major programmes of this plan. (Chapter 4, Section 3, Sub Section 3.6, Ka-2)
Fifteenth Plan Approach Paper (2076/77-2080/81)	2076/77-2080/81	This plan also has separate provision for water supply & sanitation sector. Regarding this sector, this plan aims to ensure access to safe water supply & sanitation service and to enhance quality service. This plan has also its own strategy, working policy and expected positive outcomes through various development works in the field of water supply & sanitation service.	The successful implementation of the proposed project shall be the expected outcome of this plan.
National Environmental Policy	2076 B.S. (2019 A.D.)	• This encourages the state to control pollution, manage	This will be followed during the

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
		wastes and promote greenery so as to ensure citizens' right to live in a fair and healthy environment. This was framed to guide the implementation of environment related laws and other thematic laws, realize international commitment and enable collaboration between all concerned government agencies and non-government organizations on environmental management actions. • The policy has entrusted the federal government with the responsibility for looking after national-level policy, law and standards related works for environmental protection and management.	proposed project implementation phase.
ii) Laws & Acts			
Essential Goods Protection Act	2012 B.S. (1955 A.D.)	• Deems drinking water an essential commodity and strictly protects drinking water. • Prohibits any unauthorized use or misuse, stealing, damaging etc. of drinking water.	The proposed project ensures safe, reliable & potable water along with the provision of protection works and metering system to prevent any misuses, stealing and damage problems.
Aquatic Animal Protection Act	2017 B.S. (1961 A.D.) with Amendments (2055 B.S. (1997 A.D.))	This act renders punishment to any party introducing poisonous, noxious or explosive materials into a water source or destroying any dam, bridge or water system with the intent of catching or killing aquatic life. It also emphasizes that GoN empowers to prohibit catching, killing and harming of certain kinds of aquatic animals by notification in Nepal Gazette.	Information of this act will be delivered to the construction workers, as they may get involved in fishing during construction period.
Town Development Act	2045 B.S. (1988 A.D.)	This act has provision of services and facilities like road, transport, electricity, drainage, sanitation and open space based on density of such area.	The proposed project is solely for provision of water supply & sanitation services.
Water Resource Act	2049 B.S. (1992 A.D.)	• The umbrella Act governing water resource management. • Provides for the formation of water user associations and establishes a system of licensing. • Prohibits water pollution	WUSC has been formed for this proposed project as per this act and There is provision of control of water pollution through protection works and strict supervision.

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
Forest Act	2049 B.S. (1993 A.D.) with Amendments - 2055 B.S. (1999 A.D.)	The Act prohibits the extraction of boulders, rocks, pebbles, sand or soil from national forests, defined as all forests, excluding private forests, whether marked or unmarked with forest boundary, to include waste or uncultivated lands, or unregistered lands surrounded by the forest or situated near adjacent forests as well as paths, streams rivers, lakes, riverine lands within the forest.	No trees will be cut. EMP stipulates no quarrying of natural aggregate materials.
Land Acquisition Act	2049 B.S. (1993 A.D.)	It guides the compulsory acquisition of land. It also describes that GoN can acquire land at any place and in any quantity by giving compensation pursuant to the act for the land acquired for any public purposes or for operation of any development project initiated by GoN.	There is no requirement of land acquisition of private land. All the land required are under the ownership of GoN.
Child Labor Prohibition and Regulation Act	2056 B.S. (2001 A.D.)	The section 3 of the Act prohibits a child from engaging in work, sub-clause 1 of the clause 3 states "Nobody shall engage in work a child who has not completed fourteen years of age as a labor and sub clause 2 states "Nobody shall engage a child in a risk full occupation or work set forth in the Schedule". The section 4 states "Child not to be engaged in work against his will by temptation or fear or pressure or by any other means.	This provision has been stated in EMP.
Water Supply Management Board Act	2063 B.S. (2006 A.D.)	It guides to prevents the misuse of potable water and prevent pollution of potable water	The proposed project has followed this as it has provision of protection works at the intake site, WTP & RVT sites that will prevent pollution of water.
Solid Waste Management Act	2068 B.S. (2011 A.D.)	Article 4 provides that the management of hazardous, medical, chemical or industrial waste rests upon the generators of such wastes. Management should be as prescribed in the Act. Article 5 provides that individuals and entities must reduce the amount of solid waste generated while carrying out work or business.	EMP prescribes eco-friendly management of solid and hazardous wastes.
Labor Act	2074 B.S. (2017 A.D.)	• The has provisions for the rights, interest, facilities and safety of workers and employees working in enterprises of various sectors. • The Act emphasizes on occupational health and safety of workers and stipulates provision of necessary safety	These provisions are stated in EMP.

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
		gears and adopting appropriate precautionary measures against potentially hazardous machine/equipment in the workplace. • It also specifies to arrange such as removal of waste accumulated during production process and prevention of dust, fume, vapor and other waste materials, which adversely affect the health of workers. • It specifies the provision of controlling the communicable diseases at the construction site. It also prohibits mobilization of child as a labor. It emphasizes on the provision of temporary camp, safe drinking water and necessary food supplies to the workers.	
Local Government Operation Act	2074 B.S. (2017 A.D.)	The Act gives Province Government the functions, duties & powers to: (i) entrust municipalities with responsibility of WSS services, (ii) conserve & protect their local environment & natural resources; (iii) plan, implement &/or operate & maintain WS projects at local level; (iv) implement or arrange for implementation local sanitation/sewerage & drainage projects; (v) protect cultural heritage & religious sites; &/or (vi) monitor project activities within their respective jurisdictions	Provides a basis for Local Government to monitor the environmental performance of the projects EMP provides the responsibilities of LGs in EMP implementation.
Land Use Act	2076 B.S. (2019 A.D.)	The main aim of the act is to ensure that land is properly used and managed and that land set aside for one purpose is not used for other. The act has assigned the responsibility for implementing the act to not only the federal government but also to the provincial and local governments.	Information on this act is necessary for this project to avoid misuse of land for the construction of project components. However, as this project requires RoW of the public road for the proposed components, land misuse May not be a serious issue.
iii) Rules & Regulations			
Solid Waste (Management & Resource Mobilization), Rules	2044 B.S. (1987 A.D.) & Amendments 2049 B.S. (1992A.D.)	• This act focuses on the management of solid waste and mobilization of resources related. • These also ensure the health convenience of the common people by controlling the adverse impact on pollution from solid waste.	• This act needs to be reviewed during construction phase. • EMP covers the requirement of this rule for the proposed project.

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
Water Resource Regulations	2050 B.S. (1993 A.D.)	• This is the umbrella Regulation governing water resource management. • Sets out the procedure to register a Water User Association and to obtain a license • Sets out the rights and obligations of Water User Associations and license holders	The proposed project has followed these provisions.
Forest Regulations	2051 B.S. (1995 A.D.)	• This has separate provision for the protection of Community Forest along with the duties & responsibilities of Community Forest User's Group.	The proposed transmission mains run along the Naule Commununity Forests. The IEE study has considered this forest regulation assuring the protection of the Naule Community Forest.
Drinking Water Regulations	2055 B.S. (1998 A.D.)	• Regulates the use of drinking water • Provides for the formation of Drinking Water User Associations and sets out the procedure for registration. • Deals with licensing of use drinking water. • Deals with the control of water pollution and maintenance of quality standards for drinking water • Sets out the conditions of service utilization by consumers	The proposed project has followed all these provisions.
Solid Waste Management Rules	2070 B.S. (2013 A.D.)	• GoN has issued these rules by exercising the power conferred by the section 50 of the Solid Waste Management Act, 2068. • Section 3 of this rule focuses on Segregation & management of solid wastes.	EMP for this proposed project covers this matter focused by this rule.
Labor Rules	2075 B.S. (2018 A.D.)	• GoN has issued these rules by exercising the power conferred to it under the section 184 of the Labor Act, 2074. • Section 7 of these rules deals with Occupational Safety & Health Policy.	EMP for this proposed project covers this matter focused by this rule.
iv) Directives, Guidelines & Manuals			
National EIA Guidelines	2049 B.S. (1993 A.D.)	This guidelines aims to assess the environmental impacts likely to be caused by a project, and promote its positive impacts and mitigate or eliminate adverse impacts by	This has been followed for evaluation of the anticipated environmental impacts.

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
		undertaking preventive and other effective measures after integrating the environmental impacts in the planning cycle of all the projects to be initiated in Nepal, prior to their initiation, so as to make the economic benefits from development projects sustainable	
WHO Air Quality Guidelines, Global Update	2061 B.S. (2005 A.D.)	It provides basis for global standards in air quality that are designed to offer guidance in reducing the health impacts of air pollution.	During air quality monitoring, this guideline will be followed
WHO Guidelines for Drinking-water Quality, Fourth Edition	2073 B.S. (2017 A.D.	It provides the recommendation of WHO for managing the risk from hazards that may compromise the safety of drinking water.	During water quality monitoring, this guideline will be considered and followed
National Noise Standard Guidelines	2068 B.S. (2012 A.D.)	It provides basis for national standards in noise quality that are designed to offer guidance in reducing the health impacts of noise pollution.	During noise quality monitoring, this guideline will be followed
Guidelines for Community Noise by WHO	2055 B.S. (1999 A.D.)	It provides basis for global standards in noise quality at community level that are designed to offer guidance in reducing the health impacts of noise pollution.	During noise quality monitoring, this guideline will be followed.
Working procedure for the use of national forest for national priority projects, 2074	2074 B.S. (2017 A.D.)	It emphasizes on the management regarding the use of national /community forests for the implementation of national priority project.	During construction activities within the community forest area, this will be followed

Source: IEE Study, 2018

B. Environmental Agreements

International Environmental Agreements

35. Nepal is a signatory to many international agreements and conventions related to environmental conservation. However, all of those conventions are not interrelated to the proposed project. The conventions related to the proposed project are as follows:

(i) The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973

(ii) International Covenant on Economic, Social and Cultural Rights (ICESCR), 1976

(iii) Worst Forms of Child Labour Convention, 1999

36. The relevance of the aforementioned environmental agreements to the Subproject are with their emphasis on human activities to (i) take measures to protect local, as well as global, natural resources and environment; (ii) prevent or reduce the causes of climate change; and (iii) anticipate and mitigate the adverse impacts of climate change. The country is also committed to the Millennium Development Goals, the seventh goal of which is to "ensure environmental sustainability" targeting the reverse of loss of forest and environmental resources, reduction of biodiversity loss, and increase in the proportion of the population with sustainable access to safe drinking water and basic sanitation.

37. The Ilam Water Supply & Sanitation Project does not and will not break or go against Nepal's commitment to these international agreements.

C. Environmental Standards

38. The key environmental quality standards applied in the GoN IEE (as well as in the ADB IEE) are listed below and their details featured as ***Appendix 2A***:

- National Ambient Air Quality Standards, for Nepal (NAAQS), 2003 A.D. & Updated in 2012 A.D.
- National Diesel Generator Emission Standard,2012
- Nepal Vehicle Mass Emission Standard, (NVMES), 2069 B.S. (2012 A.D.)
- The relevant environmental quality standards applied in the GoN IEE (as well as in the ADB IEE) are listed in ***Table II-II*** and their details on the acceptable level criteria of these standards are featured in ***Appendix 2A***.

Table II-II: Relevant Environmental Quality Standards

Particular	National Standard	International Standard
Ambient air quality	National Ambient Air Quality Standards, for Nepal, 2003	WHO Air Quality Guidelines, Global Update, 2005
Noise	National Noise Standard Guidelines, 2012	WHO Noise Level Guidelines
Drinking water quality	National Drinking Water Quality Standards, 2005	WHO Guidelines for Drinking-water Quality, Fourth Edition, 2011

Particular	National Standard	International Standard
Emission standard for diesel generator discharge to ambient Air	National Diesel Generator Emission Standard,2012	

Source: IEE Study, 2018/019

39. As shown in the above table, *National Ambient Air Quality Standards, for Nepal, 2003* is enforced by GoN that has set quality standards for seven parameters TSP, PM_{10}, Sulphur Dioxide(SO_2), Nitrogen Oxide(NO_2), Carbon Mono-oxide (CO), Lead (Pb) and Benzene at national level. Similarly, *WHO Air Quality Guidelines, Global Update, 2005* enforced by WHO has set quality standards for four parameters PM_{10}, $PM_{2.5}$, SO_2 and NO_2 at international level. Both standards provide guidelines to follow and comply the set standards for the ambient air quality during construction period. The acceptable level criteria for ambient air quality as per both standards are tabulated below:

Table II-III: Standards for Ambient Air Quality

Parameter	Averaging Period	Nepal's Ambient Air Quality Standard (µg/m³) *	WHO Air Quality Guidelines (µg/m³) **	
			Global Update 2005	Second Edition ^ 2000
TSP	Annual	-	-	-
	24-hour	230	-	-
PM_{10}	Annual	-	20	-
	24-hour	120	50	-
$PM_{2.5}$	1-year	-	10	-
	24-hour	-	25	-
SO_2	Annual	50	-	
	24-hour	70	20	-
	10-minute	-	500	-
NO_2	1-year	40	40	-
	24-hour	80	-	-
	1-hour	-	200	-
CO	8-hour	10,000	-	10,000
	15-minute	100,000	-	100,000
Pb	1-year	0.5	-	0.5
Benzene	1-year	20	-	-

Source:

* National Ambient Air Quality Standards for Nepal, 2003. Obtained from Environment Statistics of Nepal 2011, Government of Nepal, National Planning Commission Secretariat, Central Bureau of Statistics, Kathmandu, Nepal.
** Environmental, Health and Safety General Guidelines, 2007. International Finance Corporation, World Bank Group.
^ Air Quality Guidelines for Europe, Second Edition, 2000. WHO Regional Office for Europe, Copenhagen.
Parameter that either has no national standard value for 24-hour observation or with WHO guideline value for 24-hour observation as more stringent than that specified in the national standards.

40. Similarly, *National Noise Standard Guidelines, 2012* has set the standard noise levels measured in dBA for Inustrial area, Commercial Area, Rural Residential Area, Urban Residential Area, Mixed Residential Area and Quiet Area. This also has provision of standard values for the noise level generated by Water Pumps and Diesel Generator also. This is limited within the country only. For international level, *WHO Noise Level Guidelines* has set the standard noise levels measured in dBA for two areas that includes residential and commercial areas. The standard values for ambient noise quality are given in the table given below:

Table II-IV: Standards for Ambient Noise Quality

Receptor / Source	National Noise Standard Guidelines, 2012 (dB)		WHO Guideline Values for Noise Levels Measured Out of Doors * (One Hour L_{Aeq} in dBA)	
	Day	Night	07:00 - 22:00	22:00 - 07:00
Industrial area	75	70	70	70
Commercial area	65	55		
Rural residential area	45	40	55	45
Urban residential area	55	50		
Mixed residential area	63	55		
Quiet area	50	40	-	-
Water pump	65		-	
Diesel generator	90		-	

* Guidelines for Community Noise, WHO, 1999.

Source: Environmental, Health and Safety General Guidelines, 2007.International Finance Corporation, World Bank Group.

41. *National Diesel Generator Emission Standard,2012* has been introduced by the Government of Nepal in 2012 for new and in use diesel generators with a capacity of 8 kW-560kW (under the 1997 Environment Protection Act). The emissions standards set for new diesel generator imports is equivalent to Bharat Stage III standards and, for in-use diesel generators, is equivalent to Bharat Stage II. The Diesel Power Generation: Inventories and Black Carbon Emissions in Kathmandu Valley, Nepal 60 emissions limits are set for four major pollutants: CO, HC, NOx, and PM. This is given in detail below:

Table II-V: National Diesel Generators Emission Standards, 2012

1. Emissions Limits (g/kWh) for Imports of New Diesel Generators

Category (kW)	CO	$HC+NO_x$	PM
kW< 8	8.00	7.50	0.80
8 = kW <19	6.60	7.50	0.80
19 = kW <37	5.50	7.50	0.60
37 = kW <75	5.00	4.70	0.40
75 = kW <130	5.00	4.00	0.30
130 = kW <560	3.50	4.00	0.20

Note: This standard is equivalent to Bharat III standards.

2. Emissions Limits (g/kWh) for In-use DG Sets

Category (kW)	**CO**	**HC**	**NO_x**	**PM**
kW< 8	8.00	1.30	9.20	1.00
8 = kW <19	6.60	1.30	9.20	0.85
19 = kW <37	6.50	1.30	9.20	0.85
37 = kW <75	6.50	1.30	9.20	0.85
75 = kW <130	5.00	1.30	9.20	0.70
130 = kW <560	5.00	1.30	9.20	0.54

Note: This standard is equivalent to Bharat II standards.

a) Sampling collection point should be located at one-third of the DG set stack height.

*b) kW= Power Factor * kW*

c) Testing Methodology: Should be according to ISO 8178 or equivalent to ISO 8178 standard set by the manufacturing country.

Source: Diesel Power Generation, 2014 by The World Bank

D. Environmental Assessment Requirements

42. The Project is subjected to the environmental safeguard requirements of both the ADB and Government of Nepal.

i. Environmental Assessment Requirements of ADB

43. All projects funded by the ADB must comply with the Safeguard Policy Statement (SPS) 2009 to ensure that projects funded under ADB loan are environmentally sound, legally compliant, and safe. On the environment, the ADB Operations Manual, Bank Policy (OM Section F1/OP, 2010), underpins the SPS 2009. The policy promotes international good practice as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health, and Safety Guidelines.[1]

44. ADB's Environmental Safeguards policy principles are defined in SPS (2009), Safeguard Requirements as per ***Table II-VI*** given below and the IEE is intended to meet these requirements.

[1] New Version of the "World Bank Group Environmental, Health, and Safety Guidelines", April 30, 2007, Washington, USA. http://www.ifc.org/ifcext/enviro.nsf/Content/EnvironmentalGuiidelines

Table II-VI:SPS 2009 Safeguard Requirements

SPS 2009 - Safeguard Requirements	Remarks
Use a screening process for each proposed project, as early as possible, to determine the extent and type of environmental assessment (EA) so that the studies are undertaken commensurate with the significance of potential impacts and risks.	REA has been undertaken, indicating that the Subproject is **NOT**: (i) environmentally critical; and (ii) adjacent to or within environmentally sensitive/critical area. The extent of adverse impacts is expected to be local, site-specific, confined within main and secondary influence areas. Significant adverse impacts during construction & operation will be temporary & short-term, can be mitigated properly. Hence, IEE is sufficient.
Conduct EA to identify potential direct, indirect, cumulative, & induced impacts and risks to physical, biological, socio-economic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), and physical, cultural resources in the context of the project's area of influence. Assess potential trans boundary global impacts, including climate change.	IEE has been undertaken to meet this requirement. (Section VI).
Examine alternatives to the project's location, design, technology, and components and their potential environmental and social impacts and document the rationale for selecting the particular alternative proposed. Also, consider the no project alternative.	No project alternatives
Avoid, and where avoidance is not possible, minimize, mitigate, &/or offset adverse impacts and enhance positive impacts using environmental planning & management. Prepare an EMP that includes the proposed mitigation measures, environmental monitoring and reporting requirements, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators.	An EMP has been prepared to address this requirement. Section IX
Carry out meaningful consultation with affected people &facilitate their informed participation. Ensure women's participation. Involve stakeholders, including affected people & concerned NGOs, early in the project preparation process & ensure that their views & concerns are made known to & understood by decision makers and taken into account. Continue consultations with stakeholders throughout project implementation as necessary to address issues related to EA. Establish a GRM to receive & facilitate resolution of affected people's concerns & grievances on project's environmental performance.	Key informant and random interviews have been conducted. A grievance redress mechanism for the resolution of valid Project-related social and environmental issues/concerns is presented in Section VIII.
Disclose a draft EA (including the EMP) promptly, before project appraisal, in an accessible place & a form & language(s) understandable to affected people & other stakeholders. Disclose the final EA, & its updates if any, to affected people & other stakeholders.	This is the final IEE based on the Final DEDR. Copies of both SPS-compliant IEE and GoN-approved IEE is made available at the offices of the PMO, ICG, and WUSC for public consultation.
Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclose monitoring reports.	EMP implementation, reporting, and disclosure of monitoring reports are in this IEE.
Do not implement project activities in areas of critical habitats, unless (i) there are no measurable adverse impacts on the critical habitat that could impair its ability to function, (ii) there is no reduction in the population of any recognized endangered or critically	The subproject does not encroach into areas of critical habitats. No tree will be

SPS 2009 - Safeguard Requirements	Remarks
endangered species, and (iii) any lesser impacts are mitigated. If a project is located within a legally protected area, implement additional programs to promote and enhance the conservation aims of the protected area. In an area of natural habitats, there must be no significant conversion or degradation, unless (i) alternatives are not available, (ii) the overall benefits from the project substantially outweigh the environmental costs, and (iii) any conversion or degradation is appropriately mitigated. Use a precautionary approach to the use, development, and management of renewable natural resources.	cut. Although in due time, groundcover is expected to naturally grow over the backfilled affected area, EMP recommends seeding of the re-surfaced area to accelerated re-growth.
Apply pollution prevention and control technologies and practices consistent with international good practices as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health, and Safety Guidelines. Adopt cleaner production processes and good energy efficiency practices. Avoid pollution, or, when avoidance is not possible, minimize or control the intensity or load of pollutant emissions and discharges, including direct and indirect greenhouse gases emissions, waste generation, and release of hazardous materials from their production, transportation, handling, and storage. Avoid the use of hazardous materials subject to international bans or phase-outs. Purchase, use, and manage pesticides based on integrated pest management approaches and reduce reliance on synthetic chemical pesticides.	This requirement is marginally applicable to the Subproject regarding waste generation. The Subproject will not involve hazardous materials subject to international bans or phase-outs.
Provide workers with safe and healthy working conditions and prevent accidents, injuries, and disease. Establish preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks to the health and safety of local communities.	EMP provides measures to mitigate health and safety hazards during construction and operation.
Conserve physical, cultural resources and avoid destroying or damaging them by using field-based surveys that employ qualified and experienced experts during the environmental assessment. Provide for the use of "chance find" procedures that include a pre-approved management and conservation approach for materials that may be discovered during project implementation.	The Subproject will not affect any physical, cultural resource. The EMP recommends the measure/s mitigate the adverse impact on PCRs in the case of the chance find.

Source: ADB, SPS, 2009

ii. Environmental Impact Assessment Requirements of Nepal

45. The Environmental Protection Rules (EPR, 1997) defines the process that should be followed for the preparation, review, and approval of environmental assessment reports. The process applicable to the project is summarized in ***Table II-VII.*** The key environmental quality standards applied in the GoN IEE (as well as in the ADB IEE) are included in ***Appendix 2A***.

Table II-VII: The GoN IEE Report Preparation, Review, Approval, and Implementation Process

Steps in the Process	Remarks
Proponent refers to EPR Schedules 1 & 2 for the required environmental assessment (IEE or EIA) to carry out.	This project requires an IEE as prescribed in Schedule 1 & 2 of EPR.
If a proposed project requires an IEE, Proponent prepares an IEE schedule of work/ToR using the format prescribed in Schedule 3 of the EPR and submit this to the CSA for approval.	• ToR approved by MoWS. • IEE Report has been prepared and is solely based on Final Updated DEDR submitted in 2018 A.D.
Proponent carries out IEE according to the approved work schedule/ToR and prepares an IEE Report following the format prescribed in EPR Schedule 5 and incorporating stakeholders' feedback applying the consultation procedure specified in the EPR.	The IEE report as mentioned above has already been prepared and has been submitted as prescribed in Schedule 5 of EPR.
Proponent submits 15 copies of the IEE Report along with the project proposal and recommendation of the concerned town or town to the CSA.	These copies of IEE report have already been submitted.
CSA conducts review and grants approval of IEE Report.	The IEE Report has already been approved by the Ministry of Water Supply (MoWS). Refer Appendix-4
If the review reveals project implementation to have no substantial adverse impact on the environment, CSA grants approval within 21 days of receipt of the report.	
If the review reveals the necessity to carry out an EIA, Proponent conducts an EIA following the prescribed EIA process.	The IEE study shoes that there is no requirement of EIA for this project.
Proponent implements approved IEE Report and any terms and conditions given the approval.	Subproject has not started implementation.
CSA monitors and evaluates the impact of project implementation. When necessary, issue directives to the Proponent to institute environmental protection measures.	Subproject has not started implementation.
MoPE conducts the environmental audit after two years of project commissioning/operation.	Subproject has not started implementation.

Source: EPR, 1997 with Latest Amendments 2017

III. APPROACH AND METHODOLOGIES

46. The IEE study was carried out in accordance with the requirements of the ADB's Safeguard Policy Statement (SPS 2009) and environmental legal requirements of GoN i.e., EPA (1997) and EPR (1997 with amendments 1999, 2007 & 2017). The IEE study was conducted through preliminary exercise to solicit information from the planners, policy makers, concerned authorities, WUSC and the relevant stakeholders. This involves walkthrough survey, desk study, field visits and impact identification & evaluation. For this, the stepwise process to undertake these activities are as follows:

A. Literature Review/Desk Study

47. Available secondary information in the form of reports and maps; topographic maps, land use maps, aerial photographs, cadastral survey maps, etc. were collected and reviewed. Feasibility Study Report, Detailed Engineering Design Report and Social Safeguard Due Diligence Report of the proposed project were the key documents to determine the nature and scope of activities of the project that influences the environmental conditions of the proposal area. Rainfall & Other Meteorological data of the project town were also collected from the Department of Hydrology & Meteorology. Similarly, published and unpublished reports about environmental policies, laws, rules, standards, Acts, Regulation and other legal provisions were also collected and reviewed. Published and unpublished literature of the project area about biological, social, chemical, physical, and cultural environments in the form of maps, and reports, etc. were collected from various sources and reviewed to get information on the coverage of the studies and fulfill the data gaps.

B. Impact Area Delineation

48. To carry out IEE study, the possible areas where the anticipated impacts have either significant or insignificant effects, need to be delineated. To specify the area that would be covered by the assessment, the geographical boundary of the influence area is delineated on the topographical map. This delineating methodology is called Impact Area Delineation The impact areas have been delineated on the basis of proximity of the construction site to the nearby surrounding areas. The impact areas has been delineated as “Core Project Area”, and “Surrounding Project Area” on the basis of proximity and magnitude of the impacts due to the proposed project activities.

49. Core Area: Here, the Core Area indicates the area required permanently as well as temporarily for the proposed project. This area refers to the service area as well the area where the construction of the project components will be carried out.

50. Surrounding Area: Here, the Surrounding Area indicates the area within the immediate surroundings of the core area of proposed project. It includes the area of the project town which is closely associated with the core area of the project

C. Field Study

51. Field studies were carried out within the project site areas in an extensive manner by a multidisciplinary team comprising a) an Environmental Specialist; b) Water Supply & Sanitation Engineer; c) Sociologist; d) Geo-hydrologist and e) Botanist. During the visit, baseline information on physico-chemical, biological, and socio-economic & cultural conditions of the

core area and surrounding areas of the project area were collected through simple checklist method and Survey Questionnaire method. During field study, Rapid Environmental Assessment (REA) Checklist (***Refer Appendix 1***) as recommended by ADB as per SPS, 2009 were duly followed and filled up. This checklist primarily includes the data regarding physico-chemical, biological, socio-economic & cultural environment. Various approaches and methodological tools that were used for the data collection of various environmental aspects during this field study are described below:

i. Physico-Chemical Environment

52. An extensive physical & chemical environment survey were carried out by delineating the project impact area to collect the baseline information. Topographic and geomorphological features that include Landforms, Geology & Soil, Land use pattern, Landslide susceptibility etc. were observed and documented. The data regarding Climate & Rainfall of the project town were collected from the concerned authority. Similarly, information on air quality and noise quality condition were collected through field observation and expert's judgment. Information on rivers and aquatic ecology were also collected to assess the existing condition. Various consultations programs with the local communities and Interviews with few government officials, schools & representatives of the local bodies were also conducted.

ii. Biological Environment

53. The baseline information regarding biological environment were collected through walkthrough survey throughout the core & surrounding areas of the project area by adopting simple checklist method (***Refer Appendix 5***), through professional judgment and local interaction. Under this baseline information in regard to the biological environment, types of vegetation and forests were identified based on the species composition. The protected vegetation (rare, endangered, indigenous, etc.) of the project area as per IUCN Red Book, CITES Appendices, Proximity Report Generated by IBAT and GoN list species were enumerated based on consultation with the local people and the expert judgment.

54. Information on rivers of the project area and aquatic ecology were also collected through the interaction with the locals, the expert judgment and field observation.

55. The data on the existing wildlife/mammals, birds, herpetofauna (Reptiles/Amphibians) were collected through field observation and interaction with the locals. The checklists as given in ***Appendix 5*** were filled up accordingly. The status of each of these species were identified as either threatened or near threatened or endangered species or least concern as per IUCN Red Book, IBAT Report of ADB, CITES Appendices and GoN list species. This were affirmed by the expert review.

iii. Socio-Economic & Cultural Environment

56. Household surveys were conducted through interviews by simple questionnaire method to obtain information on the socio-economic & cultural environment that primarily includes demography, ethnicity, education, health & sanitation, drinking water condition of the project area, irrigation facility, local traditions, religions, land use patterns, incomes & expenditures and to acquire their perception towards the proposed project, etc. Information on Migratory patterns of the local people and the Impact of river on settlements & agriculture were collected. Information on the people residing within the core area of the proposed project town were collected through socio-economic survey. The sample of Household Survey Questionnaire that were filled up during household survey has been included in ***Appendix 5.***

57. Focused Group discussions (FGD) were conducted to obtain suggestions and comments from all the potential stakeholders. Direct observation (Transect Walk Method) were conducted to ascertain the existence of the cultural sites, and public institutions such as temples, cremation grounds, historical & archaeological sites, schools, and health posts within the project core areas and to determine the effect on their existence due to project construction activities. The Consultations with the village elites, Meetings and Group discussions were done to assess the current situation of the project area community.

D. Stakeholder & Public Consultation

58. Various consultations with key stakeholders were held during design phase of this proposed project. Here, the key stakeholders include government agencies, local bodies, road users, local beneficiaries etc. These consultation programs disclose information regarding the proposed project to the relevant stakeholders. Along with this, other required information for the project were collected from the concerned stakeholders, which were integrated in the identification of anticipated environmental impacts.

E. Impact Identification, Prediction & Evaluation Methods

59. The information regarding Physico-chemical, Biological and Socio-economic & Cultural aspects as mentioned above were collected to identify the susceptibility of these aspects to be affected by the proposed project activities. This helped to identify the anticipated environmental impacts of the proposed project. For this, Simple Checklist method were adopted for the impact identification. This was carried out by using Rapid Environmental Assessment (REA) Checklist prepared by ADB and by using simple household survey questionnaire (***Refer Appendix 5***) prepared during the desk study. These checklists explained about the environmental features or factors that need to be addressed while identifying the impacts of projects and activities.

60. Once all the important impacts were identified, their potential characteristic were predicted. The baseline data on physico-chemical, biological, socio-economic and cultural aspects were used to estimate the likely characteristics and parameters of impacts that includes Nature, Magnitude, Extent and Duration.

61. The nature of each predicted impact has been classified into Direct (D) and Indirect (ID). The magnitude of the impact is classified into High (H), Medium (M) and Low (L). The extent is classified into Site-Specific (SS), Local (L), and Regional (R). Similarly, the duration of impact is classified into Short Term (ST), Medium term (MT), and Long term (LT).

62. Impact predictions is generally made against a baseline established by the existing environment. Hence, during our field study, the baseline data were used as reference point against which the characteristics and parameters of impact related changes were analyzed. Impact predictions were made by considering the future state of the environment. This also requires professional judgment for accuracy.

63. After the impact identification and prediction method, the impacts will be evaluated regarding the significance of the predicted impacts to assess the adversity of adverse impacts and efficiency of beneficial impacts within the project core & surrounding areas. This was done by following the *National EIA Guidelines 1993* according to which scoring for each likely parameter of the impacts was carried out and the level of significance has been assessed as recommended by these guidelines.The scoring of Impacts as per *National EIA Guidelines 1993* is tabulated below*:*

Table III-I: Scoring of Impacts

S. No.	Likely Parameters of Impacts	Type	Scoring as per National EIA Guidelines,1993
1.	Nature	Direct	No Scoring Required
		Indirect	
2.	Magnitude	High (H)	60
		Medium/Moderate (M)	20
		Low (L)	10
3.	Extent	Regional (R)	60
		Local (L)	20
		Site Specisifc (SS)	10
4.	Duration	Long Term (LT)	20
		Medium Term (MT)	10
		Short Term (ST)	5

Source: National EIA Guidelines 1993

64. Then, the significance level of Impact rated will be assessed as per the following table:

Table III-II: Significance of Impacts

S. No.	Scoring as per National EIA Guidelines,1993	Level of Significance as per National EIA Guidelines,1993
1.	Less than 50	Insignificant
2.	50 to 75	Significant
3.	More than 75	Very Significant

Source: National EIA Guidelines 1993

65. This evaluation has been carried out as per the professional judgment by the key expert team involved in the IEE study.

IV. DESCRIPTION OF THE PROJECT

A. Proposed Service Area

66. The proposed service area delineation has been made through a long discussion between WUSC, community and stakeholders. The distribution system layout plan has been verified together with WUSC in the field also referred as the project area. The proposed project covers complete area of ward no.6 & 7 and partial area of ward number 8 & 9 of Ilam Municipality.

67. As per the HH survey record, there are 2,798 households having present population 20,704.

68. The proposed service area of the proposed project is depicted in the figure given below:

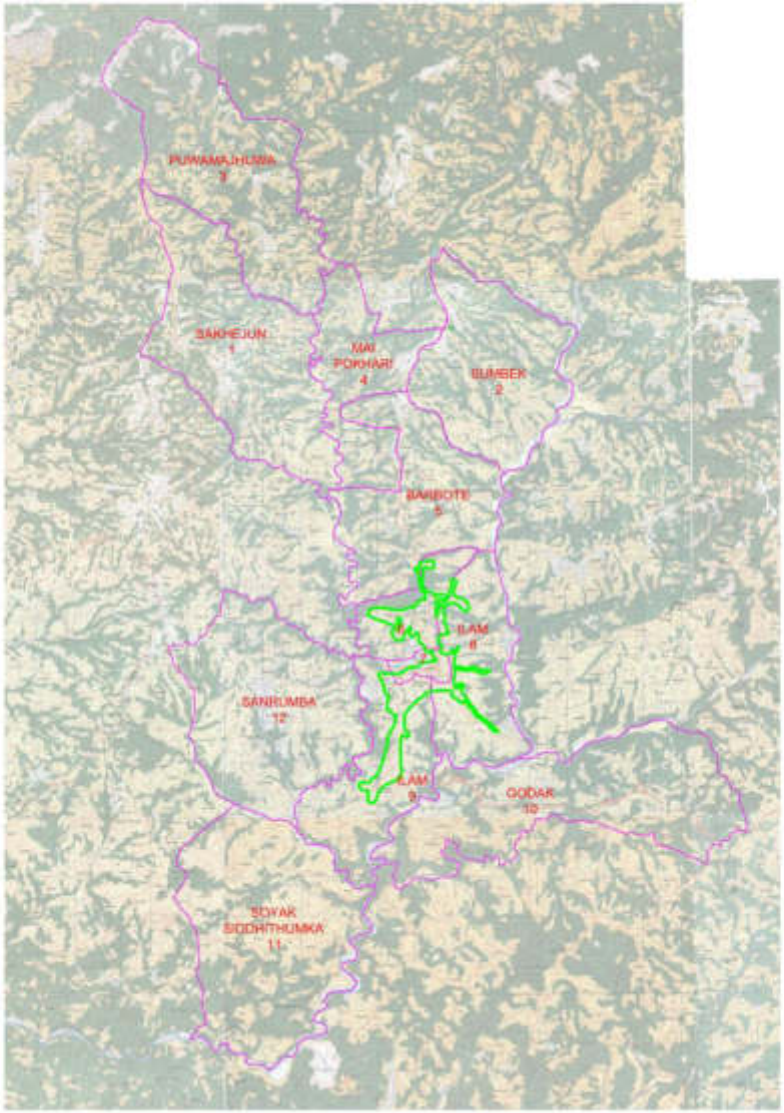

Figure IV-I: Proposed Service Area

B. Project Components

i. Water Supply Components

69. The following sections describe the proposed water supply components.

a) Sources

70. Altogether there are four sources viz., Gitang Khola,Bhadi Khola, Rate Khola & Mewa Khola that will be used for the proposed system. Among them, Gitang & Bhadi Khola are the sources that are still used as the major sources in the existing water supply system. The study also shows that Bhandi Khola has been used as water source since 1937 A.D. while Gitang Khola has been used as source since 1998 A.D. The existing system is drawing water from Bhandi and Gitang Khola in the past with safe yield of about 4 and 16 lps, respectively. Hence, no detailed hydrological analysis of these existing sources in regard to the lean/low season river flow rate has been carried out.

71. All these sources are surface water types. The Bhadi Khola is a spring source, which is said to have decreased over the years. There are several leakages and spillovers of water in the existing intake at Bhadi Khola. The vegetation around the source is also not dense. A motorable road passes upstream of the site. All these issues confirm that the source is at risk and has to be protected from further depletion.This issue will be considered in this proposed project.

72. All other three sources that includes Gitang, Rate & Mewa Khola are perennial stream sources. The river has been widened at proposed intake sites. The river banks have been gradually eroded, and there is possibility of minor landslides and soil erosion. The existence of large stones around the sites indicates that the river tends to bring large stones and boulders during the rainy season. It demands source protection from flood and soil erosion. The source protection measures through Barbed Wire Fencing has been proposed in this project.

73. The proposed sources Rate & Mewa Khola is a tributary of Mai Khola, which eventually drain into Kankai Mai River. Both river originates from the Middle Mountain region which is also known as Mahabharat range. The highest altitude of the Rate Khola basin is 3,100m amsl near Chintapu Danda, and the highest altitude of the Mewa Khola basin is 3,488m amsl located near Tindobate (near Indo-Nepal border BP 9).

74. There are no hydrological stations in these rivers. Therefore, regional approach have been used to predict low flow. Hydrological analysis recommended by the PDSP Manual (Planning and Design Strengthening Project, Design Manual published by Department of Irrigation) has been used to predict mean monthly flow and 80% reliable monthly flow. The mean monthly flows over the river at two abstraction points have been estimated according to the regional hydrograph prepared for Region 6 (Kankai- Mai Basin) in the PDSP manual. The anticipated low flow during April is 45.17 lps and 55.42 lps at abstraction point of Rate Khola and abstraction point of Mewa Khola, respectively.

75. The predicted specific discharges have been compared with the regional specific discharges for all months and found that the predicated discharges are quite comparable. The predicted specific discharge for all months is slightly less than the given regional specific discharge.

Table IV-I: Mean Monthly Flow Hydrograph of Rate and Mewa Khola

Month	Non-Dimensional Hydrograph	Predicted Hydrograph (lps)		Predicted Hydrograph (lps/Sq Km)		Regional Hydrograph (lps/Sq. Km)	Specific Discharge at ST No. 728 (lps/Sq. Km.)
		Rate	Mewa	Rate	Mewa		
May	2.57	116.1	142.5	16.7	13.8	18.0	27.76
June	6.08	274.7	337.0	39.6	32.5	43.0	84.67
July	24.32	1098.6	1347.9	158.4	129.9	180.0	169.41
Aug	33.78	1526.0	1872.1	220.1	180.3	245.0	189.68
Sept.	27.03	1221.0	1498.0	176.1	144.3	204.0	147.14
Oct	6.08	274.7	337.0	39.6	32.5	46.0	59.76
Nov.	3.38	152.7	187.4	22.0	18.1	25.5	23.53
Dec.	2.57	116.1	142.5	16.7	13.8	18.5	14.95
Jan	2.03	91.7	112.6	13.2	10.9	14.9	15.61
Feb	1.62	73.2	89.8	10.6	8.7	11.8	11.82
Mar	1.27	57.4	70.4	8.3	6.8	9.4	11.89
Apr	1.00	45.2	55.5	6.5	5.4	7.5	16.63

Source:DEDR,2018

76. According to Detailed Engineering Design Report, as per PDSP manual, these regions falls in Hydrological Region no 6. The 80% reliable flow of April for this region as per PDSP methodology is about 53% of the April mean flow. To predict 80% reliable April flow, 53% of mean April flow has been taken and from this value non-dimensional hydrograph for 80% reliable flows have been predicted.

77. During the DEDR phase, 12.5 lps, 12.5 lps, 16lps & 4 lps (total 45lps) flows were tapped design discharge from Rate Khola, Mewa Khola, Gitang Khola and Bhandi Khola respectively. This information has also been delivered during DEDR presentation to WUSC, Community and Ilam Municipality.

78. The existing system has been drawing water from Bhandi and Gitang Khola in the past with safe yield of about 4 and 16 lps, respectively. However, the other two new sources, Rate and Mewa are at different locations. Therefore, hydrological analysis of these rivers were carried out in detail. It has been clearly described above in the *Table IV-I.* It has been estimated that 80% reliable discharges in the new sources in Rate and Mewa Khola are 21 lps and 26 lps, respectively. Therefore, drawing water of about 13 to 15 lps at these sources is possible. Accordingly, **12.5lps** from each Mewa and Rate source has been tapped during the preparation of DEDR.

79. ERDSMC had requested WUSC and Ilam Municipality to take consent letter from Sandakpur Rural Municipality. However, during meeting held between WUSC, Ilam and Sandakpur Rural Municipality, minutes of meetings mentions that 10 lps shall be tapped from each proposed two new sources (i.e., Mewa and Rate).

80. Best efforts have been made from the design team to correct the discrepancy in the minutes and tapped design discharges. WUSC can continue their effort in future too. Even if there is no minutes, WUSC can withdraw the required quantity of water @12.5 lps from each of these two new sources under mutual consent with Sandakpur Rural Muncipality. It is to be noted that there will be not any adverse impacts on downstream as there is availability of sufficient reliable discharge. If WUSC does not get permission to add the additional required flow from Rate and Mewa (in addition to present agreed discharge of 10 lps from each), water can be added from the existing water supply system.

81. The system designed with water demand of 100 lpcd requires about 44.40 lps (designed 45 lps). If WUSC does not get permission to withdraw the required design discharge from Mewa and Rate (new sources) and also water not added from the existing sources, the community will get 100 lpcd till year 2033 A.D., after then per capita water availability will be decreased gradually and reaches upto about 90 lpcd during design year 2039 A.D. The following table shows the water demand for **Scenario 1** with designed discharge 45 lps and 40 lps (if no more water added from Mewa and Rate and existing sources).

Table IV-II: Total Water Demand Forecast (Scenario 1)

Permanent Population (2017):	20,704	HH :	2798	**Nos**		
Avg. Growth Rate (%):	1.75					
Description	**Survey Year**	**Base Year**			**Design Year**	
	2017	**2019**	**2029**	**2033**	**2034**	**2039**
Per Capita Water Demand, lpcd	**100**	**100**	**100**	**100**	**100**	**100**
Net total daily demand (liters)	**2,619,056**	**2,711,528**	**3,225,118**	**3,456,866**	**3,517,333**	**3,836,239**
in lps	30.31	31.38	37.33	40.01	40.71	44.40
in MLD	2.62	2.71	3.23	3.46	3.52	3.836

Source: DEDR, 2018

82. The following table shows the water demand for **Scenario 2** that says that If more water will not be available from these new sources (Mewa and Rate) that equals to design tapped discharge in addition to that of previously agreed discharge @ 10 lps from each new sources and water not added from existing sources:

Table IV-III: Total Water Demand Forecast (Scenario 2)

S.N.	**Description**	**Survey Year**	**Base Year**				**Design Year**	
		2017	**2019**	**2029**	**2033**	**2034**	**2036**	**2039**
	Per Capita Water Available, lpcd	**100**	**100**	**100**	**100**	**98.3**	**94.95**	**90.1**
	Net total daily water available (liters)	**2,619,056**	**2,711,528**	**3,225,118**	**3,456,000**	**3,456,000**	**3,456,000**	**3,456,000**
	in lps	30.31	31.38	37.33	40.0	40.0	40.0	40.0
	in MLD	2.62	2.71	3.23	3.46	3.46	3.46	3.46

Source: DEDR, 2018

83. Hence, this establishes the need to add 5 lps water from the existing system that uses Gitang Khola & Bhandi Khola. Despite of this addition, there is no requirement to alter the design and pipe size. There will also not be any impacts on the project implementation. However, after the implementation of the project, WUSC will make effort to bring insufficient water from the proposed new sources. Otherwise, this insufficiency can be balanced by fetching the insufficient quantity of water from the existing system.

84. The figure given below represents the schematic diagram of Ilam WSSP:

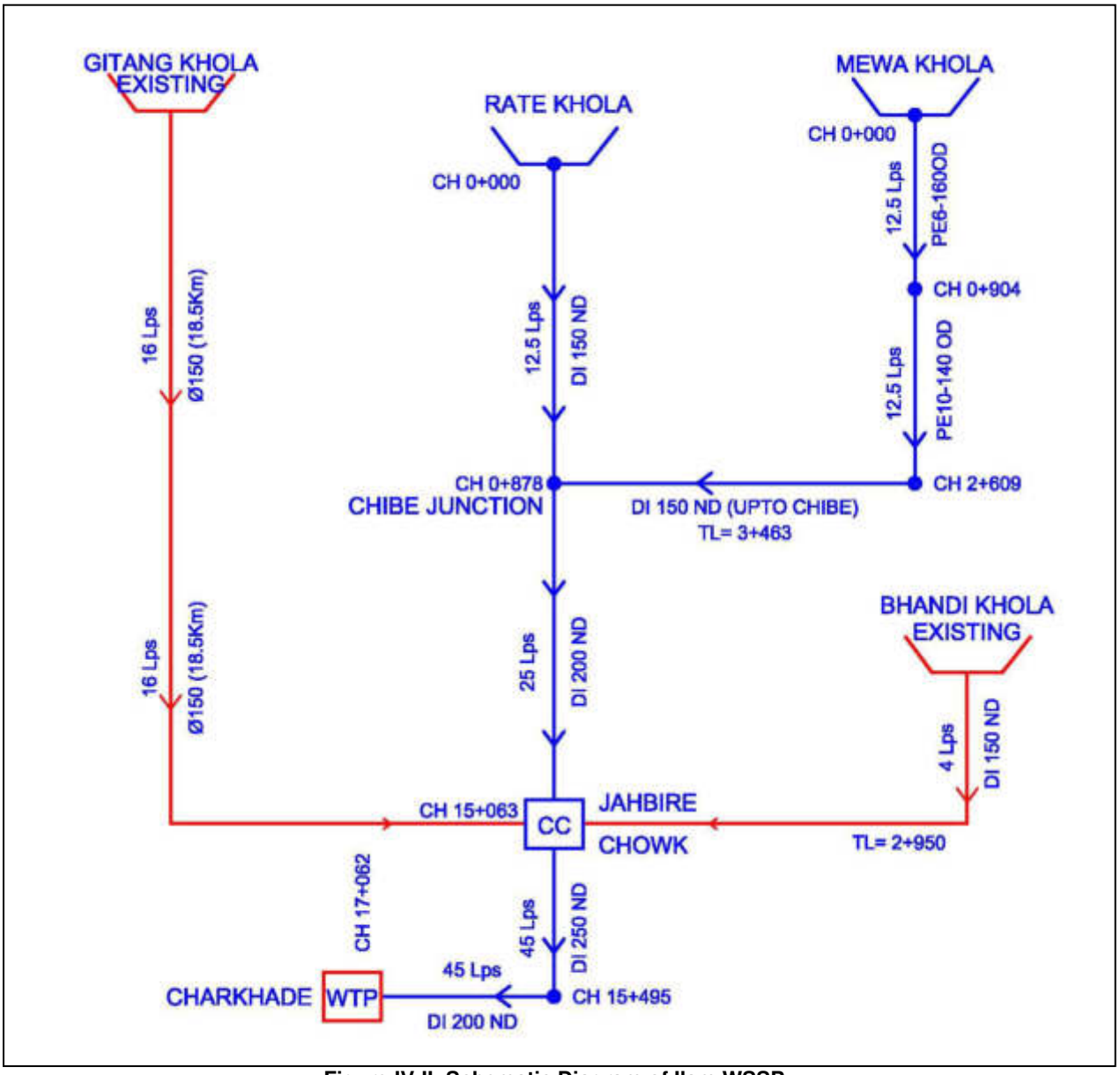

Figure IV-II: Schematic Diagram of Ilam WSSP

b) Intakes

85. Two existing intakes belonging to two existing sources i.e., Gitang Khola & Bhandi Khola will be used for the proposed project after some minor rehabilitation works. Among these two intakes, there is one stream intake at Gitang Khola and one spring intake at Bhandi Khola. Similarly, two new intakes have been proposed for two proposed sources that includes Rate & Mewa Khola. Both proposed intakes are stream type intakes. At Rate Khola, simple weir intake has been proposed across the river. In case of Mewa Khola, a side intake has been proposed. Each source river have a safe yield of more than 15 lps.

86. Simple off-take type of intakes has been proposed in Rate Khola. Discharge of 12.5 lps has been proposed to abstract from this river. Relative Level (RL) of this intake is around 1875 amsl.

87. As the Mewa Khola flows in very steep gradient with large rolling stones at intake area, temporary type of weir by Rip-Rap has been recommended. A single orifice type intake with minimal sill height has been provided to divert river water to intake filter chamber in the main river. As rigid structure like concrete or masonry weir is not found suitable for the river

of mid hill with wider river width, a temporary weir formed by heaping of Rip-Rap for 0.5 to 1 m high across 20m wide river has been provided for the diversion structure of the system. Moreover, such flexible structure is easy for operation and maintenance. A single orifice type of intake has been provided to capture the design flow even during the lean season. To make simple design and simple operation, no gates and scour sluice at intake has been provided. To control heavy discharge in the canal during flood time in the river, a control orifice has been provided immediately after the gravel tap. Relative Level (RL) of this intake is around 1910m amsl.

c) Transmission Mains

88. There are three different transmissions subsystem in the proposed system. The first two are existing transmission system, and the third one is proposed transmission system.

89. The main transmission line has been considered length between Intakes to WTP at Charkhade. The transmission mains have been designed to meet water demand for the design year. The cumulative length of transmission line 41.975 km.

90. The total length of existing transmission lines of Gitang and Bhadi Khola up collection chambers are 18.5 and 2.95 km, respectively. The proposed transmission Rate is about 17.1 km. The segmental length of proposed transmission of Mewa Khola is 3.463 km. The transmission line of Mewa Khola joins transmission line from Rate at Chibe junction.

91. The proposed transmission line comprises of 150 mm to 250 mm diameter ductile iron pipes and 140 and 160 outside diameter of 6 kg polyethylene and 10 kg polyethylene pipes, respectively.

d) Thrust Blocks, Saddle Blocks and Thrust Beam

92. Thrust blocks have been proposed for DI pipes (transmission and distribution mains) from being moved by forces exerted within the pipes arising from the internal pressure of the pipeline or the flow of water hitting bends, tapers and closed or partially closed valves. Typical thrust blocks have been designed for a pressure of 16 kg/sq cm for both transmission lines and distribution lines.

93. A large number of saddle blocks, thrust beams and anchor blocks are required in the transmission mains in All saddle block are proposed to be anchored with concrete at the center of each pipe to prevent movement.

e) Rivers/Stream Crossings

94. There are number of small river crossing in the proposed transmission system. There are major wide crossing along the transmission system at various rivers like Rate Khola, Sano Mai Khola and Soti Khola. Pipe crossing of MS truss over these rivers have been proposed. MS truss pipe crossing span of 25m have been proposed for Rate and Sano Mai Khola whereas crossing span of 20m have been proposed for Soti Khola. These truss crossings are triangular comprising of tubular mild steel sections and braced by welded tubular sections to form composite light section which is economical than the traditional angle and channel sections.

95. A simple crossing by providing SP-4 type concrete saddle blocks are recommended for the small crossings for DI pipes. These type of crossings are used only when the span of crossing is less than 6m. There are about ten numbers of this type of crossings along the

transmission line. In case of crossing near the existing bridge and culvert, provision of pipe clamps has been made.

f) Water Treatment Plant and Chlorination

96. The existing water treatment at Charkhande consists of sedimentation tank (ST), horizontal roughening filter (HRF), slow sand filter (SSF) and disinfection unit. The design capacities of the existing water treatment units at Charkhande have been checked. There are some design inconsistencies between design discharges of different units. The design discharge of slow sand filter is about five to six times higher than that of ST and HRF. There is also problem with the filter media of the SSF. Hence, the existing SSF requires rehabilitation to be fit for the proposed project. However, some of other existing components like ST & HRF are functional and will be considered in this proposed project. There is also a disinfection unit, but it is not in operation.

97. The water quality test has also been carried out for each sources to ensure the requirement of water treatment plant. Accordingly, the water quality test reports (***Refer Appendix 7)*** of the existing for physical, chemical & biological parameters show that the sample from Geetang Khola & Bhandi Khola has 5 NTU turbidity value and has hardness value of 40 mg/L & 36 mg/L as $CaCO_3$ respectively which falls below the prescribed NDWQS (Turbidity: 5-10 NTU and Hardness: 500 mg/L). Similarly, the test result also shows that both of the exisitng sources has minimal value of iron content that is less than 0.05 mg/L which is very less than the prescribed NDWQS i.e., (0.30-3)mg/L. Similarly, the test result of the proposed sources as given in ***Appendix 7*** shows that the sample from Rate Khola & Mewa Khola has 5 NTU & 1 NTU turbidity value and hardness value of 46 mg/L & 12 mg/L respectively. These values are also less than the prescribed standard. The values observed for the iron content (Rate Khola-0.34 & Mewa Khola-0.23) are also acceptable as per the prescribed NDWQS. However, there is no surety that these sources' quality will remain same in the future as the project town is leading towards urbanization and the urbanization may intensify the risk of contaminaton in the proposed sources. Similarly, the on site bacteriological test carried out during field study shows that the proposed water sources are contaminated with bacteria which constrain the provision of water treatment plant for the proposed project. Hence, along with the rehabilitation of the existing WTP, there is requirement of new WTP for the system to be served by the proposed sources.

98. The proposed water treatment plant consists of construction of two new sedimentation tanks along corresponding transmission routes of Rate and Mewa Khola, eight numbers of Horizontal roughing filters and repair of existing slow sand filters since SSF is good in size.

99. Plain sedimentation has been provided as a pre-treatment unit for proposed transmission lines where settling process of coarse and heavy suspended particles such as sand, silt, etc. will settle through the force of gravity. This settling process will reduce the turbidity of water because lesser the presence of suspended solids, lesser will be the turbidity.In each settling tanks, the retention period is equal or more than 4 hours.

100. Each setting basin is rectangular basin with a longitudinal flow. Each setting basin with two identical chambers of 2.4 m x 12 m has been adopted for design discharge of 12.5 lps with a design load of 0.8 m^3/ m^2/hour. The required area for the proposed tank is about 150 m^2 in every location along transmission line of Rate and Mewa Khola

101. The horizontal roughing filter has been proposed near Charkhade (existing WTP). It is primarily used to separate water from fine solids that are only partly retained, or not at all, by sedimentation tanks. In addition to this, it partly improves bacteriological water quality. The roughening filter (HRF) has been designed for a flow capacity of 3147.6 m^3/hour (or 41 lps) considering the diverted additional four lps from Bhandi Khola does not require any treatment since it is from spring source. Four numbers of identical units have been proposed with a filtration rate of 1,8 m^3/ m^2/hour. A unit consists of four chambers of 5 m wide and 1.7 m in depth. The overall size of each chamber is 5m x 8.8m. Each unit comprises of three chambers for the fill filter material apart from the inlet, and outlet compartment of each chamber is 90 cm wide. The additional required area for the proposed HRF tank is about 3500 m^2 in a location close to existing WTP area.

102. The rehabilitated existing SSF will enhance the removal of turbidity. This SSF improves water quality by removing water borne parasites, bacteria and suspended solids.This is also effective in removing oxidated precipitate of dissolved soilds like iron.

103. Chlorination or disinfection unit is required for the removal of complex iron content and complete removal of bacteriological content. Hence, there is provision of dosing system or chlorination/disinfection unit before distributing water to the RVTs.

104. The dosing system comprises of electronic dosing pump with FRP tank and stirring device. As the pump is automatic dosing pump of the electronic type, close housing is recommended. This will effectively remove bacteriological content that are only partly removed by SSF.

105. The environmental audit of the proposed WTP is also carried out, the result of which is tabulated below:

Table IV-IV: Result of the environmental sudit of the proposed WTPs

Details of the Existing Reservoir Tanks to be Demolished.	Required Environmental Clearances per Government of Nepal Laws and Regulations	Status of Monitoring of Raw and Treated Water (per Government of Nepal and WHO guideline values)	Sludge Management (if sludge is being generated)	Management of Reservoir	Operation and maintenance (roles and responsibilities, availability of O&M manual, environmental monitoring being conducted)
This existing reservoir tank (RVT) is referred as Shikharnagar RVT. There are 4 exisitng RVTs among which one is in damaged consition. Each of 3 RVTs has 165 cum, 38$m^3$and 42m^3capacities. According to the locals, it is said that this existing system was constructed around 1940 A.D. during Rana regime Hence, it has become quite out dated. It was further damaged by the massive earthquake that took plcae on April 25, 2015. This led to leakage problems.	process of getting initial environmental examination (IEE) clearances by Government of Nepal, it takes 2-3 months	Raw water taken from the concerned sources meets NDWQS. During rainy season turbidity became high and chances of E. coli is increased. During the operation of treatment plant, the tap water meets	Sludge generated is very less which is managed by buried in low land within premises of the exisitng WTP.	Management of reservoir specially to avoid excessive algal growth within the reservoir, done by Ilam Municipality as per specified methods.	Operation and maintenance along with minor repair works done by separate water supply section of Ilam municipality since 1998. Out of 93 staffs of the municipality, 35 are working in this section. O&M manual is not well prepared and practiced. Environmental monitoring being conducted by Ilam municipality as the entire responsibility of

Details of the Existing Reservoir Tanks to be Demolished.	Required Environmental Clearances per Government of Nepal Laws and Regulations	Status of Monitoring of Raw and Treated Water (per Government of Nepal and WHO guideline values)	Sludge Management (if sludge is being generated)	Management of Reservoir	Operation and maintenance (roles and responsibilities, availability of O&M manual, environmental monitoring being conducted)
It is located in the ward no. 7 of Ilam municipality. Its surroundings is moderately populated. It is surrounded by Bamboo forest. After demolition of these four exisitng RVTs, new RVT with 150 m^3 capacity will be constructed.		both NDWQS and WHO guidelines. Turbidity and residual chlorine was within the limits of NDWQS. Monitoring is done by DWSSM, Water quality section.			the existing system is handed over by Ilam Water Supply and Sanitation Division Office to the Ilam municipality in 1998 A.D.
Ilam View Tower and Shikharnagar RVT constructed by JICA is located in the same premises of these exisitng RVTs.It is well fenced by stone masonry wall and secured.					
The another exisitng RVT to be demolished is Gadhi Barrack (RVT A). Its existing capacity is 48 m^3. According to the locals, it is said that it was constructed around 50-60 years back. It has steepy hill topography					

Source: IEE Field Study,2017

g) Service Reservoir

106. The existing system has been operated as multi reservoir (nine) system with RVTs of different sizes at six locations. The proposed system is designed on the basis of multi reservoir system. The design considers the use of existing RVTs to the extent possible. The following table shows that four operating RVTs with total volume of 692.5 m^3 will be used with minor rehabilitation. However, the storage capacity of these reservoirs is not enough to meet water demand. Hence, new six RVTs with a total storage volume of 700m^3 has been recommended.The details of capacities of each reservoir are mentioned below:

Table IV-V: Details of Service Reservoirs

Location		Existing Capacity	Size of RVTs (m^3)			Remarks
	Name		Require	Use of Existing	New Proposed	
1	GumbaDanda	60	50		50	Requiredrelocation
2	GadhiBarrack (RVTA)	48	150		150	NonOperating
	GadhiBarrack		120	120		UnderConstruction
	Shikharnagar	165				

Location		Existing Capacity	Size of RVTs (m^3)			Remarks
	Name		Require	Use of Existing	New Proposed	
3	Shikharnagar	Damaged	150		150	Demolition of all 4 old RVTs(made of stone masonry)
	Shikharnagar	38				
	Shikharnagar	42				
	Shikharnagar(JICA)	360	360	360		
4	MilanKendra(JICA)	87.5	87.5	87.5		Rehab of existing
5	CampusDanda	80	50		50	Required
6	Tundikhel(JICA)	125	125	125		Rehab of existing
7	Golakharka				150	
8	Tilkini				150	

Source: DEDR,Ilam, 2018

107. The cumulative capacity of all service reservoir provided in the proposed project is about 1,392.50 m^3. A minimum of 50m^3 capacity has been provided for all reservoirs.

h) Bulk Distribution Mains

108. As the service area is very scattered and stretched in 15 to 20 km with high elevation difference within the service area (in the range of 1000 m), the proposed concept of Bulk Distribution has been proposed. This has been done to reduce inequality of pressure in HHs connection within the service area so that the household at high elevation and the tail end of the service area will get equal service level.

109. All of the storage reservoirs of the system will get required water from water treatment plants. The total cumulative length of BDS is about 18.130 km.

i) Distribution Mains

110. The distribution system comprises of a pipe network, which is looped in certain cases and branched in other. The network has been analyzed using EPAnet, a design analytical software tool. The entire system has been designed using Polyethylene (PE), Ductile Iron (DI) and Galvanized Iron (GI) pipes.

111. The minimum diameter of distribution pipe has been adopted as 50mm for the proper saddle arrangement at the household connection in distribution pipe.Two types of pipes have been used in the distribution network; Galvanized Iron (GI) pipes and PE pipes. However, uses of GI pipes have been limited. The total pipe lengths of various diameters are given in the table below. The total pipe length of the proposed distribution system works out to be 109.822 km.The details are briefly given below:

Table IV-VI: Details of Pipes Used in Distribution System (in meters)

A	PEPipes	Lengthof PN 6 Pipe (m)	Lengthof PN 10 Pipe (m)	Lengthof PN 16 Pipe (m)
	50OD PEPipe	0	27,318	30,918
	63OD PEPipe	0	25,127	2,564
	75OD PEPipe	7,283	4,398	710
	90OD PEPipe	2,647	1,843	
	110OD PEPipe	2,643	985	
	125OD PEPipe	987	646	

A	PEPipes	Lengthof PN 6 Pipe (m)	Lengthof PN 10 Pipe (m)	Lengthof PN 16 Pipe (m)
	140OD PEPipe	491	387	
	160OD PEPipe	765	0	
	Sub Total	**14,816**	**60,704**	**34,192**
B	**METALLIC PIPE**	**Lengthof GI Pipe(m)**	**Lengthof DI Pipe(m)**	
	100 ND	110		
	Sub Total	**110**		
	GRAND TOTAL	**109,822**		

Source: DEDR,Ilam, 2018

j) Household Connections

112. Two types of house connections have been envisaged in the project. There is about 573 number of household connections from GI pipes from distribution chambers in core Bazaar and high-pressure area, about 2,007 number of house connections from PE pipes out of which about 286 HHs connection require drain crossing provision. This will make the total household connection of 2,868 in the project area. All of the connection will be private.

113. The house connection shall comprise about 12 m pipe PE or GI Pipe (as per requirement) and water meter. The house connection pipe shall be PE-80 or 100, 20 mm OD diameter pipe rating PN-16. In case of tapping from GI pipes, the house connection pipe shall be medium class GI of 15 ND. Tapping of household connection in PE pipe has been proposed from PE saddle with the ferrule. Tapping from GI pipes has been proposed from PE saddle with ferrule.

114. Dry dial volumetric rotary piston type water revenue meter for all house connections are proposed. These household water meters have 15 mm ND and have been recommended.

k) Appurtenances

115. **Line or Sectional Valves :** Line or Sectional valves are gate valves used to isolate sections of a pipeline in an emergency or for maintenance and repair. It should be noted that gate valves are suitable for isolation of a pipeline in either “fully open” or “fully closed” positions, but not for frequent open/close operation and flow regulation. All valves shall be with nominal pressure rating PN16 unless in special circumstances where higher pressure rating is required.

116. **Air (Release) Valves :** Airvalves willbe installed at allhigh points ofthe pipeline,in sections which forma peakwith respect to the hydraulic gradientand on the downhillside ofline valves.

117. Air Valves shall be of the combined type with a larger and smaller venting orifice which permits passage of large volume of air for vacuum breaking and venting on starting up and closing down operation and a small venting cross section for the release of small volumes of air under full internal operating pressure. All air valves shall be Double Orifice Air Valves and shall be with nominal pressure rating PN 16 unless in special circumstances where high pressure rating is required.

118. **Wash out Valve:** Washout valves formed by gate valves, has been proposed to allow sediment to be flushed out and to enable the pipeline to be drained for maintenance and repair work. At least one washout valve has been proposed at the lowest point between two sectional valves on the pipeline and the dead end of a pipeline. Double valves should be provided to washouts for trunk mains and primary distribution mains to suit operational needs. The upstream valve should be opened while the downstream valve should be closed so that the washout pipe on the upstream side of the downstream valve is fully charged with water. Care should be taken to position the discharge points of washout pipes to avoid water in stream course seeping through the washout pipes into the water mains.

119. **Flow Meters :** A flowmeter has been installed at the at the inlet and outlet mains of a service reservoir, within treatment works to measure the quantity of water flow for a supply zone. For a DMA, a flow meter has been installed at the inlet of the DMA to monitor continuously the quantity of water flowing into or out of the DMA. The flowmeter of Waltman type has been recommended to regulate flow.

120. **Fire Hydrants:** Fire hydrants are provided at major road junctions.These fire hydrants shall also be used for flushing of the system as required. Fire hydrants, namely, stand post type, conforming to IS908 is recommended.

121. **Control Valve Chambers:** Three type of Chambers have been proposed in the project to control or regulate the flow of the proposed water supply system. The chambers constructed by brick masonry wall and random rubble masonry have been provided in non-vehicular areas and rural area. In other vehicular carriageway and city area chambers constructed with RCC has been provided.

122. The concrete chambers shall serve as housing, protection and convenient access to these pipe appurtenances. Inside the concrete chambers, necessary concrete supports shall be provided for pipes and valves at appropriate locations.Access to the concrete chamber will be given via lockable cast iron covers with frames. Manhole covers of the heavy-duty type have been recommended in these RCC chambers. Covers for manholes in paths may be proposed of medium duty type.

123. In total, 20 nos. of Brick Valve Chambers, 10 nos. of RRM Valve Chambers and 10 nos. of RCC Valve Chambers have been proposed.

124. **Pressure Release Valve Chambers:** To protect the water supply system during an overpressure event, pressure valve chamber has been proposed. For this project, only one pressure release valve chamber for 100 mm diameter pipe has been proposed where there is possbility of occurrence of overpressure event.

125. **Distribution Chambers:** Similarly, to regulate the flow in the distribution system to supply water for house connections, distribution chamber has been proposed. 20 numbers of Prefabricated RCC Chamber and 10 nos. of Cast in Situ Brick chambers have been proposed for the project.

l) Office Building, Guard House, Dosing House and Boundary Wall

126. To safeguard storage tanks and RVT from vandalism as well as contamination, Chain-link boundary (CLBW) wall and barbed wire fencing (BWF) has been proposed. A galvanized chain link fencing over 450 mm high parapet wall has been proposed from

aesthetic and economic consideration for boundary wall. Barbed wire with the concrete post has been proposed for fencing in a fringe area of town and rural area of the municipality.

127. A two-bay two-storeyed building for office is proposed at Shikharnagar. The old building on the north- west corner shall be demolished to construct the office building. The proposed office building comprises of big meeting hall, water quality laboratory, administrative rooms, store for household meter and other small gadgets. A seperate toilet block housed with a bath chamber and two toilet chambers have been prooposed at its premises.

128. Three numbers of single storey Guard House (GH-3) are proposed at two WTP locations and Golkharka RVT area. Slightly ample space is required in this area since this area is far from the main bazaar. The Guard House building comprises of residence facilities for a guard in addition to rooms for tools of repair & maintenance.

129. Similarly, two numbers of small Guard Houses (GH-1) have been proposed at two reservoir locations, Gadhi and Tilkini. This Guard House comprises two rooms. As the locations are very close to settlement and bazaar areas, only guard room and room for tools of repair & maintenance has been proposed.

130. The Dosing Pump House or Chemical Dosing House (DPH) with two compartments has also been proposed. The one compartment is for housing dosing pump and other compartment is recommended for the chemical store.

131. As the system comprises of many RVTs and other structures to be protected and operated, different size of building structures and different type of boundary has been discussed with the WUSC and proposed in the project. The table below summarizes these in details.

Table IV-VII: Proposed Buildingsand Boundary Type

Location	Components	Building	Septic Tank	Boundary Type
Settling Basin Area	SettlingBasin	G	S+S	Fencing by Barbed Wire
Additional WTP Area	H	G	S+S	Fencing by Barbed Wire
Existing SSF Area	S	C	Existing	Existing
Gumba Danda	N-RVT			Fencing by Barbed Wire
Gadhi Danda	E-RVT #2+N-RVT #3	G	S+S	GI Chainlink with B/W
Shikhernagar	N–RVT #4+E-RVT (JICA)#5	OFF-1	Existing	Existing
Milankendra	E-RVT (JICA)#6			Fencing by Barbed Wire
Campus Area	N-RVT			GI Chainlink with B/W
Tundikhel	E-RVT (JICA)#8			Fencing by Barbed Wire
Golakharka	N-RVT	G		GI Chainlink with B/W
Tilkini	N-RVT	G		GI Chainlink with B/W
Various Locations	Intakes,IC,CC and BPTs			Fencing by Barbed Wire

Source: DEDR Ilam,2018

m) Internal Access Roads

132. There is also provison of Internal Access Roads which has been included under Road Development & Re-sealing of Roads. This involves construction of Approach Road of

Gravel of total length 100m with 5m width. Similarly, this also involves construction of RCC Access road of 100 m^2.

n) Miscellaneous Works

133. There is also provison of miscellaneous works for this proposed project that includes Construction of RRM Wall, Gabion Wall, Surface Drain, Footpath, Hume Pipe, Landscaping & Plantation etc. for River Protection Works, Site Development Works, Drainage for the protection of Intakes, WTPs, RVTs, Guard House and Distribution system.

o) DMA Establishment

134. One increasingly common principle of managing a large water network is to sub-divide it into a number of areas, typically of between 500 and 3000 connections, each established area having a defined and permanent geographical and/or hydraulic boundary. Such an area is known as a District Management Area or, more commonly, a District Meter Area (DMA). Ideally, each DMA has a single source of supply to maximize the accuracy of data, with a strategically placed and suitably sized meter installed on the inlet that is capable of accurately measuring flow into the area. In this way, it is possible to regularly quantify the leakage level in each DMA so that the leakage location activity is always directed to the worst parts of the network.

135. An important factor in lowering and subsequently maintaining a low level of leakage in a water network is pressure control. The division of the network into DMAs facilitates the creation of a permanent pressure control system, thus enabling pressure reduction in DMAs which reduces the level of background leakage, the rate of flow of individual bursts and the rate of the annual burst frequency. In order to manage NRW in the proposed system, the total system has been divided into 10 DMAs according to theserving reservoir.

136. The figure given below gives brief details on the DMAs of the proposed project:

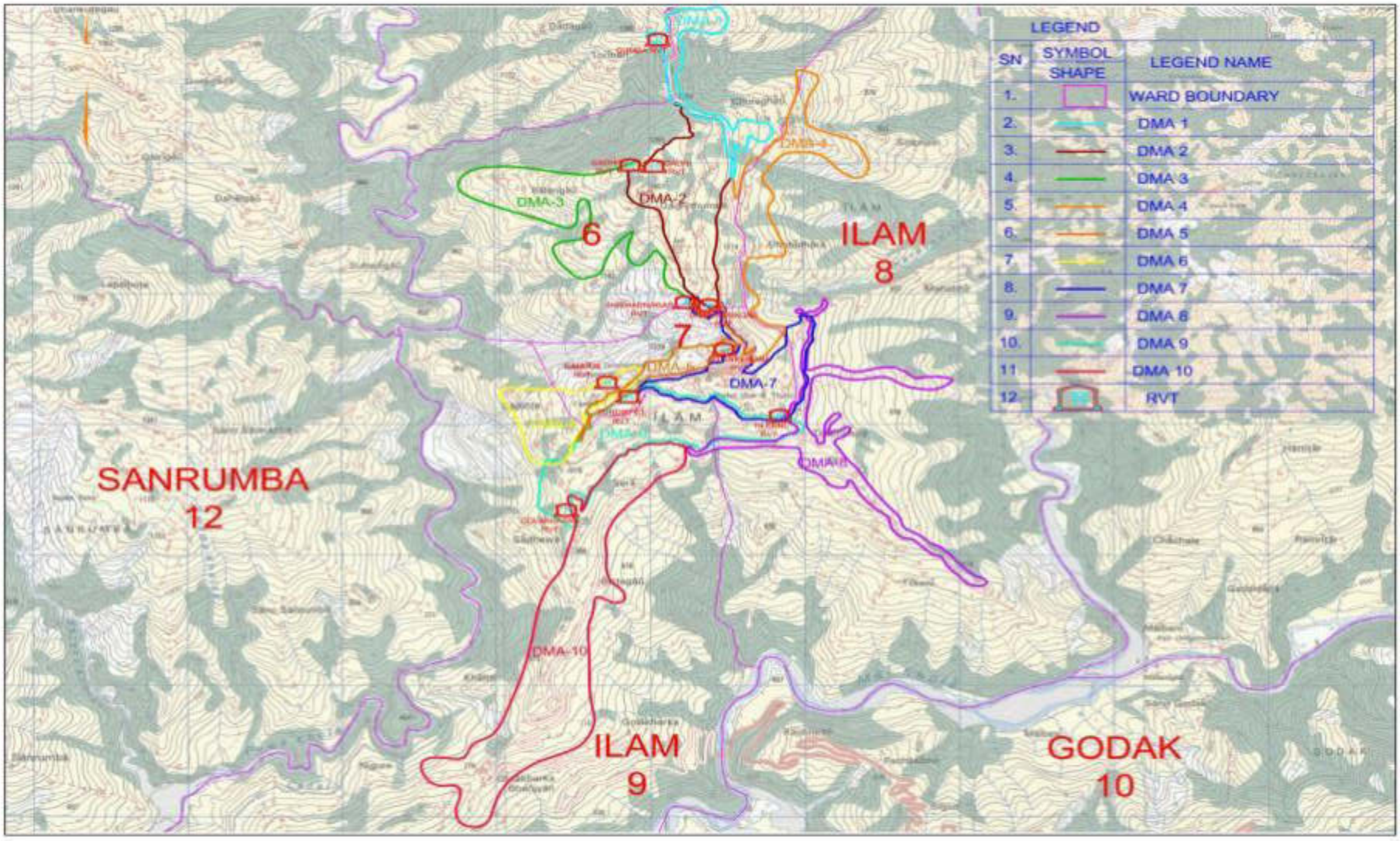

Figure IV-III: : : District Metering Area (DMA) of the Proposed System

ii. Sanitation Components

137. There are five existing public toilets in the project area, which have been observed to be insufficient. Hence, new public toilets have been proposed at three identified areas that includes Dhobi Dhara, Tundikhel and Adrasha Krishi Bazaar. However, the exact location of these public toilets has not been yet established and the required land has not been acquired. The wastewater from public toilets will be treated through a septic tank and soak poit at each site.

138. These sanitation components contribute towards the betterment of sanitation facilities in this area. These facilities also inculcate behavior of toilet use among the general public. Hence, the proposed project also address basic sanitation issues through the provision of public toilets.

C. Salient Features of the Proposed Project

139. The salient features of the proposed project area are tabulated below:

Table IV-VIII: Salient Features of the Project

SN.	Items	Description
1	Nameof Project	Ilam Water Supply and `Sanitation Project
2	Type	Gravity
3	StudyLevel	Detailed Engineering Design
4	LocationArea	
	Province	1
	District	Ilam
	Municipality/Rural Municipality	Ilam Municipality
	Ward	Complete Area of wards 6 & 7 Partial Area of wards 8 & 9
5	Available Facilities	
	Road	Mechi Highway
	Water Supply System	WUSCs
	Electricity	Available
	Communication	Available
	HealthServices	Available
	BankingFacilities	Available
6	SocialStatus	
	PresentHHsNumbers (2017)	2,798
	Present Population(2017)	20,704
	BaseYearPopulation(2019)	21,433
	DesignYearPopulation(2039)	30,325
	Average HHSsize	7.22
	Weighted Growth Rate%(WGR)	1.75
	Projected HHs in DesignYear(basedonWGR)	~4100
7	Water Demand(MLD)	
	BaseYear(2019)	2.711
	DesignYear(2039)	3.836
8	SourceCharacteristics	

SN.	Items	Description
	SourceName	Existing Sources: Bhandi & Gitang Khola Proposed Sources: Rate & Mewa Khola
	Source Type	Bhandi Khola: Spring Gitang, Rate & Mewa Khola: Pernnial Stream
	Source Location	***Existing Sources:*** Bhandi Khola :WN-2 of Ilam Municipality Gitang Khola :WN-2 of Sandakpur Rural Municipality ***Proposed Source:*** Rate Khola : WN-2 of Sandakpur Rural Municipality Mewa Khola: WN-2 of Sandakpur Rural Municipality
	Safe Yield & Measured Flow	**Safe Yield:** **Existing Sources:** Bhandi Khola-5lps & Gitang Khola:16lps **Proposed Sources:** Rate & Mewa Khola-More than 15 lps **Measured Flow:** **Proposed Sources:** RateKhola-45.17lps & Mewa Khola-55.42lps (During April)
	Proposed Tapped Discharge	**Existing Sources:** Bhandi Khola- 4lps & Gitang Khola:16lps **Proposed Sources:** Rate Khola-12.5lps & Mewa Khola-12.5lps
9	Typeof Structures/Components	
a)	Water Supply Components	
	Proposed Intakes	**Total : 4 Nos** 2 nos of New Stream Intakes ;1 no.at each Rate & Mewa Khola Rehabilitation of 2 nos of Existing Intakes; 1Existing Stream Intake at Gitang Khola and 1 Existing Spring Intake at Bhandi Khola
	Water treatment plant	**Assuming water from Bhandi Khola does not require any primary treatment** Sedimentation Tanks- 2 nos each with 12.5lps capacity HRF: 8 nos (41 lps capacity in total) SSF: 1 no. with some rehabilitation works Disinfection Unit: 1 no.
	Ground Reservoir(Number and Capacity in cum)	**Existing RVTs; 4 nos with total capacity 692.50 cum** 1 no. at Gadhi Barrack -120cum 1 no. at Shikharnagar (JICA)-360cum 1no. at Milan Kendra (JICA)-87.5cum 1no. at Tundikhel (JICA)-125cum **Proposed RVTs; 6 nos with total capacity 700.00 cum** 1 no. at Gumba Danda-50cum 1no. at Campus Danda-50cum 1 no. at Gadhi Barrack-150cum 1 no. at Shikharnagar-150cum (after Demolition of all existing4 RVTs) 1 no. at Golkharka-150cum 1 no. at Tilkini -150cum ***Hence, Total Capacity: 1392.50cum***

SN.	Items	Description
	Valve Chamber	Brick Masonry: 20nos. RCC: 10 nos. RRM: 10nos.
	Office(O1)/ Small Guard House (GH1) Medium Guard House(GH2)/Dosing Pump House(DPH) & Chemical Store	O1- 1no. at Shikharnagar (2 storey) GH1- 2 nos. at Gadhi RVT & Tilkini RVT (2 Rooms) GH2- 3 nos. at two WTP locations & Golkharka RVT DPH & Chemical Store- 1no.
	Household Connection	2,866
	Fire Hydrant	12
	River/Stream Crossings	a) MS truss crossings: 3 nos. •2 nos. of 25m span at Rate & Sano Mai Khola •1 no. of 20m span at Soti Khola b) Simple crossings withSP-4 type concrete saddle
	Transmission Mains	41.975km
	Bulk Distribution Mains	18.130km
	Distribution Mains	109.822km
	Boundary Wall/Fencing	A) Barbed Wire Fencing at; a) Proposed Intakes: 120.00m b) Proposed Sedimentation Tank:160.00m c) RVT 2 & 3 at Gadhi Danda:125.00m d) RVT 6 at Milan Kendra:48.00m B) Galvanized Chain Link Fencing at; a) RVT 1 at Gumba Danda: 154 m^2 b) RVT 7 at Campus Area: 100 m^2 c) RVT 9 at Golkharka:154 m^2
	Internal Approach/Access Roads	Gravel Road; Length:100m & Width:5m RCC Stretches; 100 m^2
	Reinstatement/Resealing Works	Reinstatement of PCC/RCC Pavements: 2500 m^2 Resealing of Blacktopped Roads: 5000 m^2 Resealing of Gravel Roads: 10000 m^2
	Rehabilitation Works	Existing SSF of 3 units
	Demolition Works	4 nos. of Old Masonry RVTs at Shikharnagar
b)	Sanitation Components	
	Public Toilets	3 nos. (1 no. at 3 locations; Dhobi Dhara, Tundikhel and Adrasha Krishi Bazaar Areas)
10	Total Cost of WS Component (Inclusive of all) NRs.	**836,800,292.80**
11	Cost Sharing Arrangement in WS Component	
	GON Component (75%)	585,760,204.96
	TDF Loan(25%)	209,200,073.20
	WUSC's Contribution for upfront cash(5%)	41,840,014.64
12	Tariff	
	Upto 6cum/monthly(NRs)	210
	7 to10cum/monthly(NRs)	53
	11 to20cum/monthly(NRs)	79
13	Sanitation Cost(Inclusive of all)NRs. andSharing	**11,108,223.00**
	GONContribution(85%)	9,441,989.55
	LocalAuthority/Users'(15%)	1,666,233.45
14	Per Capita Cost for W/Scomponent	

SN.	Items	Description
	Per Capita Cost (for base year pop.)	39,043.00
	Per Capita Cost (for design year pop.)	27,595.00
15	Per Capita Cost for Sanitation component	
	Per Capita Cost (for base year pop.)	518
	Per Capita Cost (for design year pop.)	366
16	Total Cost oftheProject (WATSAN)	**847,908,515.80**
17	Economic and Financial Indicators	
	Economic Rate of Return(EIRR)	44.29%
	Financial Rate of Return(FIRR)	7.91%
18	Environment	
	ADB Category	"B" , Only IEE necessary
	IEEfinding	No significant adverse impact

Source: DEDR,Ilam, 2018

V. DESCRIPTION OF THE ENVIRONMENT

A. Physical Environment and Resources

i. Landforms and Topography

140. The project area is a hilly region which is mostly known as Mahabharata Range.The altitude of the project area ranges from an elevation of 401m above mean sea level (amsl) at the riverbed to 1407 m amsl at the top of Ilam hill. The main Ilam Bazaar lies at an altitude of 1228m amsl. Mountain terrains in Ilam are of gentle slopes. The less steep slopes together with a moist climate provides suitability for important cash crops like tea and cardamom.

141. The term "Ilam" itself describes its topography as the word "Ilam" comprises two words derived from Limbu langauge – "I" (winding) and "Lam" (Way) which means winding way. The topography of Ilam is such that it has several winding paths crisscrossing on the way.

ii. Geology and Soils

142. Ilam municipality lies in the southern part of the higher Himalayan crystallines dominated by the Precambrian to Cambrian Kyanite and sillimanite bearing genesis, biotite schist, Metaquartizite, amphibolites, calc-silicate genesis, orthogenesis and angiogenesis.

143. All fresh rocks are strong, weathering is pronounced along less steep terraces that are covered either by residual soils or colluviums.

iii. Land Use Pattern

144. Generally, the agricultural land dominates the land use pattern of the project area. This is followed by forests and residential areas. Likewise, the remaining area has been used by rivers & rivulets and commercial areas.

145. The survey shows that out of total 2666.19 ha land covered by the project area, 50.59% area is covered by agriculture followed by forest with 34.93%. The residential covers 8.00% area of the project area. Likewise, Riverine and Lake Area and Public service area covers 3.43% and 2.29% respectively. Other coverage is not potentially significant.

iv. Water Resources

146. The project district, Ilam is rich in water resources, as there are various sources of water. The project area has potentiality of surface water only. The major river of the municipality are Mai Khola (which lies in the east) and Puwa Khola (which lies in the west). Ilam municipality is a sub water-shed area of the Mai River system. Besides this, there are also other rivers like Rate Khola, Mewa Khola, Chhange Khola, Gitang Khola and Bhandi Khola. All these rivers are potential source of the proposed project; however, each of them has limitation. There are series of hydropower stations in these rivers, which seems to be major obstacle to utilize some of these sources.

147. Technically, Gitang Khola, Bhandi Khola, Rate Khola & Mewa Khola have been considered for the proposed project. The proposed Rate Khola & Mewa Khola are the tributaries of Mai Khola, which eventually drain into Kankai Mai.

v. Climate

148. The climate of the project area is essentially warm temperate or sub-tropical with the temperature ranging between a maximum of 31.5°C in the summer to a minimum of about 6°C in the winter. The annual rainfall in the area is about 1,545 mm. In winter, there is much less

rainfall in Ilam than in summer. The climate here is classified as Cwa by Koppen and Geiger. The huge difference in altitude influences the variation in climate within the municipality.

vi. Water Quality

149. During the survey, respondents were asked in term of existing water quality in the project area. The survey revealed that out of total 2798 respondents, about 7.10% (198) feel as good quality , 73.10% (2046) feel satisfactory or moderate, and 8.1% (227) respondents feel bad in term of water quality. Similarly, the survey also shows that 11.7% (327) respondents are not able to evaluate the exisitng water quality.

150. The WSSDO constructed water treatment plant (WTP) at Charkhade to treat water from Bhandi Khola and Gitang Khola sources. Due to design deficiencies and poor construction, it does not function properly and is out of operation most of the time. There is disinfection unit at WTP site but is rarely used. So, the existing water supply system is supplying water to consumers virtually without any treatment.

151. The municipality does not have any testing/monitoring facility and trained human resources to conduct water quality monitoring and management programs. Ilam WSSDO has some field testing kits for water quality testing, but they are unused due to the lack of some necessary chemicals and parts. It used to carry out testing of some physical parameters such as turbidity of the municipal supply. Reportedly, a local NGO named Namsaling Community Development Centre (NCDC) carries out water quality test, but reports are not available.

152. During field survey,water samples collected from the existing sources were tested for various physical and chemical parameters. The test reports show that all parameters of water quality of the sample collected are observed to be within the permitted value of NDWQS.The result of this water quality test is shown in detail in ***Appendix 7***.

153. Similarly, during field study, simple bacteriological tests (Coliform P/A Test Vial) which has been developed by ENPHO to determine the presence of Coliform bacteria at the water source was carried out. This on-site bacteriological test is based on the principle developed by Manja et. al in 1982. The test is based on the readily observable formation of black precipitate iron sulfide in the test bottle, as a result of the reaction of H_2S with iron.The results of the Coliform P/A Test Vial shows that the samples collected are contaminated with bacteria.

vii. Air Quality

154. Air pollution is generally caused by fugitive dust from vehicle movements e.g. old and over smoky buses, tractor, heavy and overloaded trucks, old jeeps particularly over unpaved roads, construction activities, and wind action on unpaved exposed surfaces.Air emissions come from household cooking, open burning, and moving vehicles. Emissions from these sources are scattered regarding both locations and timing. However, the field observation shows that the magnitude of air quality problems in Ilam is not that severe.

viii. Acoustic Environment

155. The sources of noise in the Project area are from the construction activities, vehicle movements, and industrial activities. The anthropogenic noise is confined in few clustered settlements and market places only in the daytime.

B. Biological Environment

i. Flora

156. Ilam District is blessed with natural beauty of floral diversity. The site specific vegetation types are decribed below.The major plant life forms available in the project area are given in the table given below:

Table V-I: Plant Life Forms Found in the Project Area

S.No.	Scientific Name	Local Name	Family	Life Forms
1	*Rubus Ellipticus*	Ainselu	Rosaceae	Shrubs
2	*Emblica offficinalis*	Amala (Indian Gooseberry)	Euphorbiaceae	Trees
3	*Pieris ovalifolia*	Angeri	Ericaceae	Shrubs
4	*Adhatoda vasica*	Asuro	Acanthaceae	Shrubs
5	*Michelia Champaca*	Aule Chaanp	Magnolioideae	Trees
6	*Melia azedarach*	Bakena/Bakaino	Meliaceae	Trees
7	*Desmodium confertum*	Ban Gahat	Fabaceae	Shrubs
8	*Ficus bengalensis*	Bar	Moraceae	Trees
9	*Terminalia bellirica*	Barro	Combretaceae	Trees
10	*Aegle marmelos*	Bel (Wood Apple)	Rutaceae	Trees
11	*Semecarpus anacardium*	Bhalayo	Anacardiaceae	Trees
13	*Populus ciliate*	Bhote Pipal	Salicaceae	Trees
14	*Lagerstroemia Parviflora*	Bot Dhayaro	Lythraceae	Trees
15	*Schima wallichii*	Chilaune	Theaceae	Trees
16	*Bassia butyracea*	Chiuri	Sapotaceae	Trees
17	Berberis aristata	Chutro	Berberidaceae	Trees
18	*Debregeasia salicifolia*	Daar	Urticaceae	Shrubs
19	*Garuga pinnata*	Dabdabe	Burseraceae	Trees
20	*Mussaenda macrophylla*	Dhobini	Rubiaceae	Shrubs
21	*Colebrookea oppositifolia*	Dhusure	Lamiaceae	Shrubs
22	*Dioscorea bulbifera* L.	Gitthe Tarul	Dioscoreaceae	Climbers/Vine
23	*Callicarpa macrophylla*	Guenlo	Verbenaceae	Shrubs
24	*Lannea coromandelica.*	Hallunde	Anarcardiaceae	Trees
25	*Terminalia chebula*	Harro	Combretaceae	Trees
26	*Syzygium cumini*	Jamun	Myrtaceae	Trees
27	*Phoebe lanceolata*	Jhankri syaula	Lauraceae	Trees
28	*Ficus lacor*	Kabro (Seto)	Moraceae	Trees
29	*Myrica esculenta*	Kafal	Myricaceae	Shrubs
30	*Adina cordifolia*	Karam/Karma	Rubiaceae	Trees
31	*Castanopsis indica*	Katus	Fagaceae	Trees
32	*Acacia catechu*	Khair	Leguminosae	Trees
33	*Ficus semicordata*	Khanayo	Moraceae	Trees
34	*Sapium insigne*	Khirro	Euphorbiaceae	Trees
35	*Morus alba*	Kimbu	Moraceae	Trees
36	*Cochlospermum religiosum*	Kumbhi	Bixaceae	Trees
37	*Schleichera trijuga*	Kusum	Sapindaceae	Trees
38	*Litsea monopetala*	Kutmero	Lauraceae	Trees
39	*Duabanga grandiflora*	Lampate	Lythraceae	Trees
40	*Macaranga pustulata*	Malato	Euphorbiaceae	Trees
41	*Engelhardtia spicata*	Mauwa	Juglandaceae	Trees
42	*Prunus cerasoides*	Painyu	Rosaceae	Trees
43	*Erythrina stricta*	Phaledo	Fabaceae	Trees
44	*Ficus religiosa*	Pipal	Moraceae	Trees
45	*Shorea robusta*	Sal	Dipterocarpaceae	Trees

S.No.	Scientific Name	Local Name	Family	Life Forms
46	*Pinus roxiburghii*	Sallo	Pinaceae	Trees
47	*Terminalia alata*	Sajh	Combretaceae	Trees
48	*Calotropis procera*	Seto Aank	Apocynaceae	Trees
49	*Osbeckia nepalensis*	Seto Chulsi	Melastomataceae	Trees
50	*Vitex negundo*	Simali	Lamiaceae	Trees
51	*Mallotus philippensis*	Sindure	Euphorbiaceae	Trees
52	*Albizia chinensis*	Siris	Leguminosae	Trees
53	*Dalbergia sisoo*	Sisam	Fabaceae	Trees
54	*Bauhinia vareigata*	Tanki	Leguminosae	Trees
55	*Alnus nepalensis*	Uttis	Betulaceae	Trees

Source: IEE Field Visit Survey, 2017

ii. Fauna

157. Some species of mammals available in the project area is given below.The status of these mammals are as per IUCN & IBAT reports.

Table V-II: Mammals in the Project Area

S. No.	Scientific Names	Common Names	Local Name	Status
1	*Macca assamensis*	Assamese Macaque	Kalo Badar	LC
2	*Panthera pardus*	Common Leopard	Chituwa	VU
3	*Neufelis nebulosa*	Clouded Leopard	Ban Biralo	LC
4	*Vulpes vulpes*	Fox	Fyauro	LC
5	*Canis aureus*	Golden Jackal	Syaal	LC
6	*Mos hosmour*	Hill Mouse	Musa	LC
7	*Felis Chaus*	Jungle Cat	Ban Dhade	LC
8	*Viverra zibetha*	Large Indian Civet	Thulo Nir Biralo	LC
9	*Funambulus sp.*	Squirrel	Lokharke	LC
10	*Taphozous longimanus*	Long-winged Tomb Bat	Lampakhete Chamero	LC
11	*Hytrix brachyuran*	Malayan Porcupine	Dumsi	LC
12	*Martes flavigula*	Yellow Throated Marten	Malsapro	LC
13	*Macaca mulatta*	Rhesus Monkey	Rato Bandar	LC
14	*Semnopithecus schistaceus*	Nepal Grey Langur	Dhedu	LC
15	*Rattus sikkimensis*	Sikkim Rat	Musa	LC
16	*Canis lupus*	Wolf	Bwanso	LC

Source: IEE Field Visit Survey, 2017

158. Some of the birds reported in theforest areas are listed in *Table V-III*.The status of these birds are as per IUCN & IBAT reports.

Table V-III: List of Birds in the Project Area

S.No.	Scientific Names	English Name	Local Names	Status
1.	*Ictinaetus malayensis*	Black Eagle	Dronak Chil	LC
2.	*Ithaginis cruentus*	Blood Pheasant	Chilime	LC
3.	*Megalaima australis(Psilopogan asiaticus)*	Blue-throated Barbet	Basanta	LC

S.No.	Scientific Names	English Name	Local Names	Status
4.	*Ketupa zeylonensis*	Brown Fish Owl	Malaha Huchil	LC
5.	*Ninox scutulata*	Brown Hawk Owl (Brown Boobook)	Kalpechak	LC
6.	*Eudynamys scolopacea*	Common Koel/Western Koel	Koili	LC
7.	*Tyto alba*	Common Barn Owl	Gothe Latokosero	LC
8.	*Arborophila torqueola*	Common Hill Partridge	Piura	LC
9.	*Acridotheres tristis*	Common Myna	Dangre Rupi	LC
10.	*Coturnix coturnix*	Common Quail	Battai	LC
11.	*Tragopan satyra*	Crimson Horned Pheasant	Munal	NT
12.	*Megalaima virens (Psilopogon virens)*	Great Barbet	Nyauli	LC
13.	*Passer domesticus*	House Sparrow	Ghar Bhangera	LC
14.	*Cuculus micropterus*	Indian Cuckoo	Kafal Pakyo	LC
15.	*Pavo cristatus*	Indian Pea Fowl	Mayur	LC
16.	*Lophura leucomelanos*	Kalij Pheasant	Kalij	LC
17.	*Corvus macrorhynchos*	Large Billed Crow	Kaalo Kag	LC
18.	*Cuculus sparverioides*	Large Hawk Cuckoo	Pahadi Biu Kuhiyo	LC
19.	*Caprimulgus macrurus*	Large Tailed Night Jar	Lampuchhre Chaite Chara	LC
20.	*Falco columbarius*	Merlin	Sano Baaz	LC
21.	*Streptopelia orientalis*	Oriental Turtle Dove	Tame Dhukur	LC
22.	*Psittacula cyanocephala*	Plum-headed Parakeet	Tuisi Suga	LC
23.	*Gallus gallus*	Red Jungle Fowl	Luinche	LC
24.	*Pycnonotus cafer*	Red Vented Bulbul	Jureli	LC
25.	*Celeus brachyurusy (Micropternus brachyurus)*	Rufous Woodpecker	Sanotame Lahanche	LC
26.	*Zoothera dauma*	Scaly Thrush	Gobre Chachar	LC
27.	*Turdoides nipalensis (Acanthoptila nipalensis)*	Spiny Babbler	Kade Bhyakur	LC
28.	*Ciconia episcopus*	Woolly Necked Stork	Lovi Papi Garud	VU
29.	*Parus spilonotus (Machlolophus spilonotus)*	Yellow Cheeked Tit	Pitmuhar Chichilkote	LC

Source: IEE Field Visit, 2017

159. As per *Wikipedia - List of Butterflies of Nepal* based on the list prepared by Colin Smith in 2006, there are 690 species or sub species of butterflies in Nepal. The project area also provides habitats for a variety of butterflies, and during the walkover surveys, various types of butterflies were observed.

160. The commonly found Herpito-fauna (reptiles & amphibians) observed in the project area are shown in the table given below:

Table V-IV: List of Herpito-Fauna Found in the Project Area

S. No.	Scientific Name	English Name	Local Name	Status
1.	*T. albolabris*	Green Pit Viper	Haryau	LC
2.	*Boiga trigonata*	Indian Gamma Snake	Adhoo Sarpa,Tirishe, Batasa	LC
3.	Ovophis monticola	Chinese Mountain pit viper	Chhirbire Sarpa	LC
4.	*Japalura tricarinata*	Three Keeled Mountain Lizard	Chheparo	LC
5.	*Duttaphrynus Himalayanus*	Himalayan Toad	Lekhali Khasre Bhyaguto	LC
6.	*Euphylctis cyanophlyctis*	Skittering Frog	Ahale Bhyaguto	LC
7.	*Zootoca vivipara*	Common Lizard	Mausuli	LC
8.	*Calotes versicolor*	Oriental Garden Lizard	Chheparo	LC

Source: IEE Field Study, 2018

iii. Aquatic Life

161. Similarly, common fishes found in the project area are given in *Table V-V*. These species are found in the nearby water bodies of the project area that includes Mai Khola, Puwa Khola, Chhange Khola, Rate Khola, Mewa Khola & Gitang Khola.

Table V-V: List of Fishes Found in the Project Area

S. No.	Scientific Name	English Name	Local Name	Status
1	*Garra annandalei*	Annandale Garra	Chuche Buduna	LC
2	*Glyptothorax indicus*	Catfish	Kabre	LC
3	*Neolissocheilus hexagonolepis*	Copper mahseer	Katle	LC
4	*Channa gachua*	Dwarf Sankehead	Hile	LC
5	*Heteropneustes fossilis*	Stinging Catfish	Singhi	LC
6	*Psilorhynchus pseudecheneis*	Stone Carp	Tite	LC
7	*Nemacheilidae(Schistura Multifasciata)*	Stone Loach	Gadela	LC
8	*Tor tor*	Tor Mahseer/Tor barb	Sahar	LC
9	*Schizothoraichthys sp*	Trout	Asala	LC
10	*Barilius vagra*	Vagra Baril	Faketa	LC

Source: IEE Field Visit, 2017

162. There will be no significant effects on the lives of fish species as well as fisheries by the proposed project activities.

*Note:
(LC= Least Concern; VU= Vulnerable)
*Note: Though some species fall under VU category, the project activities will not affect the habitat of these species as the construction area does not interfere their habitats.

LC* are the status of the species according to IUCN Red List of Threatened Species however it is not included in IBAT report

iv. Protected Area

163. As per The Proximity Report on Ilam Town generated by ADB ***(Refer Appendix 3)***, neither protected areas nor Key Biodiversity areas exist within 1 km radius of the subproject sites & alignments. Hence, there is no possibility of intervention into any of the protected areas by the construction activities of the proposed project.

v. Community Forests

164. The field study shows that the location of the proposed RVT-1 of 50m^3 capacity and small guard house is within Gumbadanda Community Forest Area . The forest type is mixed forest type where especially sallo trees, Peepal trees are found. The study also shows that there is no requirement of cutting trees. There is requirement of clearing of some bushes and shrubs, only along the proposed pipeline alignment. Hence, there is no such significant effect on any of these forest areas.

C. Socio-economic and Cultural Environment

i. Settlement pattern

165. The project town is located in hilly area with heterogeneous ethnic composition. Most of the government and non government offices are located in ward no. 7, which is the most densely populated area of the service area. The core Ilam bazaar area is also located in ward no 7.

166. The wards of the service area are comprised of many settlements. These settlements are referred as Gaun or Tol or Chok or Bhanjyang. Settlement hamlets located at the crossroads are referred as Chok. Likewise, the linear settlements along the main roads are referred as Tol. Other isolated or agglomerated settlements are normally called Gaun here although the distinctions are rather blurred. Major settlements of this Municipality are shown in the table given below.

Table V-VI:Settlement of the Project Area

Ward No.	Name of Settlement
6	Taragaun, Tilkeni,Ranigaun, Beninagar,Singfring
7	Malapath,Ratnechowk,Hakimtole, Tudikhel,Suntalabari,Chiyabari,Kuldhara
8	Thinggaun,Golbasti,GolkharkaBhanjyang,Bistagaun,
9	Pipalbote,Ghosgaun, Buddhanagar,Chureghanti, MathiloBarbhai

Source: Socioeconomic Survey 2017

ii. Population Distribution

167. As the service area of the project town covers whole wards of former Ilam municipality, the total population of historical time has been used for the population assessments of the area and presented below:

Table V-VII:Population of the former Ilam Municipality

Year	Population
1971	7,299
1981	9,733

Year	Population
1991	13,197
2001	16,240
2011	18,633

168. Source:SocioeconomicSurvey, 2017

169. However, the Municipality has increased it judiciary area more than six folds than the previous area during May 2017 by incorporating adjoining former VDCs. The formation of the new municipality has been described in earlier (section 1.2). Therefore, the present population assessment of newly formed municipality has been carried out with the help of neighboring VDCs' population data. The ward-wise population of the project town according to the census, 2001 and 2011 has been presented below:

Table V-VIII: Population ofthe Ilam Municipality

Ward	W.Area (Ha)	Census 2001			Census 2011			Growth Rate
		HHs	Pop	P. Densities (PPHA)	HHs	Pop	P. Densities (PPHA)	
1	2,053	761	3,779	1.84	932	4,045	1.97	0.68
2	1,525	478	2,564	1.68	591	2,563	1.68	0.00
3	2,127	558	3,020	1.42	634	2,927	1.38	-0.31
4	924	535	2,784	3.01	631	3,008	3.26	0.78
5	1,432	911	4,591	3.21	1,139	5,101	3.56	1.06
6	**453**	**746**	**3,216**	**7.10**	**968**	**3,821**	**8.43**	**1.74**
7	**103**	**1,272**	**4,745**	**46.07**	**1,435**	**5,132**	**49.83**	**0.79**
8	**978**	**723**	**3,460**	**3.54**	**902**	**3,922**	**4.01**	**1.26**
9	**1,128**	**1,276**	**4,819**	**4.27**	**1,427**	**5,758**	**5.10**	**1.80**
10	2,183	924	4,600	2.11	1,137	4,978	2.28	0.79
11	2,582	404	2,064	0.80	799	3,616	1.40	5.77
12	1,777	683	3,637	2.05	788	3,665	2.06	0.08
Total	17,265	9,271	43,279	2.51	11,383	48,536	2.81	1.15

Source: CBS 2001 &,2011

170. As per census data of 2011 A.D., the calculated total population of Ilam Municipality (after incorporating new adjoining areas) is 48,536. The population of former Ilam municipality (considering only old areas of the former ward) is 18,633 during 2001. The populations of the municipality during 2001 were 43,279, and the population of the former municipality was 16,240. The analysis of census population shows that the overall annual growth rate of the municipality is only 1.15%. Ward number 3 of the municipality has declining population growth in last one decade.

171. The average HHs size of the area has decreased from 4.67 in 2001 to 4.26 in 2011. Ward 7 of the municipality, old Ilam Bazaar area (former WN 1 and 2), is the only densely populated ward. The population density of this ward is comparatively high (about 50 PPHA). The population densities of other remaining wards area less than 10PPHA. The overall population density of the municipality increased slightly from 2.51 PPHA (2001 A.D.) to 2.81 (2011 A.D.) PPHA. This may be due to increase in the area of the municipality. If we compare the former scenario, the overall population density of the project area increased slightly from

6.10 PPHA (2001 A.D.) to 7.00 PPHA (2011 A.D.) persons per hectare. This data has been extracted from Central Bureau of Statistics 2001 & 2011.

172. The consultants conducted a socio-economic survey in 2017 A.D. of the proposed service area. It shows that the total population of the service area is 20,704 which is tabulated below:

Table V-IX:Beneficiaries households

Ward	HHs	Population
6	5	3,367
7	1,119	9,823
8	5	3,025
9	6	4,489
Total	**2,798**	**20,704**

Source: Socioeconomic Survey 2017

iii. Caste & Ethnicity

173. The composition of the community by caste/ethnic is heterogeneous. Therefore, diversity of cultures, customs, traditions, norms, and values exists in the project area. The socioeconomic survey of the subproject area also reflects the cross-section of major ethnic groups of the country.

174. The survey revealed that out of total 2798 households, Brahmin/Chhetri are the major groups comprising of 57.3% (1604) households within the service area. Similarly, Janajati/ethnic (Limbu, Magar, Rai, Sherpa, Tamang, Gurung, Newar,etc.) are the second largest group. It comprises 37% (1035) of total household whereas, Dalit and other castes (Madeshi, Musalman, etc.) comprises only 4.9% (137) and 0.8% (22) respectively.

iv. Education and Health

175. **Education:** The institutional data shows that there are total 19 educational institutions including campus for higher education, higher secondary schools , secondary schools as well as primary schools in service area with 9109 people including students, staffs and teachers. Similarly, our survey also shows that almost of all the educational institutions rely on tap water provided by existing water supply system. Likewise, during survey, it has also been observed that all the educational institutions have water sealed latrines .

176. The socioeconomic survey also assessed on the education status of teach household head. The survey revealed that only 3.8 % (107) of household head of the project area are illiterate. Whereas, just literate ratio is 43.6% (1219) and more than SLC to above MA are 35.8% (1002). Details of education status of household head are presented in the table given below:

Table V-X:Education Status of Household Head by Ward

S.N.	Education	Ward				Total	%
		6	7	8	9		
1	Illiterate	25	35	20	27	107	3.8
2	Literate	236	462	180	341	1,219	43.6
3	Primary	29	46	64	26	165	5.9
4	Secondary	86	95	76	48	305	10.9
5	SLC	60	182	66	72	380	13.6
6	Intermediate	46	139	52	37	274	9.8

S.N.	Education	Ward				Total	%
		6	7	8	9		
7	Bachelor	30	104	28	46	208	7.4
8	MA	17	52	21	27	117	4.2
9	Other	0	4	6	13	23	0.8
	Grand Total	529	1,119	513	637	2,798	100.0

Source: Socio-economic survey 2017

177. **Health:** The socioeconomic survey also revealed that medical facilities for diagnosis and treatments are available in the service area. There is one district hospital with 50 bed capacities & 56 staffs. Similarly, there is also another hospital called Sing Fing Hospital with 15 bed capacities and 27 staffs. Similarly, some polyclinics, pharmaceutical stores and medical shops are also available in Ilam Bazaar area.

178. The survey revealed that cases of waterborne diseases such as diarrhea, dysentery, stomach aches and skin disease etc. are found to be very few. Similarly, it has also been observed that the cases of mortality by water related diseases are nil. The information realted to water borne and communicable disease was crossed checked by visiting hospital and health posts within the service area. According to the obtained information, out of 165 sampled population,only 0.20%(25) population suffered from diarrhea whereas 0.50% (63) suffered from dysentery. Similarly, about 0.7% (77) suffered from other diseases such as skin diseases, stomach pains, fever etc.

v. Economic Activities

179. The economy of the municipality is extensively agrarian although most of the households in the project area depend on more than one occupation. During the household survey of the project area, the detailed data has been collected regarding the major occupation and economic activities of all the households. The survey shows that out of total 2798 households, the highest number of population, i.e., 45.20% (1264) are engaged in Agriculture, whereas 18.20% (508) population depend on the business and 17% (476) of the population are engaged in service (either government or private). Similarly, about 0.9% (25), 6.1% (171) and 6.6% (184) of total household head are dependent upon industry, remittance and labour respectively while only 6.1% (170) household heads are involved in other miscellaneous occupations.

180. Ilam is known for its six "A"s: are Alu (Potato), Olan (Milk), Alainchi (Cardamom), Aduwa (Ginger), Amriso (Broom Grass), and Akabare khursani (Round Chillies),etc. although tea, bamboo, flowers and silk are also produced in Ilam. Agricultural commodities helps to increase the Agricultural Gross Development Product. Beside these, the tourism sector also contributes in the economy of Ilam. New Hotels are increasing in Ilam due to upgraded tourism business. There is also practice of operating local market place which is locally called “Haat Bazaar”, on Sundays and Thursdays every week in Ilam Bazaar.

181. There are about 22 hotels/lodges in the project area. The existing financial institutions are Agricultural Development Bank, Nepal SBI Bank, Century Bank, Machhapuchhre Bank, Excell Development Bank etc. and various cooperatives.

vi. Income Level and Poverty Conditions

182. As it has already been mentioned that the survey revealed that the main sources of household income of the service area are agriculture, business, service,remittance, labour and industry. Out of 2798 households, 40.9% (1145) households have a monthly income of the range (Rs. 20,001- Rs.50,000) and about 26.10% (729) households have a monthly income of the range (Rs.10,876 - Rs.20,000). Likewise, the survey also shows that 8.8% (247) of households are earning more than Rs. 50,000 and 16.5% (462) HHs are earning in the range (Rs. 7501-Rs.10,875). Similarly,only 7.7% (215) of total households fall under the poor category as they are only earning less than Rs 7,500 per month. The table given below gives details on the distribution of mean monthly household income.

Table V-XI: IncomeLevel ofHouseholdsby Ward

S.N.	Income LevelRange	Ward				Total	%
		6	7	8	9		
1	<Rs.7,500	59	96	23	37	215	7.7
2	Rs.7501-10,875	92	208	84	78	462	16.5
3	Rs.10,876-20000	129	225	111	264	729	26.1
4	Rs.20,001-50,000	227	467	248	203	1,145	40.9
5	>Rs.50,000	22	123	47	55	247	8.8
	Grand Total	529	1119	513	637	2,798	100

Source: Socio-economic survey 2017

vii. Monthly Expenditure Details

183. The socioeconomic survey has also assessed the details on the monthly expenditure of each households of the service area. The survey revealed that among 2798 households, 10.50% (293) HHs expend less than Rs. 7500 per month. Similarly, 31.0% (866) households have monthly expenditure level of the range (Rs. 7,500-10,875) whereas 34.10% (955) of household's expenses are in the range of Rs. (10,876 to 20,000). Likewise, about 22.90% (641) of total households expend within the range (Rs 20,001-50,000) per month. Similarly only 1.50% (43) of household's expenses are more than Rs. 50,000. Hence, it is found that expenditure level is less than income level of households within the service area. So, it can be assumed that capacity for upfront cash contribution and affordability of community for regular tariff collection after implementation seems high. Details of monthly expenditure level are presented in the table given below:

Table V-XII: Expenditure Level of Households by Ward

S.N.	Expenses	Ward				Total	%
		6	7	8	9		
1	<Rs. 7,500	76	115	34	68	293	10.5
2	Rs. 7501-10,875	130	314	186	236	866	31.0
3	Rs. 10,876-20,000	193	339	209	214	955	34.1
4	Rs. 20,001-50,000	123	332	75	111	641	22.9
5	>Rs. 50,000	7	19	9	8	43	1.5
	Grand Total	529	1119	513	637	**2798**	**100**

Source: Socio-economic survey 2017

viii. Willingness to Pay

a) Monthly Water Tariff

184. The sampled survey was carried out to observe the response of the community towards the willingness to pay for monthly water tariff. As per the findings, out of total 140 sampled households, 57.1% (80) households prefer to pay monthly water tariff from Rs. 151 to 200 whereas about 12.90% (18) of households prefer to pay tariff from Rs. 201-250. Similarly, another 15.0% (21) of households are willing to pay between Rs. 251-300 per month. Likewise, the survey also shows that only 5.70% (8) of HHs are willing to pay from Rs. 301 to Rs.350 while only 4.3% (6) households are willing to pay between Rs. 351 & Rs.400. The survey also shows that only 1.4% (2) and 3.6% (5) households are willing to pay between Rs. 401 & Rs.450 and more than Rs 500 respectively. Details information about willingness to pay monthly water Tariff is presented in the table given below:

Table V-XIII: Willingness to pay for monthly tariff by Ward

S.N.	Tariff Range	Ward				Total	%
		6	7	8	9		
1	>Rs. 500	0	2	0	3	5	3.6
2	Rs. 401-450	0	2	0	0	2	1.4
3	Rs. 351-400	0	6	0	0	6	4.3
4	Rs. 301-350	1	3	0	4	8	5.7
5	Rs. 251-300	3	13	2	3	21	15.0
6	Rs. 201-250	4	9	1	4	18	12.9
7	Rs. 151-200	14	28	24	14	80	57.1
	Grand Total	22	63	27	28	140	100

Source: Socio-economic survey 2017

b) Up-front Cash Contribution

185. To assess details on willingness to pay for upfront cash contribution, the detailed soioeconomic survey was carried out. As per the survey, 98.03% (2743) of total 2798 HHs showed willingness to pay 5% up-front cash contribution for the proposed project. That means only 1.96% (55) of total 2798 HHs seemed unwilling for upfront cash contribution. It shows that most of the HHs are ready to contribute required upfront cash so far. Similarly, most of the poor HHs has also shown interest towards this project and willingness for cash contribution even there is provision of free tap connection to poor household. This indicates the longing, the people of the project town have for the proposed project.

ix. Affordability

186. The study has also assessed affordability of community in terms of monthly income level for expense on water supply & sanitation service. Hence, while assessing the income level of households, it has been observed that about 7.70% (215) of 2798 households falls below poverty level as per the implementation guidelines (Income< 7500 per month).This means more than 85% of households can afford monthly water tariff and contribute for up front cash. Hence, afffordability of the community has been obseved as encouraging and positive towards the program.

187. The WUSC can manage provision of subsidy to poor households for regular monthly tariff assessing the economic condition and affordability

x. Community Infrastructures

a) Existing Water Supply Condition

1. Existing Water Supply Service

188. Ilam had a facility of piped water supply system since 1937 A.D. This is still the major water supply system in the Municipality, which collects water from two sources (Gitang Khola and Bhandi Khola). It has been expanded up to four times to meet the growing water demand of the municipality. DWSSM, JICA, WSSDO and Ilam Municipality were involved in the expansion of the system at different phases.

189. At the very beginning, Mahabir Shamsher Rana, the then BADA HAKIM (chief of an area), built a water supply system with five taps to supply water to government offices, the police, and the jail. The system obtained water from the source of Bhadi Khola located 16 km from the municipality and water was collected in 3 reservoir tanks, each of 5,000 liters capacity. Ilam continued to get water through the same system for several years even after the declaration of Ilam as a municipality in 1958. In 1978, DWSSM improved the existing system by increasing the size of the transmission line to increase the flow of water. Later in 1991/92, JICA improved and expanded the system by increasing the size of the transmission line, expanding distribution pipe network and building new reservoir tanks.

2. Source Description

190. Till 1998 A.D., Bhandi Khola was the only source for the existing water supply system. With the increasing population pressure and expansion of the municipality, Bhandi Khola source befitted insufficient to meet the increasing demand for water. In 1998 A.D., WSSDO Ilam tapped new water source at Gitang Khola, which is located at former Maimajhuwa VDC while presently, it falls under Sandakpur rural municipality. It is around 31 km far from Ilam.

191. At Municipal level, currently, there are two sub-systems that includes Major System and Minor System. The major system is the one which collects water from the two major sources (Bhandi Khola and Gitang Khola). The details of major sources which, can be used in the upcoming project have been presented below in a tabular form.

Table V-XIV :Existing Major Source Details

Particulars	Source1	Source2
Name of the Source	BhandiKhola	Gitang Khola
Former Location	Sumbek -2	FormerMaimajhuwa5
Present Location	WN2of Ilam Municipality	
Type (Spring/Stream)	Stream	Spring
Source yield(lps)	5lps	16lps

Source: Detailed Engineering Design Report, 2017

192. Similarly, minor systems consists of nine local sources located within the municipality. It is estimated that the Municipality has been consuming 3.366 lps from these minor sources altogether. However, all these minor sources were not measured in recent years and are said to be decreasing.

Table V-XV: Existing Minor Source Details

S.No.	Local sources	Location	SourceYield (lps)
1	Kharka	8	0.071
2	Singhbahini	9	0.33

3	Aitandhara	8	0.18
4	Bhalubanse	9	0.53
5	Sisne	9	0.91
6	Chiyabari	9	0.53
7	Devithane	9	0.2
8	Jordhara	9	0.39
9	Sukilumba	9	0.225
		Total	3.366

Source: Detailed Engineering Design Report, 2017

3. Transmission Lines, Distribution Lines and Storage Capacity

193. The water from Gitang Khola is collected at a connection chamber at Bhandi Khola source through 18 km transmission line of 110/125 mm dia and PE/GI pipes. The water from Bhandi Khola source is mixed here and is supplied to Water Treatment Plant at Charkhande through 13 km transmission line of 150 mm diameter GI pipe. The total transmission pipeline is about 31 km under the main system. WSSDO has laid 20 km of new PE lines from Gitang Khola since last six years. After the PPTA study, the municipality is laying new transmission line from Gitang Khola to existing WTP to draw about 16 lps design as recommended in the PPTA report.

194. A few years back (2014 A.D.) WSSDO completed construction of a WTP at Charkhnade, which covers seven ropanis (0.36 ha) of land. It consists of a sedimentation tank (ST); horizontal roughening filter (HRF) and a slow sand filter (SSF). It is designed for 25 lps covering both sources Bhadi Khola and Gitang Khola. Reportedly, the design has been done in such a way that the water from the Bhandi source is supposed to pass through the horizontal roughing filters (HRF) and the slow sand filters (SSF) only as the source is a spring with less turbidity. But the water from Gitang Khola needs to be treated by the sedimentation tank (ST), HRF and SSF consequently as the water is from a stream. And the design envisaged laying of the separate transmission line for Bhandi Khola source. But in reality, a single transmission line conveys water from both sources to the WTP which overloads it. Moreover, the quality of sand used in WTP is reported of poor quality, which makes the WTP operation poorly. There is a disinfection unit, but it is not in operation.

195. The water from the WTP is supplied to the consumers through three different sub-systems. They are Gadi sub-system (6.06 km); Shikhar Nagar sub-system (8.58 km) and Gumba Danda sub-system (3.84 km). Through these sub-systems pipe network, the water received from the WTP is collected in service reservoirs and supplied to the consumers.

196. The cumulative storage capacity of the existing system is 1005.5 m^3. Capacity of the redundant and under construction reservoir has not been considered. The storage capacity is very high as compared to drawing discharge. The storage capacity is more than 58% of the daily supply. The details are tabulated below

Table V-XVI:Existing Storage Reservoir Details

SN	Name	Location	Capacity m^3	Yearof Constructio	Type	Remarks
1	GumbaDanda	INP-WN 6	60	2000 A.D.	RCC-R	Operating
2	GadhiBarrack	INP-WN 6	48	1977 A.D.	StoneMasonry	LeakingNon-Operating
3	ShikharNagar	INP-WN 7	165	1979 A.D.	StoneMasonry	Old but Operating

SN	Name	Location	Capacity m^3	Yearof Constructio	Type	Remarks
4	ShikharNagar	INP-WN 7	0	1983 A.D.	StoneMasonry	Redundant
5	ShikharNagar	INP-WN 7	38	1995 A.D.	StoneMasonry	Operating
6	ShikharNagar	INP-WN 7	42	1998 A.D.	StoneMasonry	Damaged
7	ShikharNagar(JICA)	INP-WN 7	360	1991 A.D.	FiberGlass	Operating
8	MilanKendra(JICA)	INP-WN 7	87.5	1991A.D.	FiberGlass	Operating
9	Tundikhel(JICA)	INP-WN 7	125	1991 A.D.	FiberGlass	Operating
10	CampusDanda	INP-WN 7	80	2001 A.D.	RCC-R	Operatingbut
11	GadhiBarrack	INP-WN 6	0	2017 A.D.	RCC-C	UnderConstruction
		Total	**1005.5**			

Source: Detailed Engineering Design Report, 2017

197. Apart from these reservoirs of the main system, there are about seven reservoirs served by the local sources having a cumulative capacity of 193 m^3. The largest reservoir is of about 60 m^3 and is located at Sisne of Chiyabari Mul.

198. Under the main system, the water is supplied from these service reservoirs to the consumers through six distribution systems, which are named after the RVT location. They are Gumba Danda, Gadi, Shikhar Nagar, Milan Kendra, Campus and Tundikhel distribution systems. Gumba Danda, Gadi and Shikhar Nagar distribution systems receive water from the WTP at Charkhade through the individual pipeline. The other distribution systems (Milan Kendra, Campus, and Tundikhel) receive water from the Shikhar Nagar RVT. It is estimated that the total length of the distribution lines is about 24 km. They are of GI, DI and PE. In general, they have been laid along the roads and are exposed. The existing distribution pipelines are very old and unable to supply water in sufficient quantity in many areas. This has encouraged people to take direct connections with the service reservoir. As a result, there are numerous spaghetti connections all along the city. It makes it difficult to quantify the actual length of the distribution system.

199. Currently, about 2,985 households (including offices and institution) have been connected to the existing systems managed by the Municipality. Till date, 2,500 HHs have been registered as consumers under the main system, whereas 505 HHs are under local sources. Similarly, there are seven community taps and two public taps to serve the poor community, whereas all others are private connections.

200. It is reported that the existing system has been providing 864,000 liters per day, i.e., ten lps in the dry season, which is in actual, not formally measured. In reality, the total production, distribution, and losses of water of the existing system are not known.

4. Coverage

201. The main system which collects water from the two major sources (Bhandi Khola and Gitang Khola) has been providing water services to the core area of Municipality. The core area of the municipality is a complete area of WN 7 and a partial area of WN 9, whereas local sources are supplying water to the partial area of additional wards (WN 8) in addition to partial areas of WN 9.

202. This shows that the existing piped water supply system serves only three wards of the municipality (WN 6, 8 and 9) or former six wards (WN 1 to 6). Other former wards of the Municipality use tap water through locally managed sources. However, some of the wards,

located at the foothill of the Municipality, are deprived of tap water and are dependent on spouts and direct consumption of water from the river.

5. Service Level and Consumption

203. Due to limited water, the supply is intermittent with 1½ hrs on an alternate day. Moreover, the supply is not reliable as there is a frequent breakdown of the system. The local people, especially business organizations, rely on water supplied by private tankers. No groundwater resources have been used. Currently, the rainwater harvesting system has been installed in three locations, and four are under consideration.

6. Water Quality

204. The WSSDO constructed Water Treatment Plant (WTP) at Charkhade to treat water from Bhandi Khola and Gitang Khola sources. Due to design deficiencies and poor construction, it does not function properly and is out of operation most of the time. There is a disinfection unit at WTP site but is rarely used. So the Municipality is supplying water to consumers virtually without any treatment.

205. The municipality does not have any testing/monitoring facility and trained human resources to conduct water quality monitoring and management programs. Ilam WSSDO has some field testing kits for water quality testing, but they are unused due to the lack of some necessary chemicals and parts. It used to carry out testing of some physical parameters such as turbidity of the municipal supply. Reportedly, a local NGO named Namsaling Community Development Centre (NCDC) carries out water quality test, but reports are not available.

7. Operations Costs & Tariff

206. Ilam WSSDO handed over the water supply system to the Municipality in 1998 A.D., and since then it has been operating it. It constitutes a separate water supply section for the operation of the system. This section is responsible for operation & maintenance of the system and carries out minor repair works. The Ilam Municipality has 93 staffs, out of which 35 are working in this section in different capacities.

207. The Municipality has been operating the main system as well as the local systems and the tariff has been fixed differently for these systems. For the main system, the minimum water tariff rate is NRs. 200 up to 10 m^3 use and NRs. 150 per 10 m^3 for local systems. The details have been presented below in tabular form:

Table V-XVII: Existing Tariff Structure

Water Consumption in m^3	WaterTariffRate(NRs./month)
Up to8	NRs.200
8 to10unit	25/unit
10 to15unit	30/unit
15-20unit	40/unit
20-30unit	50/unit
30 to100unit	55/unit
>100unit	60/unit

Source: Detailed Engineering Design Report, 2017

208. Similarly, the municipality is discouraging non-meter tap by introducing a penalty of a minimum of NRs.5000 at first month for a non-functional meter or tap without a meter. The

consumers have to pay the water tariff within 30 days of the meter reading. A late fee is charged at 35% in the second month and 45% in the third month.

8. Problems of the Existing System

209. The existing system is not able to meet the water demand, supply is intermittent, and the supplied water is of poor quality. The major problems of the existing system are presented below:

- The existing system is about 80 years old. During field study, it has been identified that the existing water supply system is said to be about 82 years old. Despite having been rehabilitated and expanded four times, the system is still not able to meet the current water demand. The expansion work of the existing system lags far behind urbanization and population growth. The demand is roughly four times the supply;The quality of sand in SSF of the existing WTP is said to be poor which results in ineffective operation of WTP. The study also shows that the existing disinfection unit is also not in operation. It is observed that the existing distribution pipelines are very old and unable to supply water in sufficient quantity in many areas. This compelled people to take direct connections with the service reservoir. As a result, numerous distribution mains entangled with each other can be observed to be laid all along the project town.

- The Municipality water supply system consists of one major system with Bhandi Khola and Gitang Khola sources and nine local sources. The yield of the local sources is limited and will not be able to meet the demand of such a large city as Ilam. The yield at Bhandi Khola cannot be increased much. The Gitang Khola has enough water availability, but due to lack of transmission pipeline and public limitation on the quantity of water, the source was not properly utilized. The limitation of some of the existing sources and underutilization of Gitang Khola source are some of the major reasons that the Municipality has an acute shortage of water. Currently, the supply is intermittent.

- The Municipality has been operating the existing system since July 1998. But the limitation on technical know-how, financial resources, and skilled workforce, the Municipality has not been able to operate the system efficiently. The expansion is beyond its capacity in its present form. It is said that 75% of the Municipality problems are related to water supply. On water sector, the Municipality is in the loss. The institution is so weak in operating the system that the local people and the Municipality itself are the not satisfied with the services;

- The Municipality is willing to hand over the operation of the system to an alternative organization, but no such organization exists.
- The distribution pipelines are laid haphazardly with spaghetti-like connections everywhere. The network is so old and under-designed that it can-not convey enough water to meet growing demand. In many places, the land owners do not allow pipelines to be laid in their land. This has created a mentality where everybody wishes to have direct connections from the reservoir itself. The management of these distribution pipelines is considered one of the major problems at present and will be in future during implementation of the project;
- The existing Water Treatment Plant (WTP.) is hardly in operation. As a result, the supplied water is not treated, and the water is supplied as it comes from the sources.

b) Existing Sanitation Situation

1. Sanitary Facilities

210. The survey has revealed that majority of the households have household latrine facilities within the project area. Out of total 2798 households, about 98% (2743) of households have latrine facilities, and only 2% (55) does not have latrines in their house.

211. The survey also shows that about 72.20% (2021) households have pour flush latrine whereas 12.20% (341) households have pit latrines. About 9.2% (258) have ventilated pit latrine whereas 4.4% (123) of the households are using cisterns flush type of pit latrine as shown in the table given below

Table V-XVIII:Type of Toilets in use in Project Area

S.N.	Type of Toilet	Ward No.					%
		6	7	8	9	Total	
1	No Toilet		11	16	28	55	2.0
2	Pit Toilet	36	159	7	139	341	12.2
3	Ventilated Pit Toilet	5	39	50	164	258	9.2
4	Pour flush	485	811	438	287	2,021	72.2
5	Cistern Flush	3	99	2	19	123	4.4
	Grand Total	**529**	**1119**	**513**	**637**	**2,798**	**100**

Source: Socio-economic Survey, 2017

212. The existing latrines in the houses as well as in the schools are not maintained properly. The community has very limited knowledge on the use of sanitary latrines and personal hygiene, especially in the city periphery.

2. Drainage Facilities

213. There is no proper drainage system for storm water as well as for the domestic sewage in the Project area. As the terrain is mostly steep, people are less concerned about storm water drain. This information was collected as it can be useful for resolving drainage problem that may arise during pipeline excavation works. Other in-depth information regarding this issue were not collected as this does not fall under the scope of the project.

3. Wastewater Management Practices

214. There is no sewerage system in the project area. The socioeconomic survey revealed that wastewater from each individual is managed on their own within the house. The survey shows that 98% of 2798 HHs have their own toilets. Similarly, there is no wastewater treatment plant within the Municipality to treat domestic sewage/septage. Likewise, the survey also shows that 99% of the sampled HHs showed interest in improving the septage management system and are interested to pay for it. However, this issue does not fall under the scope of the proposed project. Hence, this will not be considered in the design of the proposed project.

4. Solid Waste

215. The major sources of waste generation in Ilam Municipality are households, hotels, hospitals, vegetable and fruits market, meat stores, groceries, clothing/ fancy stores/tailors etc.

The survey revealed that out of 140 sampled households, 88.57% (124) of households are disposing of domestic solid waste in pits near to the house, 7.14% (10) of households use private collectors and only 1.43% (2) households prefer to dispose solid waste either at pit or container managed by municipality. It was observed that the respondents have sufficient knowledge about improperly managed solid waste that may affect public health and the surrounding environment. There has been no study about types and volume of solid wastes. The details on the practice adopted by the people of the project town for the disposal of solid waste is given in the following table.

Table V-XIX: Solid Waste Management Practice

S.N.	Waste Management Practice	Ward				Total	%
		6	7	8	9		
1	Pit Near to House	19	54	26	25	124	88.57
2	Private Collector	3	5	1	1	10	7.14
3	Pit/Container managed by Municipality	0	0	0	2	2	1.43
4	Others	0	4	0	0	4	2.86
	Grand Total	**22**	**63**	**27**	**28**	**140**	

Source: Socio-economic survey, 2017

216. However, this solid waste issue is not covered under the scope of the proposed project. The above given information on solid waste is just to assess the existing condition of the project town. Nonetheless, this information can be useful for the waste management during project construction period.

5. ODF Situation in Service Area

217. Ilam Municipality has already been declared as Open Defecation Free (ODF) area. The newly formed municipality with merged former VDCs have already been declared as ODF area on different dates. They are tabulated below:

Table V-XX: ODF Details of the project town

S.N.	Name of Municipality/VDC	ODF Declaration Date
1	Former Ilam Municipality	2071/01/25
2	Former Sakhejung VDC	2069/09/02
3	Former Sumbek VDC	2070/11/14
4	Former Puwamajhuwa VDC	2070/04/10
5	Former Barbote VDC	2070/06/11
6	Former Godak VDC	2071/01/31
7	Former Soyak VDC	2071/02/21
8	Former Siddhithumka VDC	2071/03/17
9	Former Sangrumba VDC	2071/01/14

Source: Socio-economic survey, 2017

218. This indicates that people of the project town are quite aware about the sanitation practice. However, the proposed project expects to strengthen the existing improved sanitation condition of the project town further through the provision of public toilets.

c) Local Institutions

1. Existing Institutional Situation

219. The main institutions involved in the water supply and sanitation field are DWSSM,WSSDO, Ilam Municipality, Nepal Water Supply and Sewerage Corporation (NWSC),

JICA, SEAM-N, NCDC, NRCS and some others. NWSC in September 2013 approached the Municipality to operate the system, which has not materialized. JICA provided technical and financial assistance to expand the system during 1991/92. SEAM-N provided suction tanker and other support mainly to improve the sanitary and environmental condition of the area. Some local NGOs including NCDC, NRCS, and others have been implementing community-based rural water supply projects in the area and active in sanitary improvement activities. The Ilam branch of (Federation of Water Supply and Sanitation Users Committee Nepal (FEDWASUN) is active in carrying out different activities to increase the community participation on these projects.

220. DWSSM implemented an Ilam Water Supply Improvement Project in 1981 and again supplemented discharge from Gitang Khola in the system in 1998. It constructed Water Treatment Plant in Charkhade. The WSSDO Ilam prepared Detailed Engineering Study and Design of Ilam Water Supply Project Rehabilitation in 2012. Based on this report, it has been laying transmission line with an estimated investment of about NRs. 5 million per year. It has been providing guidance, supervision, and assistance for major repairs. It has been providing both financial and technical support for large-scale maintenance and providing pipes, bleaching powder and human resource as and when needed basis. The Ilam WSSDO has facilitated the development of this small town water supply subproject.

221. With formal agreement from WSSDO in 1998, Ilam Municipality has been managing the existing system. It is the only operator of the existing system, which includes main system (Bhandi Khola and Gitang Khola sources) and nine local sources. It has a separate section with specified responsibilities. It has been collecting water revenue and spending on the sector to maintain the system. It prepared Water Supply Management Guidelines in 2009 and had been operating the system following this document.

2. Water Supply and Sanitation User's Association

222. The WUSC was registered in Water Resource Committee, Ilam as per the Water Resource Act-2049 and Water Resource Rules, 2050. It is mainly responsible for the effective management and improvement of the exisitng water supply system in Ilam bazaar.

223. The name list and position of the existing WUSC are given in the table given below:

Table V-XXI: Members of Ilam Water Supply Users and Sanitation Committee

S.N.	Name	Position
1	Mr. Kedar Thapa	Chairperson
2	Ms. Shanta Basnet	Vice Chairperson
3	Mr. Tilak Bahadur Thakuri	Secretary
4	Mr. Chhabilal Achraya	Treasurer
5	Mr. Rupdhan Rai	Members
6	Ms. Susila Sapkota	Members
7	Mr. Dhan Bahadur Thapamagar	Members
8	Mr. Rudra Sampang	Members
9	Mr. Indra Ghimire	Members

Source: Socio-economic survey, 2017

224. It is intended that the WUSC will assist the PMO to implement the proposed project and it will operate and maintain Ilam water supply system to provide regular and quality drinking water to the consumers.

3. Organization Structure of operators of Existing System

225. The existing Ilam Bazaar Water Supply and Sanitation Committee consist of nine members representing from various clusters within the service area. The executive committee consists of 7 male and 2 female members and one female member has been working as position of vice chairman in key executive post of WUSC. According to the caste/ethnicity status of WUSC body, Brahmin/Chhetri and Janajati groups occupy 3 and 6 respectively.

226. The organization structure of the office of the Ilam Municipality has been presented below, which shows that there is a separate section “Water Supply Management Section”. This is shown in the figure given below:

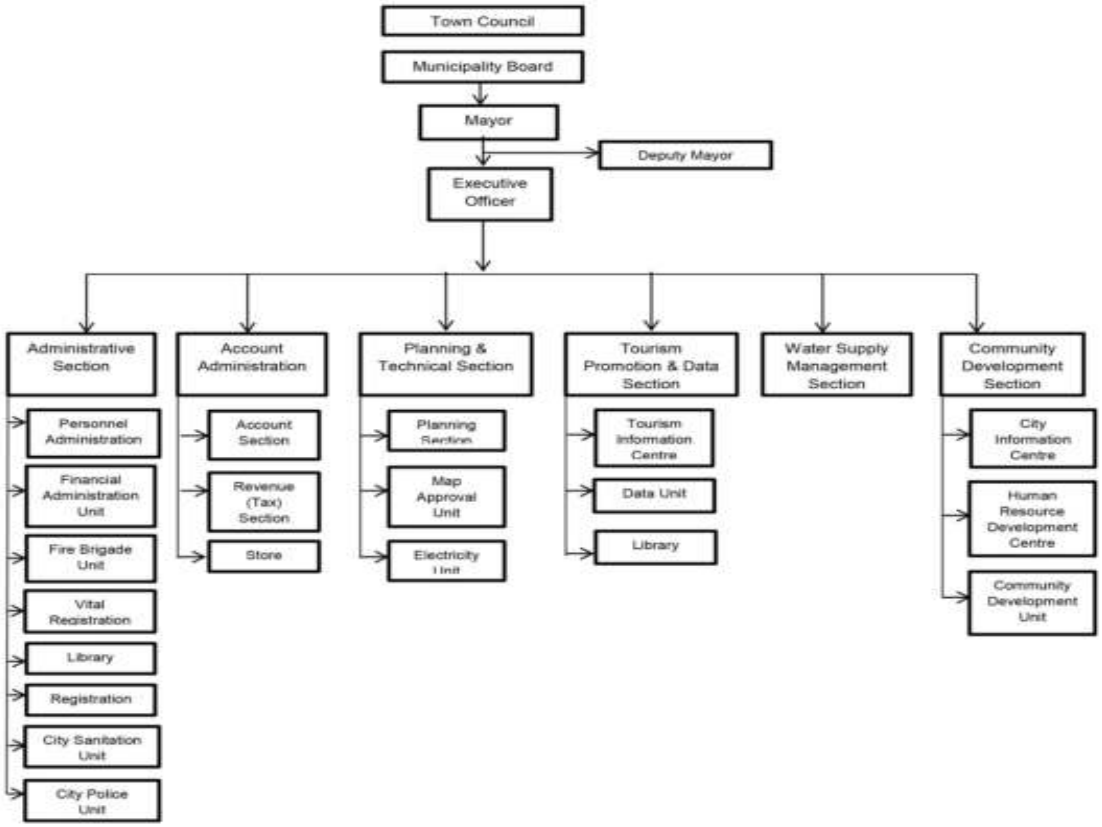

Figure V-I: Organizational Structure of Ilam Municipality

VI. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION/AUGMENTATION MEASURES

227. The anticipated environmental impacts are mainly categorized into two viz., Beneficial Impacts and Adverse Impacts on the basis of its negative and positive significance. This is then further categorized into four impacts that includes i) Impact on Physical Environment, ii) Impact on Biological Environment, iii) Impact on Chemical Environment and iv) Impact on Socio-economic Environment, based upon the effects on the existing environment. These impacts are sub divided into three categories based upon the project phase that includes i) Design Phase, ii) Construction Phase and iii) Post Construction (Operation & Maintenance) Phase. These impacts are discussed below in detail.

A. Beneficial Impacts

228. The development of water and sanitation facilities will have numerous beneficial impacts on individuals as well as to the entire community. Availability of clean and adequate drinking water and sanitary facility are basic human needs. Also, any development efforts aimed at improving water and sanitation needs of an area will significantly contribute towards improving the quality of life of that area. Some of the major beneficial impacts of the project are categorized below:

i) Impact on Socioeconomic Environment

a) Construction Phase

1) Employment Generation

229. The project provides direct employment opportunities to the local people of the project area. The construction activities of the proposed project offers the locals a grand opportunity to be engaged in the proposed project activities as either skilled or non-skilled workers in terms of their proficiency. The main target group for this benefit is People relying on daily wages. The socioeconomic survey shows that only 6.6% (184) of total 2798 households have to rely on labour/daily wages. Hence, this project will be beneficial to this 6.6% of total households. Hence, this project is beneficial to this 6.6% of total households. The amount of money earned by the local people somehow increases the local economy thereby reducing the chances of seasonal migration of the local people depending upon daily wages works to survive. To augment such benefits, priority is given to employing local laborers as far as possible.

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

231. The enhancement measures for this impact include;

- Recommend contractor to employ local people by giving high priority to women and under privileged group as far as possible.
- Ensure equity in provision of wages to both male as well as female labors.

2) Skill Enhancement

232. The construction of the project not only provides direct employment opportunities but also ensure the transfer of skills and technical proficiency to the local workforce. The project activities such as construction of intakes, treatment plant, valve chambers, buildings, public

toilets etc. will provide transferable skills. In future, these skills can be a plus point for the locals in any relevant work as such. Hence, this benefit is targetted to the local people relying on daily wages and those to be involved in labor works of this proposed project.

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

234. The enhancement measures for this impact include;

- Making a proper work plan and code of conduct during the construction period.
- Provision of regular hands on training to the workers during the project construction period

3) Local trade and business opportunity

235. The proposed project directly adds in building business opportunity within the area. As construction work involves a lot of human resources, some grocery stores and agriculture & livestock products may gain a momentum in the vicinity of the construction site. This in turn boosts the local trade and business sector. Similarly, the procurement of locally available construction materials helps to improve the local trade and business opportunity. The main target group for this beneficial impact is local people involved in local business sector. The socioeconomic survey shows that about 18.20% (508) and only 0.9% (25) of total 2798 HHs are involved in business and industry sector respectively. Though the target group quantity is not so significant, the enhancement of local trade & business opportunity is fruitful to these people. This can further boost the local trade & economy.

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

237. The enhancement measures for this impact include;

- Recommend contractor to give priority to the local products during procurement of construction of materials.
- Priority is given to local services like grocery stores, tea shops, hotel & restaurants etc. during the entire construction period.

b) Operation Phase

1) Improved health and hygiene

238. Deteriorating water quality and unsanitary conditions are often the causes of waterborne communicable diseases. The socioeconomic survey revealed that the cases of waterborne diseases such as diarrhoea, dysentery, stomach ache and skin disease etc. are found very few in numbers. Similarly, cases of mortality by water related diseases are nil. However, it is not certain that this condition will be well maintained in the future too. The provision of water treatment plant under the proposed project components provides solution to this uncertainty. After the implementation of the project, easy access to safe & potable water helps to reduce the chance of occurrence of water-borne communicable diseases within the project area in the future. This also helps them in bringing a decrease in medical expenses that may require to be incurred if any incidence of water borne diseases is observed.

239. Similarly, the proposed project also ensures improved hygiene of people of the project area through the provision of five public toilets as these sanitation components inculcate good sanitaton behaviour of people and contributes towards betterment of sanitation facilities.

240. As this proposed project aims to provide safe, reliable & potable drinking water supply services and sanitation services through provision of public & institutional toilets to the proposed service area of the project town, the main target group of this beneficial impact are the beneficiaries or people residing in the service area of this proposed project.

241. The impact is thus direct in nature, local in extent, high in magnitude and long-term in duration.

242. The enhancement measures for this impact include;

- Regular maintenance of the water supply components for smooth operation of the project and for making benefits intact.

2) Increased economic opportunity

243. Reliable Water Supply System is one of the most important infrastructures for the urban development. Hence, this proposed project increases rural-town migration due to availability of better infrastructures. This boost economic level of the town. The increased economic level increases the value of the land, thereby uplifting the economic status of the local people.

244. These benefits can be maximized by ensuring regular maintenance of water supply and sanitation components and by promoting land development activities in the area. The main target group for this beneficial impact are people of the service area involved in business & industry.

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

246. The enhancement measures for this impact include;

- Ensuring regular maintenance of the water supply components
- Promoting urbanization through proper land development activities in the area.

3) Social Empowerment

247. Social Empowerment refers to the process of self empowerment enabling to overcome the sense of powerlessness in the society. This covers Gender Equity, Women's Participation and Social Inclusion. The proposed project enhances this social empowerment through various capacity building programs. Gender Inequality that is still prevailing within the project town is expected to be eliminated through the implementation of the proposed project.

248. The scoioeconomic survey revealed that major household works such as cleaning of houses, washing clothes, child care, cooking, rearing animals, and fetching drinking water is considered as work of women. As per the sampled household survey carried out in 2017, 57.65% of female are observed to be involved in water fetching & storage and 42.35% of male are observed to be involved in this activity. This indicates that women are more responsible for fetching water in comparison to the men. As the proposed project aims to provide water supply service to each household through private connection, easy access to safe & potable water through the implementation of this proposed project contributes towards their betterment. It is because the time that may be spent for fetching water is saved and utilized in various other

activities. The improved water supply system contributes towards their better health and hygiene through the provision of safe & potable water. This in turn ensures the maintenance of health & hygiene of other family members as the sampled survey also shows that 69% of female are involved in taking care of family members especially children and senior citizens.

249. The proposed project also encourages women participation in the project related activities by enforcing at least two women in water user's committee. As per the ***Table V-XXI*** given above, one female membes has been appointed as general member and one as Vice Chairperson of Ilam Water Supply Users & Sanitation Committee. This type of involvement in WUSC boost their confidence and decision making ability. Similarly, it also provide them opportunity to actively participate in meetings, discussions and many other relevant programs.

250. The socioeconomic survey revealed that in comparison to men, women have much more work load regarding household activities as the gender inequality is still existing in urban areas like Ilam Municipality. Hence, women of the project area are mostly entangled within the household activities. The involvement of women members in WUSC can be the exemplary effort to encourage other women to come out of the cocoon within which they have been entwined by household activities for decades and isolated from the scoiety. The proposed project gives emphasis on various activities like stakeholder consultations, meetings etc. to persuade women to actively partipate in project related activities.

251. The proposed project also expects to enhance the condition of underprivileged people (Dalits & Poor People) by making them involved in various programs organized under the proposed project. Hence, this proposed project has also prioritized Social Inclusion.

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

253. The enhancement measures for this impact include;

- Prioritize the vulnerable groups in WUSC along with female groups.

- Involving underprivileged group of people especially women and poor people in various capacity building programs and project related community meetings

254. Overall, the Subproject leads towards improved public health and environment, significantly improving the quality of life of Ilam town residents.

255. The following given table shows the significance of the impacts based on the scoring that has been taken from National EIA Guidelines, 1993.

Table VI-I:Summary of Impact Matrix of Beneficial Issues of the project

Beneficial Impacts	Impact Rating				
	Nature	Magnitude	Extent	Duration	Rating
Construction Phase					
Employment Generation	D	H (60)	L (20)	ST (5)	Very Significant (85)
Skill Enhancement	ID	M (20)	L (20)	LT (20)	Very Significant (80)
Local Trade and Business	D	M (20)	L (20)	LT (20)	Very Significant (80)
Operation Phase					
Improved Health and Hygiene	D	H (60)	L (20)	LT (20)	Very Significant (100)
Increase Economic Opportunity	ID	M (20)	L (20)	LT (20)	Very Significant (80)
Women empowerment	ID	L (10)	L (20)	LT (20)	Significant (50)

Source: National EIA Guidelines, 1993 & IEE Study 2018/019

Note: Scoring is done based on following;

Nature of Impact: D = Direct; IN = Indirect;

Magnitude, H = High (60); M = Medium/Moderate (20); and L = Low (10)

Extent, R = Regional (60), L = Local (20); and S = Site-specific (10)

Duration, LT = Long-term (20), MT = Medium-term (10); and ST = Short-term (5)

The points/scoring are taken from the National EIA Guidelines, 1993

Significance of Impact

Total Score: More than 75 : Very Significant

50-75 : Significant

Less than 50 : Insignificant

B. Adverse Impacts

i. Impacts on Physical Environment

a) Design Phase

1) Soil Erosion & Slope Instability

256. During design phase, there is possibility of incorporation of sloped areas due to which construction activities in such area may result in soil erosion and slope instability.

257. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration.

258. The mitigation measures for this impact include;

- Incorporate measures and sites for handling excessive spoil materials
- Incorporate drainage plan in final design

b) Construction Phase

1) Soil Erosion & land surface disturbance

259. Excavation and digging of trenches during construction has the potential to cause erosion and cave in thereby causing soil erosion, silt runoff and unsettling of street surfaces. Unorganized disposal of the excavated earth can disturb the street surface and decrease the value of the area where it is disposed. The activity as such provides discomfort to the road users and inhabitants.

260. Similarly, the proposed project involves the construction of Internal Access Road that includes 100m of gravel road and 100 m^2 of RCC stretches. The construction activities for this may result in Slope Instability and Landslides due to site clearance and earthwork excavation works.

261. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration.

262. The mitigation measures for this impact include;

- Protecting the foundation from damage during backfilling

- Using the right backfill materials
- Compacting the backfill
- Final finishing the subgrade to ensure that water drains away from the foundation

2) Spoil Disposal & Gully Erosion

263. Inappropriate disposal of spoils from the construction activities may result in gullying and erosion of spoil tips especially when it is combined with unmanaged surface water runoff. This leads to destruction of vegetations, damage to agricultural lands and destruction to private property. This affects the people possessing those agricutural lands as well as the anticipated properties.

264. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration.

265. The mitigation measures for this impact include;

- Follow Spoil Management Plan as included in ***Appendix D***.
- Use of excess Spoil or Soil for filling depressed areas or borrow pits wherever possible.
- Appropriate disposal of Spoil at the designated places.
- Spoils should not be disposed on natural drainage paths, canals and other infrastructures.
- Provision of toe walls and retaining walls to protect the erosion of disposed spoils.
- Provision of proper drainage, vegetation and adequate protection against erosion at the Spoil Disposal Site.

3) Air Pollution

266. There can be greater impact on air quality from the inadequately managed or haphazard project activities that includes: (i) earthworks such as clearing, grubbing, excavations, and drilling especially during dry seasons; (ii) demolition works; (iii) stockpiling of natural aggregates, excavated materials and spoils; (iii) transport, loading and unloading of natural aggregates; (iv) movement of construction-associated vehicles; (v) on-site rock crushing and concrete mixing; (vi) burning of firewoods for cooking & heating in work and labour camps; (vii) construction of sanitation components at core bazaar area and (viii) open burning of solid waste by workers.

267. These activities may increase dust, carbon, monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons in the air. This affects the construction workers, people residing in this area and the passers by.

268. The impact is indirect, local to regional in extent, medium in magnitude and short-term in duration.

269. The mitigation measures for this impact include;

- Strict Prohibition of open burning of solid waste
- Watering of dry exposed surfaces and stockpiles of aggregates at least twice daily, as necessary;

- If re-surfacing of disturbed roads cannot be done immediately, spreading of crushed gravel over backfilled surfaces;
- Conduct Air Quality Test for dust nuisance (PM 10 and PM 2.5) at key settlement and market area, school, hospital at least once in a month during dry working season (Jan-June).
- Use of Construction/ Transportation Vehicles complying with NVMES,2069
- Regular inspection & maintenance of construction/transportation vehicles
- Supply of clean cooking fuel to workers instead of allowing them to use firewood for cooking

4) Noise Pollution

270. Noise-emitting construction activities include earthworks, rock crushing, concrete mixing, demolition works, movement and operation of construction vehicles and equipment, construction of sanitation components at market area and loading & unloading of coarse aggregates. The significance of noise impact is observed to be high in areas where noise-sensitive institutions such as healthcare and educational facilities are situated. This may affect the construction workers, people residing in this area and the passers by.

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

272. The mitigation measures for this impact include;

- Restricting noisy activities to daytime and overtime work to avoid using noisy equipment;
- Prohibit the use of pressure horn by transportation vehiles
- Conduct noise level test once a year during peak construction stage at location near school, hospital and settlements
- Avoid noise generating activities like excavation works, dismantling for excavation works, loading & unloading of construction materials, noise of material transportation vehicles etc. during school time and at hospital area if any.
- Regular inspection & maintenance of construction/transportation vehicles to ensure the use of Vehicles complying with NVMES,2069 B.S.
- Regular inspection & maintenance to ensure the use of equipments/machinery that comply with applicable emission standards of GoN i.e., National Noise Standard Guidelines, 2012
- Regular inspection & maintenance to ensure the use of Diesel Generators complying with National Diesel Generator Emission Standard,2012

5) Generation of solid waste & waste water from construction sites and worker's camp

273. During construction phase, generation of solid waste & waste water from the construction sites and workers camp are likely to create nuisance in the surroundings. Soil runoff from the construction site may lead to off-site contamination (particularly during rainy season). Similarly, Improper disposal of construction debris may lead to off-site contamination of water resources. Construction activities during construction of sanitation components at market areas may generate construction wastes creating nuisance and hindrance to the surrroundings of busy market areas. Unmanaged solid waste & effluent from workers camp

may contaminate the surroundings. This can affect the construction workers, people residing in this area and the passers by.

274. The impacts are direct in nature, local in extent, medium in magnitude and long-term in duration.

275. The mitigation measures for this impact include;

a) Construction Wastes

- Adopt 3R (Reduce, Reuse & Recycle) concept
- Ensure storage areas are secure, safe & weatherproof.
- Management of reusable wastes
- Sale of Recyclable wastes to scrap dealer
- Final Disposal of Bio degradable solid wastes
- Avoid over ordering of construction materials to the extent possible. This will be challenging, as it requires strong coordination with the concerned contractors, as it cannot be made mandatory. However, it is not impossible too to coordinate with the contractors in this regard.
- Use standard size & quantity of construction materials.
- Construct garland drains to reduce the runoff from the stockpiles.

b) Solid Wastes, Wastewater and Sewage from labour camp

- Adopt Segregation of Solid Waste (3R Concept) based on being biodegradable or non-biodegradable. It is because decomposers cannot break down non-biodegradable wastes and their disposal poses a big problem.
- Manage biodegradable wastes that include food waste, paper waste, biodegradable plastic, etc. by any suitable processes that include Composting & Incineration. If these two processes are not possible then, the wastes shall be managed either by handing over these wastes to the municipality waste collectors who will finally dispose those wastes to the landfill sites of the project town or by disposing those wastes to the burial pits at suitable place.
- Non-biodegradable wastes like glass, plastics & metals shall be managed by reusing them for site use or selling them to scrap dealers instead of disposing them
- Strict Prohibition on open incineration of solid wastes & use of plastic materials to minimize the quantity of plastic wastes
- Construction of the temporary latrines with temporary soak pits & septic tanks within the campsite for proper disposal of sewage
- Provide temporary but proper drainage system for proper outlet of waste water generated from cooking practices adopted by the workers
- Employ local people from nearby villages to maximum extent possible. It will minimize the number of workers residing at worker's camp. Lesser the number of people, lesser will be the solid waste & effluent generated. However, it cannot be made mandatory because availability of local people with required skills will not be ensured at the time of construction.

6) Accidental Leakage or Spillage of Stored Fuel/Chemicals

276. During construction phase, there will be requirement of storage of fuel/chemicals. During the process of storage and handling process, there is possibility of accidental leakage

or spillage of stored fuel/chemicals. If not removed quickly, the spilled chemicals/fuel may be absorbed by the floor.This may lead towards the contamination of soil & water. This will affect the community living around this area.

277. The impacts are direct in nature, local in extent, medium in magnitude and long-term in duration.

278. The mitigation measures for this impact include;

- Provision of well managed storage site
- Organize awareness programs for the workers responsible for handling fuel/chemicals
- Supervise workers to handle fuel/chemicals properly
- Use of spill kit materials to block flow and prevent discharge to nearby water bodies
- Scatter the Sawdust, sand or dry soil over the area of spill and leave for few minutes to soak up the fuel/chemical. So, availability of saw dust, sand or dry soil should be ensured in the store
- Regular Inspection Visit to the storage site to inspect the leakage of the stored container of fuel/chemical

7) Impact on Land Use Pattern

279. The construction of the proposed project components may occupy significant area of the land within the core area. This then affects the current land use pattern as the land to be used for the construction of these components could be used for other purposes like agricultural, residential etc. This effect is direct in nature.

280. As the construction works of the proposed project start, there is possibility of influx of people from the nearby areas of the project town to this project town. This in turn increase the population of the project area which lead towards the change in land use pattern within the core area in haphazard manner. Arable land may be converted to settlement areas. Unstable land may also be used for planned areas. Hapazard cutting of sloped areas may be done to increase settlement areas. The unmanageable land is the main reason behind the destruction of the environment.The effect is indirect in nature and affects the people residing within the core area of the project.

281. The impacts are both indirect & direct in nature, local in extent, medium in magnitude and long-term in duration.

282. The mitigation measures for this impact include;

- Selection of barren and public land only for the construction of project components.
- Avoid the acquisition of private and agricultural land for the construction of project components.
- Monitoring on the haphazard land use & planning by the concerned authority.

8) Disruption to Natural Drainage

283. The pipe laying works along ROW of the public road within the service area of the proposed project may disrupt the existing natural drainage system as the natural drainage flow

may be interfered by the construction activities that includes earthworks, backfilling,stockpiling etc.This can have significant consequences like Localised Flooding, Channel Erosion, Landslides etc affecting the residents of that area.

284. The impacts are direct in nature, local in extent, medium in magnitude and long-term in duration.

285. The mitigation measures for this impact are as follows:

- Avoid the natural drainage pathways for pipe laying works.
- Stockpile the excavated materials at safe but nearby place.
- Restore natural drainage system if the drainage system during construction is blocked.

9) Haphazard Disposal of Dismantled Debris

286. The proposed project also involves dismantling activities for rehabilitation of existing intakes, for pipe laying works and other miscellaneous works. This will result in the generation of dismantled debris.

287. Similarly, after the completion of construction works, the temporary facilities like labour camps, stockpiling sites, temporary toilets etc. needs to be dismantled immediately. The dismantled properties in the form of debris if not properly and instantly disposed off, may create nuisance in the surroundings. This may degrade the environmental quality. This affect the people living nearby the haphazardly disposed places and even the construction workers also.

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

289. The mitigation measures for this impact include;

- Immediate Response on handling of dismantled debris.
- Segregation of Dismantled Debris
- Adopt 3R (Reduce, Reuse& Recycle) concept
- Sale of Recyclable Wastes to Scrap Vendors/Dealers

c) Operation Phase

1) Impact on the Proposed Source

290. The four sources Gitang Khola, Bhandi Khola, Rate Khola and Mewa Khola with sufficient flow is proposed for the project. It is possible that withdrawal of water from these sources may affect the normal source yield and the sources may dry out..

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

292. **Mitigation Measures;** The study shows that as per the design report, the quantity of water to be tapped from the proposed sources will be 4 lps from Bhandi Khola, 16 lps from Gitang Khola, 12.5 lps from Rate Khola and 12.5 lps from Mewa Khola. The source yield of all these sources is more than 15 lps. Hence, it indicates that the proposed project is designed with safe yield and the tapped discharge does not exceed the source yield. This means withdrawal of water from the proposed sources does not have impact on the source yield. However, regular source yield monitoring is recommended.

ii. Impacts on Biological Environment

a) Construction Phase

1) Impact on Flora & Fauna

293. Some of the project components like RVT-1 and Guard House need to be constructed within the community forest area. Hence, the construction works of these components may affect flora & fauna available in that area, however, the effect may be insignificant. Similarly, there is no requirement of cutting trees except clearing of some bushes and shrubs. Similarly, during pipe laying works, some of the top soil may be lost.

294. The construction of Internal Access Road will also have impact on flora through certain loss of vegetation due to clearing activities.

295. Haphazard site clearing, parking, and movement of construction vehicles and equipment, stockpiling,illegal harvesting of forest resources as fuel (NTFP) for cooking by workers and hunting of animals will result in unnecessary loss of vegetation& fauna beyond Project footprints.

296. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration.

297. The mitigation measures for this impact include;

- Replace the excavated top soil to its original position after the completion of pipe laying work
- Re-vegetating disturbed slopes and grounds, as applicable;
- Awareness programs regarding policy related to the conservation of existing flora & fauna, to the workers prior to the construction and the community during various meetings and discussion programs
- Adopt the suitable mitigation measures proposed to minimize noise pollution as mentioned earlier
- Regular Monitoring

2) Impacts on Aquatic Life

298. During construction phase, nearby water bodies may be used by the workers for their daily activities like waste disposal, sanitation activities which may pollute the river quality which in turn lead the habitat of aquatic life towards risk.

299. Similarly, the construction works for the proposed sump wells may also contaminate the quality of exisitng & proposed sources affecting the aquatic habitat.

300. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration.

301. The mitigation measures for this impact include;

- Strict Monitoring on the daily activities of workers and Prohibition on disposal of wastes to the water bodies during construction works at source area.
- Provision of temporary but well-equipped toilets
- Restriction to workers from fishing

- Adopt measures mentioned above for the solid waste management

3) Forest Fire

302. It has already been mentioned that RVT1 and Guard House have to be constructed within the Gumba Danda Community Forest area. During construction of these components, there is greater possibility of accidental forest fire that may be due to carelessness of workers or sudden accidental causes. This forest fire in turn will result in various consequences that includes impact on flora & fauna, destroying of nutrients by the ashes, soil erosion etc.

303. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration.

304. The mitigation measures for this impact include: (i) Prohibition on burning dry grass or debris ; (ii) Prohibition on camp fires & smoking within the forest area to the workers;(iii) Keeping fire fighting equipment stand by within the construction sites; (iv) Provision of safety trainings regarding forest fire to the construction workers prior to construction.

4) Forest Encroachment

305. Due to construction activities, there will be regular inflow & outflow of the people to the forest area. This may result in possibility of encroachment of forest area. This will have direct impact on flora & fauna as their habitat will be disturbed by the forest encroachment. This will also discourage the ability of the forest vegetation to recover. Workers involved in the construction activities may use firewood of the forest areas which is illegal in actual.

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

307. The mitigation measures for this impact include: (i)Strict & Regular Monitoring during the entry of workers for the construction workers, (ii) Mobilization of the concerned community forest groups, (iii) Legal Provision along with imposing fines as punishment for those responsible for forest encroachment & (iv) Provision of trainings to the construction workers to provide support in controlling encroachment.

b) Operation Phase

1) Impact on Aquatic Life

308. The effluent produced from the filter backwashing, if discharged directly into the nearby water bodies, may pollute the water bodies endangering the existence of aquatic lives. This impact can be more troublesome during dry season when the flow is less and self-cleansing capacity of the river will be less.

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

310. The mitigation measures for this impact include:

- Direct discharge of the raw sludge to the water bodies will be discouraged through strict monitoring to the operators involved
- Proper Implementation of Water Safety Plan (WSP)

iii. Impacts on Chemical Environment

1. Construction Phase

1) Impacts on Water Quality of the nearby rivers

311. During construction phase, there is high possibility of nearbyrivers like Gitang Khola, Rate Khola, Mewa Khola, Mai Khola etc. to be polluted due to the chance of disposal of solid wastes by the workers and poor sanitation behavior of the workers. This will lower the water quality of these water bodies.Polluted water bodies will be detrimental to aquatic life as well as to the health of people relying mainly on the river and streams as sources of water for drinking and other domestic uses.

312. Similalrly,some sections of the distribution pipeline will cross water bodies, exposing these resources to risks of pollution caused by poorly managed construction sediments, wastes and hazardous substances

313. The impact is direct in nature, local to regional in extent, medium in magnitude and short-term in duration.

314. The mitigation measures for this impact include:

- Provision of Septage Disposal through construction of toilets with septic tanks
- Disposing of spoils or excess soils as free filling materials as soon as possible
- Locating temporary storage areas on flat grounds and away from main surface drainage routes;
- Shielding temporary storage areas with sandbags
- Adopt measures mentioned above for the solid waste management
- Provision of adequate water supply and sanitation facilities at work sites.
- Strict supervision on the behavior of workers for the waste management as well as sanitation behavior and monitoring the workers to manage the wastes properly.

b) Operation Phase

1) Impact on Quality of Water Stored in Reservoir

315. Irregularity in the supervision of the operation of distribution system may lead to excessive algae growth in service reservoir which may produce toxins reducing the water quality within the reservoir and this may cause serious illness in humans consuming water. The algal growth may also impart earthy taste & odor.

316. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration.

317. The mitigation measures for this impact include:

- Proper Implementation of Water Safety Plan (WSP).
- Removal of Algae grown within the reservoir at regular intervals by the operating team deployed by the WUSC.

2) Impacts on Water Bodies

318. The sedimentation tank requires periodic cleaning through periodic removal of sediments settled down (Raw Sludge) at the bottom of the tank. The removed sediments or sludge from sedimentation tank needs to be properly disposed. But, there is high chance of disposal of sludge directly into the nearby water bodies. This degrades the water quality of the river. This impact can be more troublesome during dry season when the flow is less and self cleansing capacity of the river is less.

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

320. The mitigation measures for this impact are as follows:

- Disposal of raw sludge to the appropriate landfill sites of the proposed project town
- Use of raw sludge as compost for agricultural land
- Avoid direct discharge of the raw sludge to the water bodies through strict monitoring to the operators involved.
- Proper Implementation of Water Safety Plan (WSP).

iv. Impacts on Socioeconomic Environment

a) Design Phase

1) Structural Instability

321. Ilam municipality belongs to hilly region hence, it is prone to seismic activity. As per report on Socio-Demographic Impact Study on Nepal Earthquake 2015 prepared by CDPS (TU), Ilam district is also affected by the massive earthquake that shook various parts of Nepal in April 25, 2015. If certain seismic activity again occurs in the future, this may result in cracking of structure leads to facility failure and public discomfort. Though this impact will be experienced during operation phase, this should be considered during design phase so that such possibility of structural failure can be reduced to greater extent through safe design of earthquake resistant structures.

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

323. ***Mitigation Measures:*** This impact can be mitigated through proper design of structures as per standard and code of practice. PMO, RPMO & DSMC are the main responsible bodies for the adoption of this mitigation measure.

2) Health & Safety of Community & Workers

324. During design phase, if the project components are designed without focusing on the health & safety of community & workers, it can have greater impact on socio-economic environment.

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

326. The mitigation measures for this impact include:

- Training on Community Health & Safety Hazards by DSMC by disseminating information about this through training manuals, photographs & documents related to safety.
- PMO, RPMO & DSMC are the main responsible bodies to carry out the above-mentioned mitigation measures.

3) Damage to the existing facilities

327. During construction phase, if the proposed pipelines interfere any of the existing utilities, there is greater possibility of those utilites getting damaged. This provides discomfort to the people getting facilities from those damaged utilities. Similarly, there is also possibility of some fraud people to take advantage of this impact and may make false claims for damaged utilities. Though this problem appears during construction phase, its mitigation measure should be considered during design phase. Hence, this impact is categorized for design phase.

328. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration.

329. The mitigation measures for this impact include:

- Coordinate with the concerned agencies to finalize the pipe network layout to avoid damage to the existing utilities.
- Design & Locate pipelines away from existing utilities during design as far as possible.
- Provide budget for restoration/replacement of damaged utilities.
- Photographs of construction sites before and after the construction to avoid the false claims.
- Prompt Reinstatement of paved as well as unpaved roads after completion of excavation works for pipe laying.

b) Construction Phase

1) Community Health & Safety Hazards

330. Overall, the communities may be exposed to cross-cutting threats from construction's impacts on air and water quality, ambient noise level; mobility of people/goods/services; accesses to properties/economic activities/social services; service disruptions, etc. Communicable and transmittable diseases may potentially be brought into the community by construction workers.

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

332. The mitigation measures for this impact include:

- Contractor's implementation of EMP
- Adequate lighting, temporary fence, reflecting barriers and signage at active work sites;
- Contractor's preparedness in emergency response;
- Adequate dissemination of GRM and Contractor's observance/implementation of GRM

2) Worker's Health & Safety Hazards

333. Workers may also be exposed to the cross-cutting threats of the impacts above during construction. Inadequate supply of safe/potable water and inadequate sanitation facilities to the worker's camp; poor sanitation practices on site; poor housing conditions; the handling and operation of construction equipment; handling of hazardous substances; exposure to extreme weather and non-observance of health and safety measures, pose additional threats to the health and safety of construction workers. Construction workers may also be potentially exposed to communicable and transmittable diseases in the community and the workforce.

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

335. The mitigation measures for this impact include:

- Submission of Simple OHS plan for employer's approval that involves appropriate health & safety arrangement that includes minimum requirements for various activities like Excavation works, Works within the confined spaces, Use of warning signs, boards & signage, Use of PPE, Accident & Emergency Response and Monitoring & Reporting.
- Comply Labor Act (1992) of GoN
- Train all site personnel regarding environmental health and safety as like in design phase by DSMC & Contractors
- Provide Personal Protective Equipment (PPEs)to workers that includes protective clothing, helmets, goggles and other equipment designed to protect the wearer’s body from injury or infection and ensure their effective usage
- Require workers to wear high visibility clothes
- Exclude public from worksites
- Maintain accident reports and records.
- Make first aid kits readily available
- Maintain hygienic accommodation in work camps
- Ensure uncontaminated water for drinking, cooking, and washing,
- Assure clean eating areas
- Make sure sanitation facilities are readily available
- Provide adequate space and light to the camp site
- Adequate supply of potable water to the camps and good sanitation within camps
- Provide medical insurance coverage for workers
- Provide orientation for guest visitors
- Ensure that visitors do not enter hazard areas unescorted;
- Ensure moving equipment is outfitted with audible backup alarms;
- Hearing protection equipment enforced in noisy environment
- Chemical and Material storage areas need to be marked clearly
- Implementation of Emergency Preparedness Response Plan to mitigate the impacts of flooding problems that includes i) Reporting of Incidents; ii) Investigation of incidents and iii) Prepared for availability of Stretchers, Life buoys, first aiders, first aid kits etc.

3) Traffic Congestion

336. The core Ilam bazaar area may be susceptible to traffic congestion during pipeline laying works as the road of this area is a bit narrower that may provide discomfort to the passer-by & shopkeepers and may obstruct the daily activities of the people living in that area .

337. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration.

338. The mitigation measures for this impact include:

- The trench for pipeline should not be abandoned and the contractor should be recommended to backfill the trench immediately followed by compaction right after completion of pipe laying works.
- Installation of signage at appropriate locations indicating available alternate access routes to minimize traffic disruptions.
- Provision of access to shops and residences using simple wooden walkways.
- Provision of alternative way for vehicular movement and pedestrians if possible
- Follow the Traffic Management Plan especially at Bazaar Areas, the sample of which has been attached in ***Appendix C***.

4) Public Protests

339. Due to traffic congestion, there is high chance of protests by the local people. This may interrupt the construction activities of the proposed project.

340. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration.

341. The mitigation measures for this impact include:

- Public Consultation should be carried out at various stages & locations as per requirement.
- Implement Grievance Redress Mechanism
- Pre-notify the public regarding the construction works that may hinder their daily activities and Coordinate with them properly

5) Disruption to Local Vendor's Business

342. The construction works during pipe laying activities may disrupt local vendor's business as the construction activities may obstruct their customers to have easy & direct access to their shops. This may hamper their daily business activities.

343. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration.

344. The mitigation measures for this impact include:

- Adopt "zero soil" approach thorugh prompt backfilling right after completion of drain construction. In general, execution of excavation works is such that excavtion will be done in a few meters length i.e., 50m at a time followed by pipe laying, backfilling over the pipe and removal of all surplus material from the site.
- Provision of temporary access to the shops through provision of planks

- Pre-notify the vendors regarding the construction works that may hinder their daily activities and Coordinate with them properly.

6) Mobilization of Child Labor

345. During construction period, there is possibility of mobilization of child labor by the contractors which is against the Child Labor Prohibition Act,2000 as child labor deprives children off their childhood and their right to education,health, safety and moral development.

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

347. The mitigation measures for this impact include:

- As the Child Labor Prohibition Act, 2000 states that "No Child having not attained the age of 14 years shall be engaged in works as a laborer" during mobilization, provision for the requirement of submission of the citizenship certificate of each labor,should be made.
- During contract agreement, the agreement by the contractor to follow Child Labor Prohibition Act, 2000 and Child Labour Prohibition Rules & Regulations,2006, should be made.

7) Impact on Sustainability of Works

348. Nepal is a seismic prone country. It is the geographical location of Nepal that makes it extremely susceptible to seismic activity from the nearby Indian and Tibetan plates. Historically, Nepal has been prone to significant disasters resulting in mass destruction and claiming thousands of lives. Most recently, on 25 April 2015, a 7.8 magnitude earthquake struck in Gorkha district that resulted in the loss of life of thousands of people. As per *Nepal Disaster Management Reference Handbook (2017).Center for Excellence in Disaster Management and Humanitarian Assistance,*this devastating earthquake affected over 50 districts in Nepal. Ilam, the project district could not remain untouched from this disaster. Nepal is still experiencing repeated but random tremors of various magnitude. Hence, we cannot ignore the fact that there is high possibility of occurrence of such seismic events in the future that will be experienced in the project town also. If this occurs during the construction period of the proposed project, this may unsustain the project by causing damage to the unsettled/unfinished/uncured and/or completed structures affecting their structural integrity.

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

350. The mitigation measures for this impact include:

- After every seismic event, the contractor must conduct engineering investigation of built structures and implement the necessary corrective actions immediately as a mitigation measure for this impact.
- Prepare Emergency Preparedness and Response Plan

8) Damage to the existing utilities

351. During the construction phase, while excavating for pipe laying works, there is possibility of the existing water supply distribution pipelines getting damaged in a few places

particularly in the market area. Similarly, the existing paved as well as unpaved road will also get damaged. This obviously provides discomfort to the people and people can be deprived of regular facilities they are getting from the existing utilities.

352. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration

353. The mitigation measures for this impact include:

354. If during construction phase, the problem regarding damage to the existing facilities arises, then it can be the fault of the people involved in construction works as this problem has to be considered during design phase. This problem arises only if no carefulness is adopted by the workers and if the pipeline layout drawings prepared during design phase is not strictly followed. Hence, the mitigation measure for this impact is to monitor construction workers to adopt carefulness and to strictly follow the layout drawings.

355. Similarly, during excavation works, damage to the existing paved as well as unpaved roads can be mitigated through reinstatement works. The proposed project has provision for this reinstatement works and the cost estimate has been included in the the detailed design cost estimate of this proposed project.

9) Impact on Downstream Users

356. During construction works at Intake site, there is chance of contamination of the source water due to carelessness in the sanitation behaviour of workers. The consumption of contaminated water may affect the health of the downstream users. However, this impact is not so significant as the socioeconomic study shows that no consumptive use of water has been noticed upto 4 km downstream of the proposed rivers and there is no human settlement area near the proposed sources. This water quality if found altered due to project activities, this can be recovered after certain duration through self purification capacity of the rivers. Nevertheless, as a preventive measure, some mitigation measures can be adopted.

357. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration.

358. The mitigation measures for this impact include:

- Strict supervision on the behavior of workers for the waste management as well as sanitation behavior and monitoring the workers to manage the wastes properly.
- Provision of temporary latrines with basic facilities

c) Operation Phase

1) Occupational Health and Safety Hazards

359. Worker's exposure to, and/or mishandling of chemicals and other hazardous substances pose health and safety hazards.

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

361. The mitigation measures for this impact include;

362. (i) installation of clear, visible signage in premises onsafety measures; and (ii) setting up amechanism for the quick response to spills of chemical and hazardous substances.

2) Delivery of Unsafe Water

363. Unsafe water delivered due to any one or combinations of the following will have impact on public health: (i) accidental human error in chlorine dosing; (ii) accidental spill of hazardous substances; (iii) leaks in the system; (iv) lack of environmental quality monitoring; (v) inadequate maintenance and housekeeping; and (vi) deteriorating quality of groundwater resource without parallel upgrading the water treatment process.

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

365. The mitigation measures for this impact include;

366. (i) ensuring the correct operation of water treatment plant to meet satisfactory water quality; (ii) providing safe storage for chemicals; (iii) ventilation of Housed dosing unit for chlorine and (iv) train operators for handling chlorine for which Chlorine Use Guidelines as included in ***Appendix 6*** will be followed.

3) Impacts on Consumer's Health

367. Irregularity in the supervision of the operation of distribution system may lead to excessive algae growth in service reservoir which may produce toxins causing serious illness in humans consuming water. The algal growth may also impart earthy taste & odor which may create dismay to the consumers and this may result in customer complaints that may lead to protests also.

368. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration.

369. The mitigation measures for this impact are as follows:

- Regular Monitoring by the WUSC
- Removal of Algae grown within the reservoir at regular intervals by the operating team deployed by the WUSC.
- Monitoring & Proper Implementation of WSP.

4) Impacts on Downstream users

370. Consumption of water from the proposed source may lessen the quantity of water at the downstream due to which downstream users may be deprived of sufficient quantity of water they have been drawing regularly from the proposed source.

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

372. ***Mitigation Measures;***However, regarding this project, there will be no issue of insufficiency of water for the downstream users. It is because as per design report, the proposed sources that includes Gitang Khola, Bhandi Khola, Rate Khola & Mewa Khola has more than 15 lps flow. The design report also mentions that the quantity of water to be tapped from the proposed sources are 5 lps from Bhandi Khola, 16 lps from Gitang Khola, 12.5 lps from Rate Khola and 12.5 lps from Mewa Khola. This shows that the tapped disharge from the

proposed sources indicates safe yield and does not exceed the source yield. However, during operation, regular source yield monitoring is recommended.

5) Non-Sustainability of Services or Completed Works

373. The critical impacts induced by climate change droughts are changes in temperature, precipitation, which has varying consequences not only on the ecosystem but on the availability of water supplies. Climate change alters the hydrological characteristics of surface water due to changes in seasonal rainfall pattern and surface run-off. This affects stream, river and reservoir yields and recharge of ground water aquifers making water resources difficult to manage and use. Good engineering design accommodates the climate change issues.This issue arises and results in disruption in smooth operation of water supply service with the Operator's disregard of these impacts. Along with this, the unsustainability of the completed works may result due to the issues that include; (i) Seismic Events; (ii) Lack of Sense of ownership & Affordability; (iii) Lack of Institutional Capacity & Policy Compliance and (iv) Ineffectiveness in O & M.

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

375. The following mitigation measures to avoid non-sustainability of services or completed works are as follows:

- Monitoring of source yield closely by WUSC especially in the dry season and during a climate-change-induced drought.
- After every seismic event, execution of engineering investigations of completed works and implementation of the necessary corrective actions without delay by WuSC. This involves preparation of Emergency Preparedness & Response Plan and Immediate Implementation of this plan after any seismic event.
- Strengthening Institutional Capacity and Policy Compliance through various project related capacity building programs
- Carrying out regular O & M with effectiveness through proper management of WUSC

376. The summary of impact matrix of adverse issues of the proposed project is given in the table given below:

Table VI-II: Summary of Impact Matrix of Adverse Issues

Adverse Issues	Impact Rating				
	Nature	**Magnitude**	**Extent**	**Duration**	**Rating**
A) Impacts on Physical Environment					
i) Design Phase					
Soil Erosion & Slope Instability	D	M (20)	L (20)	ST (5)	Insignificant (45)
ii) Construction Phase					
Soil Erosion & Land Surface Disturbances	D	M (20)	L (20)	ST (5)	Insignificant (45)
Spoil Disposal & Gully Erosion	D	M (20)	L (20)	ST (5)	Insignificant (45)
Air Pollution	ID	M (20)	R (60)	ST (5)	Very Significant (85)
Noise Pollution	D	H (60)	L (20)	ST (5)	Very Significant

Adverse Issues	Impact Rating				
	Nature	**Magnitude**	**Extent**	**Duration**	**Rating**
					(85)
Generation of Solid Waste & Wastewater from the construction site & worker's camp	D	M (20)	L (20)	LT (20)	Significant (60)
Accidental Leakage or Spillage of Stored Fuel/Chemicals	D	M (20)	L (20)	LT (20)	Significant (60)
Impact on Land Use Pattern	D & ID	M (20)	L (20)	LT (20)	Significant (60)
Disruption to Natural Drainage	D	M (20)	L (20)	LT (20)	Significant (60)
Haphazard Disposal of Dismantled Debris	D	M (20)	L (20)	LT (20)	Significant (60)
iii) Operation Phase					
Impact on the proposed source	D	M (20)	L (20)	LT (20)	Significant (60)
B) Impacts on Biological Environment					
i) Construction Phase					
Impacts on Flora and Fauna	D	M (20)	L (20)	ST (5)	Insignificant (45)
Impacts on Aquatic Life	D	M (20)	L (20)	ST (5)	Insignificant (45)
Forest Fire	D	M (20)	L (20)	ST (5)	Insignificant (45)
Forest Encroachment	ID	M (20)	L (20)	LT (20)	Significant (60)
ii) Operation Phase					
Impacts on Aquatic Life	D	M (20)	L (20)	LT (20)	Significant (60)
C) Impacts on Chemical Environment					
i) Construction Phase					
Impacts on Water Quality of the nearby rivers	D	M (20)	R (60)	ST (5)	Very Significant (85)
ii) Operation Phase					
Impacts on Quality of Water Stored in Reservoir	D	M (20)	L (20)	ST (5)	Insignificant (45)
Impact on Water Bodies	D	M (20)	L (20)	LT (20)	Significant (60)
D) Impacts on Socio-economic Environment					
i) Design Phase					
Structural Instability	ID	M (20)	L (20)	LT (20)	Significant (60)
Health & Safety of	ID	M (20)	L (20)	LT (20)	Significant

Adverse Issues	Impact Rating				
	Nature	**Magnitude**	**Extent**	**Duration**	**Rating**
Community & Workers					(60)
Damage to the existing facilities	D	M (20)	L (20)	ST (5)	Insignificant (45)
ii) Construction Phase					
Community Health and Safety Hazards	ID	M (20)	L (20)	ST (5)	Insignificant (45)
Workers' Health and Safety Hazards	ID	M (20)	L (20)	ST (5)	Insignificant (45)
Traffic Congestion	D	M (20)	L (20)	ST (5)	Insignificant (45)
Public Protests	D	M (20)	L (20)	ST (5)	Insignificant (45)
Disruption to local vendor's business	D	M (20)	L (20)	ST (5)	Insignificant (45)
Mobilization of Child Labor	ID	M (20)	L (20)	LT (20)	Significant (60)
Impacts on the sustainability of works	D	H (60)	L (20)	ST (5)	Very significant (85)
Damage to the existing facilities	D	M (20)	L (20)	ST (5)	Insignificant (45)
Impact on Downstream Users	D	M (20)	L (20)	ST (5)	Insignificant (45)
iii) Operation Phase					
Occupational Health & Safety Hazards	ID	M (20)	L (20)	LT (20)	Significant (60)
Delivery of Unsafe Water	D	M (20)	L (20)	LT (20)	Significant (60)
Impact on Consumer's Health	D	M (20)	L (20)	ST (5)	Insignificant (45)
Impact on Downstream Users	D	M (20)	L (20)	LT (20)	Significant (60)
Non-Sustainability of Services or Completed Works	ID	M (20)	L (20)	LT (20)	Significant (60)

Source: National EIA Guidelines, 1993 & IEE Study 2017

Note: Scoring is done based on following;

Nature of Impact: D = Direct; IN = Indirect;

Magnitude, H = High (60); M = Medium/Moderate (20); and L = Low (10)

Extent, R = Regional (60), L = Local (20); and S = Site-specific (10)

Duration, LT = Long-term (20), MT = Medium-term (10); and ST = Short-term (5)

The points/scoring are taken from the National EIA Guidelines, 1993

Significance of Impact

Total Score: More than 75 : Very Significant

50-75 : Significant

Less than 50 : Insignificant

377. The above given table shows that *Air Pollution*, *Noise Pollution, Impacts on Water Quality of nearby rivers and Impact on Sustainability of works* are evaluated as "Very Significant". However, if the mitigation measures as described above for these impacts are properly adopted, these impacts would not be problematic for the project implementation. Apart of this, the ***Table VI-II*** also shows that some impacts are insignificant & some are significant. The best way to mitigate these impacts is to follow the proposed mitigation measures and to implement them effectively.

C. Indirect, Induced and Cumulative Impacts

378. **During Construction – Indirect and Induced Impacts.** The volume of vehicles that will be operated from the simultaneous construction at project component sites may create traffic jams on narrow access roads and hinder the mobility of people, good, and services, particularly in the bazaar areas. A greater number of people may be exposed to safety hazards from the constricted road space. Coupled with disruption of economic activities and social services from extended interruption of power supply due to the relocation of power poles or likely accidental damages, production outputs will suffer a slowdown. Dust on crops nearby project area would have some effect on the crops' yields. Apart from the applicable mitigation measures, proper coordination with relevant ward authorities, social service institutions and businesses would further mitigate indirect and induced impacts.

379. Cumulative Impacts. The cumulative impacts will arise mainly from the construction of the main Project components and associated facilities. The project's "main area of influence covers component sites, i.e. footprints and areas within 200 m from their edges, considering the potential reach of noise, dust and socio-economic impacts; "Point works" refer to such main components as pumps, RVTs, treatment units/ancillaries, public markets; "Horizontal works" refer to the transmission main and distribution pipes; the "Construction period" (excluding O&M) for horizontal works is estimated to be 1 year, and 6 months for the collection chamber and water treatment plant and RVT and DTW unit/ancillaries is six months.

380. Assuming all components are started simultaneously, without mitigation, cumulative impacts will be "moderate" in magnitude during the peak construction (for the first four months of the construction). After this, the magnitude of cumulative impacts will lessen to "low" magnitude. The sensitiveness of the resources, natural and artificial, within the main areas of influence has been taken into account, together with the types of works involved and their intensities.

381. The potential moderate and high cumulative impacts would be dust, noise, road space limitation leading to slow mobility, access blocking, disruption of social services and economic activities, community and workers' health and safety hazards, generation of solid wastes and spoils. To reduce the cumulative impacts down to acceptable levels:

(i) civil works must be well planned, strategized and completed promptly;
(ii) the contractor should implement SEMP fully, and key institutions should act their roles in EMP implementation effectively;
(iii) there must be adequate consultations with stakeholders, including vehicle operators, and local authorities and coordination, particularly regarding expected cumulative impacts. Vehicle operations should temporarily adjust to the circumstances to relieve some road space limitations and for public safety and convenience; and
(iv) the GRM should be disclosed (through public meetings, display at strategic places and media) to the communities affected by the cumulative impacts.

D. Significance of Impact Rating

382. The significance of impact rating as shown in the above table is that it helps to determine the severity of each anticipated adverse impact. This helps to recommend suitable mitigation measures for each impact on the basis of its severity. This also helps to allocate the budget required for the implementation of the proposed mitigation measures. As per the severity, the impact rating act as a means of making policy and legislations more rational, predictable and scientific. This also helps to establish close and routine monitoring requirement or criteria for mitigating impacts. This also helps to recommend the needs of adopting special checklists, if required. Moreover, this assists to advance towards the environmental auditing during construction and operation phase, as one of the most important environmental management tools. This auditing enables to assess the actual environmental impacts, accuracy of prediction, effectiveness of environmental mitigation measures adopted and functioning of monitoring mechanism.

383. Hence, the main significance of impact rating is that it reflects the authenticity of impact assessment in which the significance is interpreted in terms of acceptability of impacts that can be either in terms of legal requirements or public/stakeholders' satisfaction.

VII. ANALYSIS OF ALTERNATIVES

A. With- and Without-Subproject Alternatives

384. Analysis of the alternatives of the proposed project is another important process of IEE study that helps to assess the feasibility of the project in regard to technical, environmental & social aspects. Primarily, this involves two alternatives that includes "Without Project" or "Do-nothing" Alternative and "With Project" Alternative.

i. Without-project' or 'do-nothing' alternative

385. "Without Project" or "Do-nothing" Alternative conducted study on the existing water supply system to analyze the existing condition of the project town in the absence of the proposed project.

386. The study shows that the residents of the project area are consuming either untreated or partially treated water from the existing water supply system.Though there are not any evidence of impacts of untreated water on the lives of local people at present situation, there is possibility of incidence of water-borne diseases in the future due to poor access to safe and potable water supply. This will result in the health hazards in the project area exposing the surroundings to environmental problems.

387. The existing water supply system in the project area is intermittent and is not able to meet the increasing demands of the increasing population of the project area. Insufficient water supply will compel them to control the use of water for various purposes even for sanitation practices. Lack of water in the sanitation practices like flushing of water after use of latrine, bathing, washing clothes etc. will demote the domestic hygiene of the project area. This may pose outbreak of diseases like Typhoid, Cholera, Dysentry etc. This may in turn result in the environmental problems.

388. 'Without Subproject' or 'Do-Nothing' alternative will toughen the chance of the occurrence of the abovementioned threats to the environment of the project area. Without subproject, people of the project area will continue to consume the partially treated or untreated water from the existing water supply system. Drinking untreated water will increase the risk of bacterial infection resulting health issues that will obviously have impact on public health, animal health and the health of the ecosystems. Similarly, 'Do-Nothing' alternative will constrain the locals to be content with the intermittent water supply service.

389. This would further impede (i) further social and economic development of the municipality, (ii) fundamental right related to health as guaranteed in Constitution of Nepal (Article 35) that says that "Every citizen shall have the right of access to clean drinking water and sanitation", (iii) Goal of National Urban Water Supply & Sanitation Sector Policy,2009 (Final Draft) to ensure the socio-economic development, improved health status and quality of life of urban populations, including the poor and marginalised, through the provision of sustainable water supply and sanitation services and protection of the environment and (iv) Nepal's delivery of its commitment to SDG 6th to increase the proportion of the population with sustainable access to safe drinking water and basic sanitation.

390. Besides this, 'Do-Nothing' alternative has one positive aspect as it may prevent the service area of the project town from the susceptibility towards the anticipated environmental impacts of this proposed project. However, for this only positive aspect, it will be irrational to ignore the hardship that locals of this project town are facing for safe,reliable and potable

water. Hence, 'Do-Nothing' alternative will not be better option to be followed in order to get rid of the anticipated environmental impacts as these environmental impacts can either be avoided or minimized by suitable mitigation measures.

ii. With Project alternative

391. With Project Alternative was also analyzed by envisaging the likely benefits of the proposed project. The analysis shows that the proposed sub project will be the best alternative to overcome the aforementioned threats that is likely to occur in the absence of this subproject. With the Subproject 21,433 populations (2019) will have convenient access to reliable and adequate safe and potable water supply. The balanced health condition of the people of the project area will be ensured through consumption of well-treated drinking water. Similarly, the adequate supply of water will encourage people to use water generously for sanitation practice ensuring good hygiene of the people. In overall, the 'with subproject alternative' will bring about improved public health and living environment that will contribute to improved quality of life in the project municipality.

392. Hence, the 'with project' alternative will contribute to the realization of the Updated 15-Yr Development Plan for Small Towns Water Supply & Sanitation Sector, compliance with the fundamental right related to health as guaranteed in Constitution of Nepal (Article 35), fulfillment of Goal of National Urban Water Supply & Sanitation Sector Policy,2009 (Final Draft) and the delivery of Nepal's commitment to SDG 6.

393. Along with this, the limitation of "Without Project" Alternatives regarding continuous water supply system, treatment system and susceptibility to water borne diseases leads to opt for "With Project" Alternative. The proposed sub project will be the best alternative to overcome the aforementioned threats that is likely to occur in the absence of this subproject.This "With Project" Alternative also involves analysis of alternatives to assess the most cost-effective, reliable and efficient system that can serve the design population. The alternatives regarding "With Project" Alternative is described in detail in the following section.

394. With No Forest alternative

395. As it has already been mentioned in section C-v that the project components including RVT 1 and Small Guard House have been proposed to be constructed within Gumba Danda Community Forest Area. As per section 2.4.13, the proposed project requires about 150sqm area of the community forest. Hence, during alternative analysis, 'With No Forest' option has also been considered so that occupying of forest area could be avoided for the construction of those project components. However, in all the three possible options that have been proposed for this project during feasibility study phase, the structures from WTP to the distribution network remain the same. There are no other possible options which do not include Community Forest for RVT 1 construction.

B. Alternatives Relative to Planning and Design

396. The system alternatives need to be developed to assess the most cost-effective, reliable and efficient system that can serve the design population. As per Feasibility Study Report by PPTA team, the system design for the town has been done under three scenarios. Optimization of a proposed water supply system can be done regarding system layout, alternative technology, alternative materials and alternative source. However, in case of

Ilam, development of system alternatives has been done using alternate sources of water keeping other parameters constant.

i. Alternative Sources

397. The environmental factors of the water source will also help to choose the best alternative source to be adopted for any proposed project. These factors include Possibility of Source Depletion, Location of source, Susceptibility of source to the erosion etc. Regarding this proposed project, there are various alternative sources available in the nearby vicinity to meet the overall demand for this project.

398. The first option considers the use of existing sources (16 lps from Gitang Khola and four lps from Bhandi Khola) and tapping new sources (10 lps from Gitang Khola down-stream of existing hydropower and ten lps from Rate Khola). The system has been designed as a gravity system in which water from all four sources is conveyed to the WTP under gravity.

399. The second option considers the use of existing sources as in first option (16 lps from Gitang Khola and four lps from Bhandi Khola) and tapping new sources (10 lps from Rate Khola and ten lps from Mewa Khola).

400. The third option considers the use of existing sources as in option I and II and tapping new sources (10 lps from Puwa Khola and ten lps from Rate Khola). The water from the Puwa Khola is also collected through gravity system.

401. All the sources proposed in each of three alternatives are environmentally safe.

ii. Alternative Design

402. The environmental issues can be a deciding factor to choose the best alternative design among the list of alternatives. The design of each of three proposed alternatives is environmentally sound. There is no such difference among the proposed alternatives. The main difference is in use of different sources with different transmission pipelines.

iii. Selected Alternative Scheme

403. All three proposed options are gravity systems with similar service areas and structures from WTP to distribution network. The difference is in use of different sources with different transmission pipelines. Technically all options are feasible. Environmentally they are not much different. Socially all these options are on equal footing.

404. The financial analysis of all three options have been carried out. The results of the analysis show that all options are financially feasible. The capital cost of the option II is lower than other two options. It has been clearly mentioned in the feasibility report prepared by PPTA team “given financial feasibility, stakeholder's interest and better sustainability of the system; Option II has been chosen as the best option for the project.” The comparison of three options have been presented in the table given below:

Table VII-I: Cost Comparisons of Various Options Based on PPTA Report

S.N.	Particular	Option1	Option2	Option3
1	Total Capital Cost in NRs.	621,469,238.07	581,211,702.95	608,591,632.00
2	Annual O&M Costs in NRs.	6,400,184.87	6,182,469.47	6,330,669.11
3	Total Base Year Population (No)	14,634	14,634	14,634
4	Length of Transmission Mains (m)	56,473	42,559	51,886
5	Length of Sub-transmission Mains (m)	11,002	10,947	11,002
6	Capital Cost/Pop served	42,467.49	39,716.53	41,587.51

S.N.	Particular	Option1	Option2	Option3
7	O&M Cost/Pop Served	437.35	422.47	432.60
	Remarks		**Preferred Option**	

Source: Detailed Engineering Design Report,2018

VIII. ENVIRONMENTAL MANAGEMENT PLAN

A. Introduction

405. The purpose of the environmental management plan (EMP): is to ensure that the activities are undertaken in a responsible, non-detrimental manner with the objectives of (i) providing a proactive, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on-site; (ii) guiding and controlling the implementation of findings and recommendations of the environmental assignment conducted for the project; (iii) detailing specific actions deemed necessary to assist in mitigating the environmental impacts of the project and in enhancing beneficial impacts; and (iv) ensuring that safety recommendations are complied with.

406. A copy of EMP must be kept on work sites at all times. This EMP will be included in the bid documents and will be further reviewed and updated during implementation. EMP will be made binding on all contractors operating on the site and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

B. Institutional Arrangement

i) Executing and Implementing Agencies

407. The Ministry of Water Supply (MoWS) is the executing agency with the responsibility of project execution delegated to the Department of Water Supply and Sewerage Management (DWSSM). Water User's and Sanitation Committees of the proposed towns are the implementing agencies.

408. The key responsibilities of the executing and implementing agencies are as follows:

Prior to construction:

- MoWS will deputize a qualified staff to act as the Environmental Safeguard Officer of the Project management office (PMO).
- MoWS will establish the grievance redress mechanism, including setting up the Grievance Redress Committee.
- The Water Supply and Environmental Division of the MoWS will be responsible for reviewing and approval of the IEE Report.
- DWSSM will review the IEE Report prepared by the Design, Supervision and Management Consultant Team's Environmental Safeguard Expert (DSMC-ESE) before forwarding this to MoWS.
- DWSSM will prepare the ToRs for the Environmental Safeguard Specialist that will engage to support PMO and for the Environmental Safeguard Specialists of the two Design, Supervision and Management Consultants that will be appointed to prepare the projects.

ii) Safeguard Implementation Arrangement

409. **Project Management Office (PMO):**A project officer (Environment) will be engaged in PMO to ensure implementation of environmental safeguards. He/ she will be provided with

necessary consultant support, and capacity development and training. The responsibilities of the Environment Officer are:

(i) review and confirm existing IEEs and EMPs are updated based on detailed designs, that new IEEs/EMPs prepared by DSMCs comply to exclusion criteria and project selection guidelines as stipulated in the EARF and government rules; and recommend for approval to PMO;

(ii) approve subproject environmental category;

(iii) ensure that EMPs are included in bidding documents and civil works contracts;

(iv) provide oversight on environmental management aspects of subprojects and ensure EMPs are implemented by RPMOs and contractors;

(v) establish a system to monitor environmental safeguards of the project including monitoring the indicators set out in the monitoring plan of the EMP;

(vi) facilitate and confirm overall compliance with all Government rules and regulations regarding site and environmental clearances as well as any other environmental requirements as relevant;

(vii) supervise and provide guidance to the RPMOs to properly carry out the environmental monitoring and assessments as per the EARF;

(viii) review, monitor and evaluate effectiveness with which the EMPs are implemented, and recommend necessary corrective actions to be taken;

(ix) consolidate monthly environmental monitoring reports from RPMOs and submit semi-annual monitoring reports to ADB;

(x) ensure timely disclosure of final IEEs/EMPs in project locations and in a form accessible to the public;

(xi) address any grievances brought about through the Grievance Redress Mechanism (GRM) in a timely manner as per the IEEs;

(xii) undertake regular review of safeguards-related loan covenants, and the compliance during program implementation; and

(xiii) organize periodic capacity building and training programs on safeguards for project stakeholders, PMO, RPMOs, and WUAs.

410. **Regional Project Management Offices (Eastern and Western RPMOs):**The environmental officer assigned by DWSSM to the RPMOs will receive support from (i) the PMO environmental officer, (ii) environmental specialist from PMQAC; and (iii) the environmental specialist and EMP monitors of the regional DSMCs to carry out the following:

(i) prepare new IEEs and EMPs in accordance with the EARF and government rules;

(ii) include EMPs in bidding documents and civil works contracts;

(iii) comply with all government rules and regulations;

(iv) take necessary action for obtaining rights of way;

(v) oversee implementation of EMPs including environmental monitoring by contractors;

(vi) take corrective actions when necessary to ensure no environmental impacts;

(vii) submit monthly environmental monitoring reports to PMO; and

(viii) address any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs.

411. **PMQAC:** The Project Management and Quality AssuranceConsultants (PMQAC) will provide support to the PMO in the following areas:

(i) ensure that the quality of the designs and construction of all water supply and sanitation components implemented under the project are to the required standards; and

(ii) assist the PMO with the overall planning, implementation and monitoring of the project during all stages of implementation including adherence to all environmental and social safeguards' requirements.

412. **Regional DSMCs:**The RDSMCs will provide support to the RPMOs in the following areas:

(i) prepare quality feasibility studies, detailed engineering designs, safeguards documents and bid documents

(ii) provide effective construction supervision and contract management of all water supply and sanitation components implemented under the project in its region

(iii) assist the RPMOs with the overall planning, implementation and monitoring of each subproject during all stages of implementation including adherence to all environmental and social safeguards requirements

(iv) work closely with the Water User and Sanitation Committees (WUSCs), respective project municipalities and communities to ensure that the citizens are aware of project benefits and their responsibilities

(v) ensure that poor and vulnerable groups will benefit equally from the project.

413. **Civil Works Contracts and Contractors:** The contractor is required to designate and appoint an Environment, Health and Safety (EHS) supervisor immediately to ensure implementation of EMP right before the start of the construction phase. It is ensured that no works should be undertaken unless the contractor has appointed its EHS officer. Accordingly, the contractor has designate Mr. Raj Kumar as EMP focal person. The contractors are to carry out all environmental mitigation and monitoring measures outlined in their contract. The contractor is required to submit to RPMO, for review and approval, a site-specific environmental management plan (SEMP) including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program as per EMP; and (iv) budget for SEMP implementation. No works can commence prior

to approval of SEMP. The contractor will be required to undertake day to day monitoring and report to the respective RPMO and DSMC.

414. A copy of the EMP or approved SEMP will be kept on site during the construction period at all times. Non-compliance with, or any deviation from, the conditions set out in the EMP or SEMP constitutes a failure in compliance and will require corrective actions. The EARF and IEEs specify responsibilities in EMP implementation during design, construction and O&M phases.

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

416. **Capacity Building**: The PMQAC safeguards experts (environmental and social) will be responsible for training the (i) PMO's safeguards officers (environmental and social); (ii) RPMOs' engineers and social development officers. Training modules will need to cover safeguards awareness and management in accordance with both ADB and government requirements as specified below:

(i) Environmental Safeguards

- (a) sensitization on ADB's policies and guidelines on environment;
- (b) introduction to environment and environmental considerations in water supply and wastewater projects;
- (c) review of IEEs and integration into the project detailed design;
- (d) improved coordination within nodal departments; and
- (e) monitoring and reporting system. The contractors will be required to conduct environmental awareness programs and orientation to the workers prior to deployment to work sites.

(ii) Social Safeguards

- (a) sensitization on ADB's policies on Involuntary Resettlement and Indigenous People;
- (b) introduction to social safeguards assessment and document requirements;
- (c) Consultation and participations requirements;
- (d) Project GRM and ADB's Accountability Mechanism (AM); and
- (e) monitoring and reporting system.

417. **Water Users and Sanitation Committees (WUSCs):** WUSCs are the eventual operators of the completed projects. The key tasks and responsibilities of the WUSCs are, but not limited to:

Before construction

- Facilitate public consultation and participation, information dissemination and social preparation.
- Provide available data to DSMC-ESS during the conduct of IEE
- Assist in securing the tree-cutting permit and/or registration of water source.

- Participate in the capacity development program.

During construction

- Assist in the observance of the grievance redress mechanism.
- Actively participate in the monitoring of Contractor's compliance with IEE and its EMP and the conditions set out with Government's approval of the IEE Reports.
- Facilitate public consultations, as necessary.

During operation

- Implement EMP and the Water Safety Plan.
- If applicable, actively work with the engaged licensed and accredited laboratory in water quality monitoring.
- Prepare the environmental monitoring report as per IEE.
- Ensure observance of the grievance redress mechanism.

418. Licensed and accredited laboratory: It is recommended that a licensed and accredited laboratory be engaged to conduct water quality monitoring in the first few years of operation and to train the WUSC on the same. The laboratory ensures that while carrying out the water quality monitoring as prescribed in the National Drinking Water Quality Standard and its Directives, 'hands-on' training is provided to the WUSC.

C. Environmental Management Plan (EMP)

419. The table given below gives brief details on the Environmental Management plan (EMP) matrix that is to be implemented for the project implementation:

Table VIII-I: Environmental Management Plan Matrix

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
A. Beneficial Impacts					
1.Impact on Socioeconomic Environment					
a) Construction Phase					
Income	Employment Generation	• Recommend contractor to employ local people by giving high priority to women and under privileged group as far as possible. • Ensure equity in provision of wages to both male as well as female labors.	DSMC, Contractor & WUSC	• Contractors' Workers Log Book • Number of local labors employed in project • Consultant Monitoring Report	During Project Construction
Personal Skills	Skill Enhancement	• Making a proper work plan and code of conduct during the construction period. • Provision of regular hands on training to the workers during the project construction period	DSMC, Contractor & WUSC	• Contractors Work Schedule • Hands on training Photographs • WUSC monitoring report	During Project Construction
Local trade & business opportunity	Enhanced Local trade & business opportunity	• Recommend contractor to give priority to the local products during procurement of construction of materials. • Priority also will be given to local services like grocery stores, tea shops, hotel & restaurants etc. during the entire construction period.	DSMC, Contractor & WUSC	• Contractors' Materials Log Book • WUSC monitoring report	During Project Construction
b) Operation Phase					

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Health & Hygiene	Improved health & hygiene	Regular maintenance of the water supply components should be done so that the project operates smoothly and the benefits are intact	WUSC	• Number of Site Inspection Visits • Photographs of Inspection Visits • WUSC monitoring report	During O & M
Economy	Increase Economic Opportunity	• Ensuring regular maintenance of the water supply components • Promoting urbanization through proper land development activities in the area	• WUSC • Local Authority	• Number of Site Inspection Visits • State of properly & legally planned land use	During O & M
Social Status	Social Empowerment	• Prioritize the vulnerable groups in WUSC along with female groups. • Involving underprivileged group of people especially women and poor people in various capacity building programs and project related community meetings	WUSC	• Number of members of WUSC • Photographs of capacity building programs • Minutes of meetings	O & M phase
B. Adverse Impacts					
1. Impacts on Physical Environment					
a) Design Phase					
Topography/Geology	Soil Erosion & Slope Instability	• Incorporate measures and sites for handling excessive spoil materials • Incorporate drainage plan in final design	PMO, RPMO, & DSMC	• Spoil Management Plan • Final Design Documents	Before award of contract, During Detailed Design Phase
b) Construction Phase					
Topography/Geology	Erosion & Land Surface Disturbance	• Protecting the foundation from damage during backfilling • Using the right backfill materials	Contractor	• Contractor's Work Log Book • Field Photographs	Weekly Basis During Construction Phase

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		• Compacting the backfills • Final finishing the subgrade to ensure that water drains away from the foundation			
Spoil Management	Inappropriate disposal of spoils from the construction activities may result in gullying and erosion of spoil tips especially when it is combined with unmanaged surface water runoff.	• Follow Spoil Management Plan as included in Appendix D. • Use of excess Spoil or Soil for filling depressed areas or borrow pits wherever possible. • Appropriate disposal of Spoil at the designated places. • Spoils should not be disposed on natural drainage paths, canals and other infrastructures. • Provision of toe walls and retaining walls to protect the erosion of disposed spoils. • Provision of proper drainage, vegetation and adequate protection against erosion at the Spoil Disposal Site.	Contractor	• Spoil Management Plan • Photographs • Location of Spoil Disposal Site • Photographs	During Construction Phase
Air Quality	Air Pollution	• Strict Prohibition of open burning of solid waste	Contractor	Written Notice/Code of Conduct	During award of contract
				Visible Emission	Weekly Basis During Construction
				Number of complaints from sensitive receptors	
		• Watering of dry exposed surfaces and stockpiles of aggregates at least twice daily, as necessary;	Contractor	Number of water Tank/s	Weekly Basis During Construction
				Capacity of Water Tank/s	
				Daily/Weekly Frequency/Timing of water spraying	
				Locations of water spraying	
		• if re-surfacing of disturbed roads cannot be done immediately, spreading of crushed gravel over backfilled surfaces;	Contractor	Contractors' Materials Log Book of Materials to ensure the use of crushed gravel	Weekly Basis During Construction
				Photographs	

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		• Conduct Air Quality Test for dust nuisance (PM 10 and PM 2.5) at key settlement and market area, school, hospital at least once in a month during dry working season (Jan-June).	Contractor	• Air Quality Test Reports • Photographs	Monthly Basis
Air Quality	Air Pollution	• Use of Construction/ Transportation Vehicles complying with NVMES,2069	Contractor	Number and Types of vehicles in use Certified documents for each vehicle used	Weekly Basis During Construction
		• Regular inspection & maintenance of construction/transportation vehicles	Consultant & Contractor	Contractor's/Consultant's log book of vehicle inspection & maintenance	Daily Basis/During Construction
		• Supply of clean cooking fuel to workers instead of allowing them to use firewood for cooking.	Contractor	Written Notice/Code of Conduct	Prior to construction
				Type of fuel supplied to camps	Weekly Basis during construction
				Quantity of fuel supplied to camps	Weekly Basis during construction
Acoustic Environment	Noise Pollution	• Restricting noisy activities to daytime and overtime work to avoid using noisy equipment;	Contractor	Written Notice	Prior to construction
		• Prohibit the use of pressure horn by transportation vehiles	Contractor	Written Notice/Code of Conduct	Daily Basis
				Number of vehicles fitted with pressure horns	
				Maximum Sound Level of Pressure Horn	
		• Conduct noise level test once a year during peak construction stage at location near school, hospital and settlements.	Contractor	• Noise Level Test Reports • Photographs	Yearly Basis
		• Avoid noise generating activities like excavation works, dismantling for excavation works, loading & unloading of construction materials, noise of material transportation vehicles etc. during school time and at hospital area if any.	Contractor	• Number of complaints from the sensitive receptors • Contractor's Work Schedule	Monthly Basis

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		• Regular inspection & maintenance of construction/transportation vehicles to ensure the use of Vehicles complying with NVMES,2069 B.S.	Contractor	Contractor's/Consultant's log book of vehicle inspection & maintenance	Daily Basis
		• Regular inspection & maintenance to ensure the use of equipment/machinery that comply with applicable emission standards of GoN i.e., National Noise Standard Guidelines, 2012	Contractor	Contractor's/Consultant's log book of equipment/machinery inspection & maintenance	Daily Basis
		• Regular inspection & maintenance to ensure the use of Diesel Generators complying with National Diesel Generator Emission Standard,2012	Contractor	Contractor's/Consultant's log book of equipment/machinery inspection & maintenance	Daily basis
Solid Waste	Haphazard Disposal of Wastes	• Construction Wastes			
		• Adopt 3R (Reduce,Reuse & Recycle) concept	Contractor	Daily/Weekly quantity/volume of reusable/recyclable SW collected	Daily basis
		• Ensure storage areas are secure, safe & weatherproof.	Contractor	Locations of stockpiling sites	Daily basis
		• Management of reusable wastes	Contractor	Number of cases of on-site reuses	Daily basis
		• Sale of Recyclable wastes to scrap dealer	Contractor	• Daily/Weekly quantity/volume of such wastes sold to or given to scrap vendors • Frequency of sale to scrap vendors	Daily basis
		• Final Disposal of Bio degradable soild wastes	Contractor	• Number/size of burial pits for final disposal of bio-degradable solid waste • Location of burial sites	Daily basis

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
				• Frequency of burials	
		• Avoid over ordering of construction materials to the extent possible. This will be challenging, as it requires strong coordination with the concerned contractors, as it cannot be made mandatory. However, it is not impossible too to coordinate with the contractors in this regard. • Use standard size & quantity of construction materials.	Contractor	• Contractor's log book of construction materials	Daily basis
		• Construct garland drains to reduce the runoff from the stockpiles.	Contractor	• Location of construction sites • Photographs	Daily basis
Solid Waste	Haphazard Disposal of Wastes	**a) Solid Wastes, Wastewater and Sewage from labour camp**			
		• Adopt Segregation of Solid Waste (3R Concept) based on being biodegradable or non-biodegradable. It is because decomposers cannot break down non-biodegradable wastes and their disposal poses a big problem.	Contractor	• Number of Colored Bins to segregate wastes into biodegradable & non-biodegradable wastes	Daily basis during construction
		• Manage biodegradable wastes that include food waste, paper waste, biodegradable plastic, etc. by any suitable processes that include Composting & Incineration. If these two processes are not possible then, the wastes shall be managed either by handing over these wastes to the municipality waste collectors who will finally dispose those wastes to the landfill sites of the project town or by disposing those wastes to the burial pits at suitable place.	Contractor	• Daily/Weekly quantity/Volume of Biodegradable solid waste collected • Site Photographs • Contractor' Work Log Book	Daily basis during construction

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		• Non-biodegradable wastes like glass, plastics & metals shall be managed by reusing them for site use or selling them to scrap dealers instead of disposing them	Contractor	• Daily/Weekly quantity/volume of such wastes sold to or given to scrap vendors • Frequency of sale to scrap vendors/dealers	Daily basis during construction
		• Strict Prohibition on open incineration of solid wastes & use of plastic materials to minimize the quantity of plastic wastes	Contractor	• Written Notice	Prior to Construction & During Construction
		• Construction of the temporary latrines with temporary soak pits & septic tanks within the campsite for proper disposal of sewage	Contractor	• Field Photographs • Contractor's Monthly Progress Report	Daily basis
		• Provide temporary but proper drainage system for proper outlet of waste water generated from cooking practices adopted by the workers	Contractor	• Field Photographs • Contractor's Monthly Progress Report	Daily basis
		• Employ local people from nearby villages to maximum extent possible. It will minimize the number of workers residing at worker's camp. Lesser the number of people, lesser will be the solid waste & effluent generated. However, it cannot be made mandatory because availability of local people with required skills will not be ensured at the time of construction.	Contractor	• Contractor's Workers Log Book	Prior to the construction
Handling of Fuels/Chemicals	Accidental Leakage or Spillage of Stored Fuel/Chemicals	• Provision of well managed storage site	Contractor	• Location of storage site	Weekly Basis during construction
		• Organize awareness programs for the workers responsible for handling fuel/chemicals	DSMC & Contractor	• Records of awareness programs in the form of minutes, photographs	Priorot the construction
		• Supervise workers to handle fuel/chemicals properly	DSMC & Supervisor of Contractor	• Records of any accidental spillage/leakage	Daily Basis During Construction

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		• Use of spill kit materials to block flow and prevent discharge to nearby water bodies	Contractor	• Contractor's log book of materials procured for construction	Weekly Basis During Construction
		• Scatter the Sawdust, sand or dry soil over the area of spill and leave for few minutes to soak up the fuel/chemical. So, availability of saw dust, sand or dry soil should be ensured in the store	Contractor	• Frequency of use of saw dust, sand or dry soil	Weekly Basis During Construction
		• Regular Inspection Visit to the storage site to inspect the leakage of the stored container of fuel/chemical	DSMC & Contractor	• Number of Site Visits • Complaints of Leakage	Weekly Basis During Construction
Land Use Pattern	Change in land use pattern in haphazard manner	• Selection of barren and public land only for the construction of project components • Avoid the acquisition of private and agricultural land for the construction of project components. • Monitoring on the haphazard land use & planning by the concerned authority.	PMO & DSMC	• Details of land ownership • Monitoring Reports on Haphazard Land Use	During Detailed Design Phase
Drainage	Disruption to Natural Drainage	• Avoid the natural drainage pathways for pipe laying works.	DSMC & Contractor	Pipe Layout plan	During Construction
		• Stockpile the excavated materials at safe but nearby place.	DSMC & Contractor	Location of Spoil Disposal Sites	Daily Basis During Construction
		• Restore natural drainage system if the drainage system during construction is blocked.	Contractor	Photographs of before and after restoration	Daily Basis During Construction
Dismantled Debris	Haphazard Disposal of Dismantled Debris	• Immediate Response on handling of dismantled debris	Contractor	Number of complaints from the sensitive receptors	Daily Basis After Construction and Prior to Operation
		• Segregation of Dismantled Debris • Adopt 3R (Reduce, Reuse& Recycle) concept	Contractor	• Number of Colored Bins • Contractor's Work Log Book	Daily Basis

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		• Sale of Recyclable Wastes to Scrap Vendors/Dealers	Contractor	• Quantity/Volume of such wastes sold to or given away to scrap vendors • Frequency of sale to scrap vendors	Daily Basis
b) Operation Phase					
Source Yield	Deficiency of water at the proposed source	• The impact comes out to be insignificant however, regular source yield monitoring is recommended.	WUSC	• Monitoring Report	Monthly Basis
2. Impacts on Biological Environment					
a) Construction Phase					
Flora & Fauna	Loss of vegetation, Loss of habitat of faunas	• Replace the excavated top soil to its original position after the completion of pipe laying work	Contractor	• Photographs of before and after the replacement of top soil • Contractor's Work Log Book	Daily Basis During Construction
		• Re-vegetating disturbed slopes and grounds, as applicable;	Contractor	• Photographs of revegetation of disturbed slopes and grounds • Contractor's Work Log Book	Weekly Basis During Construction
Flora & Fauna	Loss of vegetation, Loss of habitat of faunas	• Awareness programs regarding policy related to the conservation of existing flora & fauna, to the workers prior to the construction and the community during various meetings and discussion programs	PMO, DSMC & Contractor	Minutes & Photographs of Awareness Programs	Prior to Construction
		• Adopt the suitable mitigation measures proposed to minimize noise pollution as mentioned earlier	Contractor	• Written Notice • Contractor's Work Schedule	As mentioned earlier

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		• Regular Monitoring	DSMC & RPMO	• Contractor's Log Book • Number of Monitoring Visits	Daily Basis During Construction
Aquatic Life	Loss of habitat of aquatic life	• Strict Monitoring on the daily activities of workers and Prohibition on disposal of wastes to the water bodies during construction works at source area.	Contractor & DSMC	• Location of Labor Camp Site • Photographs • Number of Complaints from the sensitive receptors • Number of Monitoring Visits • Monitoring Reports • Written Notice to prohibit disposal of wastes	Weekly Basis
		• Provision of temporary but well-equipped toilets	Contractor & DSMC	• Location of these temporary facilities • Photographs of toilets constructed	Weekly Basis
		• Restriction to workers from fishing	Contractor & DSMC	• Written Notice • Number of complaints from the sensitive receptor	Daily Basis During Construction
		• Adopt measures mentioned above for the solid waste management	Contractor & DSMC	• Number of Colored Bins to segregate wastes Daily/Weekly • Quantity/Volume of Biodegradable solid	Daily Basis During Construction

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
				waste collected	
Forest Fire	Impact on Flora & Fauna, Destruction of nutrients by the ashes, soil erosion	• Prohibition on burning dry grass or debris • Prohibition on camp fires & smoking within the forest area to the workers • Keeping firefighting equipment stand by within the construction sites; • Provision of safety trainings regarding forest fire to the construction workers prior to construction	Contractor & DSMC	• Written Notice right before the construction • Contractor's Log Book • Photographs of Safety Trainings	Daily Basis During Construction
Forest Encroachment	Impact on Flora & Fauna	• Strict & Regular Monitoring during the entry of workers for the construction workers, • Mobilization of the concerned community forest groups, • Legal Provision along with imposing fines as punishment for those responsible for forest encroachment & • Provision of trainings to the construction workers to provide support in controlling encroachment.	Contractor & DSMC	• Written Notice right before the construction • Contractor's Workers and Visitor's Log Book • Training Photographs	Daily Basis During Construction
b) Operation Phase					
Aquatic Life	Pollution of water bodies endangering aquatic lives	• Direct discharge of the raw sludge to the water bodies will be discouraged through strict monitoring to the operators involved.	WUSC	Number of complaints from the sensitive receptors	Weekly Basis
		• Proper Implementation of Water Safety Plan (WSP)	WUSC, DSMC & PMO	• WUSC Monitoring Reports • Water Safety Plan	Monthly Basis
3. Impacts on Chemical Environment					
a) Construction Stage					

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Water Quality	Pollution on surface water sources by crossing of pipelines over water bodies, poorly managed construction sediments and other wastes, poor sanitation practices by workers	• Provision of Septage Disposal through construction of toilets with septic tanks	Contractor, DSMC	• Semi Annual Environmental Monitoring Report • Photographs of toilets constructed	Prior to Construction as well as During Construction
		• Disposing of spoils or excess soils as free filling materials as soon as possible	Contractor	• Spoil Management Plan • Location of Spoil Disposal Site	During Construction
		• Locating temporary storage areas on flat grounds and away from main surface drainage routes; • Shielding temporary storage areas with sandbags	Contractor	• Photographs of temporary storage areas	Monthly Basis
		• Adopt measures mentioned above for the solid waste management	Contractor	• Number of Colored Bins to segregate wastes • Daily/Weekly quantity/Volume of Biodegradable solid waste collected	Daily Basis
		• Provision of adequate water supply and sanitation facilities at work sites	Contractor	• Number of Complaints received from the workers • Number of Water Supplies to the workers	Weekly Basis
		• Strict supervision on the behavior of workers for the waste management as well as sanitation behavior and monitoring the workers to manage the wastes properly.		• Number of supervisions • Reports on Supervision	Weekly Basis

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
b) Operation Stage					
Water Quality	Degradation of Quality of water stored within the reservoir	• Proper Implementation of Water Safety Plan (WSP)	WUSC O & M Team	Water Safety Plan of WUSC	Monthly Basis
		• Removal of Algae grown within the reservoir at regular intervals by the O & M team deployed by the WUSC	WUSC O & M Team	• Photographs • WUSC Monthly Reports	Monthly Basis
Water Quality	Impact on Water Bodies	• Disposal of raw sludge to the appropriate landfill or burial sites of the proposed project town	WUSC O & M Team	• Frequency of Burials • Location of Burial Sites	During Cleaning of sedimentation tank
		• Use of raw sludge as compost for agricultural land	WUSC O & M Team	• Quantity/Volume of Raw Sludge Scraped from sedimentation tank	During Cleaning of sedimentation tank
		• Avoid direct discharge of the raw sludge to the water bodies through strict monitoring to the operators involved	WUSC O & M Team	• Written Notice	During Cleaning of sedimentation tank
		• Proper Implementation of Water Safety Plan (WSP)	WUSC O & M Team	WUSC Monitoring Reports	During entire operation phase, Monthly Basis
4.Impact on Socio-economic Environment					
a) Design Phase					
Structural Instability	Cracking of structure leads to facility failure and public discomfort due to construction of water supply components in high earthquake zones	• Proper Design of each & every component as per standard and code of practice.	PMO, RPMO & DSMC	Detailed Design Documents	During detailed design phase
Health & Safety of Community & Workers	Lack of provision will have impact during construction	• Training on Community Health & Safety Hazards by DSMC by disseminating information in regard to this through training manuals, photographs & documents related to safety.	PMO, RPMO & DSMC	Photographs & Minutes	During detailed design phase and Prior to Construction

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Existing facilities	Disruption of services & False Claims by the People	• Coordinate with the concerned agencies to finalize the pipe network layout to avoid damage to the existing utilities. • Design & Locate pipelines away from existing utilities during design as far as possible. • Provide budget for restoration/replacement of damaged utilities. • Photographs of construction sites before and after the construction to avoid the false claims. • Prompt Reinstatement of paved as well as unpaved roads after completion of excavation works for pipe laying	DSMC, RPMO, PMO, Contractor	• List of affected utilities and operators; • Pipeline Layout Plan • Bid document • Photographs before and after the construction sites • Contractor's Work Log Book	During detailed design phase
b) Construction Phase					
Community Health & Safety	• Cross-cutting threats from construction's impacts on air and water quality, ambient noise level; mobility of people/goods/services; accesses to properties/economic activities/social services; service disruptions, etc. • Communicable and transmittable diseases may potentially be brought into the community by	• Contractor's implementation of EMP	Contractor, RPMO, DSMC	EMP	During Construction Phase, Weekly Basis
		• Adequate lighting, temporary fence, reflecting barriers and signage at active work sites;	Contractor	• Photographs depicting lighting, temporary fencing, reflecting barriers and signage facilities. • Quantity of lighting, temporary fence, reflecting barriers and signage	During Construction Phase, Monthly Basis
		• Contractor's preparedness in emergency response;	Contractor	Emergency Response Plan	During Construction, Weekly Basis
		• Adequate dissemination of GRM and Contractor's observance/implementation of GRM	Contractor	• Monthly Reports of GRC • Number of Grievance Redress Form received	During Construction, Monthly Basis

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	construction workers				
Workers Health &Safety	Risk to worker's health & safety	• Submission of Simple OHS plan for employer's approval that involves appropriate health & safety arrangement that includes minimum requirements for various activities like Excavation works, Works within the confined spaces, Use of warning signs, boards & signage, Use of PPE, Accident & Emergency Response and Monitoring & Reporting.	Contractor	• OHS Plan Submitted	Prior to the start of the construction
		• Comply Labor Act (1992) of GoN • Train all site personnel regarding environmental health and safety as like in design phase by DSMC & Contractors • Provide **Personal Protective Equipment (PPEs)**to workersthat includes protective clothing, helmets, goggles and other equipments designed to protect the wearer's body from injury or infection and ensure their effective usage • Require workers to wear high visibility clothes	Contractor	• Site –Specific H&S plan • Record of H&S orientation training like Photographs &Minutes • Availability of personal protective equipment at construction site • Environmental Site Inspection Report	Visual inspection by RPMO (monthly) and DSMC-ESS on a weekly basis. Frequency and sampling sites to be finalized during detailed design and final location of project components
		• Exclude public from worksites	Contractor	Contractor's Visitors' Log Book	Weekly Basis during construction
		• Maintain accident reports and records.	Contractor	Number of accidents as per site records	Weekly Basis during construction
		• Make first aid kits readily available	Contractor	Contractor's Health & Safety Log Book	Weekly Basis during construction
Workers Health &Safety	There is invariably a safety risk when construction works such as excavation	• Maintain hygienic accommodation in work camps • Ensure uncontaminated water for drinking, cooking, and washing,	Contractor	• Location of Worker's Camp Site • Number of Monitoring	Monthly Basis during construction

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	and earthmoving are conducted in urban areas. Workers need to be mindful of the occupational hazards, which can arise from working at height and excavation works.	• Assure clean eating areas • Make sure sanitation facilities are readily available • Provide adequate space and light to the camp site		Visits • Number of Complaints from the workers	
		• Adequate supply of potable water to the camps and good sanitation within camps	Contractor	• Number of water supplies • Number of complaints from the workers	Weekly Basis during construction
		• Provide medical insurance coverage for workers	Contractor	Medical Insurance Documents	Prior to the construction
		• Provide orientation for guest visitors • Ensure that visitors do not enter hazard areas unescorted;	Contractor	• Record of Orientation training (Photographs & Minutes) • Contractor's Visitor's Log Book	Monthly Basis during construction
		• Ensure moving equipment is outfitted with audible backup alarms; • Hearing protection equipment enforced in noisy environment	Contractor	Contractor's Log Book of Machinery & Equipment	Weekly Basis during construction
		• Chemical and Material storage areas need to be marked clearly	Contractor	Signage Board to make aware regarding Chemical Storage and Material Storage Area	Monthly Basis during construction
		• Implementation of Emergency Preparedness Response Plan to mitigate the impacts of flooding problems that includes i) Reporting of Incidents; ii) Investigation of incidents and iii) Prepared for availability of Stretchers, Life buoys, first aiders, first aid kits etc.	Contractor	• Investigation Reports • Emergency Preparedness Response Plan • Contractor's Materials Log Book	Monthly Basis

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Traffic Congestion	Interference in the daily activities of people	• The trench for pipeline should not be abandoned and the contractor should be recommended to backfill the trench immediately. • The contractor will be accountable to provide signage at appropriate locations indicating available alternate access routes to minimize traffic disruptions. • The contractor will have to ensure access to shops and residences using simple wooden walkways. • Provision of alternative way for vehicular movement and pedestrians if possible • The contractor shall follow the Traffic Management Plan especially at Bazaar Areas	Contractor	• Number of Site Visit and Photographs of Sites • Traffic Management Plan	Daily Basis
Public Protests	Interruption in the construction activities	• Public Consultation should be carried out at various stages & locations as per requirement. • Implement Grievance Redress Mechanism • Pre-notify the public regarding the construction works that may hinder their daily activities and Coordinate with them properly	Contractor & DSMC	• Photographs • Minutes of Consultation Programs • Grievance Redress Mechanism Status • Written Notice or Miking	Prior to the construction
Local Vendor's Business	Discomfort to the customers to get access to the shops hampering the daily business activities	• Adopt "zero soil" approach thorugh prompt backfilling right after completion of drain construction. In general, execution of excavation works is such that excavtion will be done in a few meters length i.e., 50m at a time followed by pipe laying, backfilling over the pipe and removal of all surplus material from the site.	Contractor	• Field Visits • Contractor's Work Schedule	Weekly Basis
		• Provision of temporary access to the shops through provision of planks	Contractor	Photographs	Weekly Basis
		• Pre-notify the vendors regarding the construction works that may hinder their daily activities and	Contractor	Written Notice or Miking (Verbal Notice)	Prior to the construction

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		Coordinate with them properly			
Deployment of Child Labor	Deprivation of Children's right to education, health, safety and moral development is deprived	• As the Child Labor Prohibition Act, 2000 states that "No Child having not attained the age of 14 years shall be engaged in works as a laborer" during mobilization, provision for the requirement of submission of the citizenship certificate of each labor,should be made.	Contractor & PMO	Citizenship Certificate of the workers	Prior to Construction
		• During contract agreement, the agreement by the contractor to follow Child Labor Prohibition Act, 2000 and Child Labour Prohibition Rules & Regulations,2006, should be made.	Contractor & PMO	Contract Document	During award of contract
Sustainability of Works	Damage to unsettled/unfinished/uncured and/or completed structures and affecting their structural integrity by seismic event if any	• After every seismic event, the contractor must conduct engineering investigation of built structures and implement the necessary corrective actions immediately • Prepare & Follow Emergency Preparedness and Response Plan	Contractor	• Monthly Progress Report • Contractor's Work Log Book	Construction Phase
Existing Facilities	Damage to the existing utilities creating discomfort to the people	• Monitor construction workers to adopt carefulness and to strictly follow the layout drawings. • Reinstatement Works	Contractor, RPMO, DSMC	• Number of Complaints received at GRC • Pipeline Layout Plan • Contractor's Bill of Quantities • Photographs	During Construction Phase on Daily Basis
Health of Downstream Users	Health Hazards due to intake of contaminated water	• Strict supervision on the behavior of workers for the waste management as well as sanitation behavior and monitoring the workers to manage the wastes properly. • Provision of temporary latrines with basic facilities	Contractor	• Photographs • Number of Complaints received from the downstream user's group	During Construction Phase on Daily Basis

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
c) Operation Phase					
Occupational Health & Safety	Worker's exposure to, and/or mishandling of chemicals and other hazardous substances pose health and safety hazards.	• Installation of clear, visible signage in premises on safety measures	WUSC	• Number of Site Visits • Site Visit Reports • Photographs of location where signage are installed	Weekly Basis
		• Setting up a mechanism for the quick response to spills of chemical and hazardous substances.	WUSC	• Frequency of use of chemical & hazardous substances • Quantity of chemical/hazardous substances used for the proposed project	Monthly Basis
Drinking water supply	• Extraction of unsatisfactory raw water quality • Delivery of unsafe water to the distribution system • Inadequate protection of intake • Health Hazards arising from inadequate design of facilities for receiving, storing and handling of Cl	• Ensure the correct operation of water treatment plant to meet satisfactory water quality	PMO & RPMO	WUSC Monitoring Reports	Monthly Basis during operation
		• Provide Safe Storage for chemicals	Contractor	Location of Chemical Storage	Monthly Basis during operation
		• Ventilation of "Housed" dosing unit for chlorine	Contractor, PMO & DSMC	• Detailed Design Drawings • Contractor' Working drawings & Photographs of Dosing Unit Constructed	During Construction
		• Train operators for handling chlorine	RPMO, PMO & WUSC	Minutes & Photographs of Training	Prior to operation right after completion of construction

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	& other chemicals				
Consumer's Health	Irregularity in the supervision of the operation of distribution system may lead to excessive algae growth in service reservoir which may produce toxins causing serious illness in humans consuming water.	• Regular Monitoring by the WUSC	WUSC	WUSC Monitoring Reports	Monthly Basis
		• Removal of Algae grown within the reservoir at regular intervals by the operating team deployed by the WUSC.	WUSC	Frequency of Algae Removal	Monthly Basis
		• Monitoring & Proper Implementation of WSP.	WUSC	WUSC Monitoring Reports	Monthly Basis
Water Scarcity	Impacts on Downstream Users	The impact is found to be insignificant,however, regular source yield monitoring is recommended.	WUSC	Monthly Reports	Monthly Basis
Non-Sustainability of Services or Completed Works	Disruption in water supply service by sudden seismic events or climate change droughts	• WUSC should monitor yield closely especially in the dry season and during a climate-change-induced drought.	WUSC & the local body	• Number of Human Resources Mobilized for monitoring • Yield Monitoring Reports	During Dry Season and Immediate action during climate-change-induced drought.
		• After every seismic event, WUSC should conduct engineering investigations of completed works and implement the necessary corrective actions without delay. This shall involve preparation of Emergency Preparedness & Response Plan and Immediate Implementation of this plan after any seismic event.	• WUSC	WUSC Monitoring Reports	• Immediate after any seismic event
		• Strengthening Institutional Capacity and Policy Compliance through various project related capacity building programs	WUSC	• Photographs of capacity building programs • Minutes of such programs • WUSC Monitoring Report	During project cosntruction and During initial stage of operation phase

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		• Carrying out regular O & M with effectiveness through proper management of WUSC.	WUSC	WUSC Monitoring Report	Right after the completion of project construction period

Source: IEE Field Study, 2017

D. Environmental Monitoring Program

420. Environmental monitoring will be done during construction on three levels:

(i) Monitoring the development of project performance indicators by the PMO-ESS;
(ii) Monitoring implementation of mitigation measures by the Contractor; and
(iii) Overall regulatory monitoring of environmental issues by the PMO.

421. In addition to regular monitoring on-site (at the subproject level) by the ICG and DSMC-ESS on the EMP implementation of the mitigation measures, monitoring of key environmental parameters is proposed. ***Table VII-II*** presents the indicative environmental monitoring program for the subproject, which includes environmental parameters, with a description of the sampling stations, the frequency of monitoring, applicable standards, and responsible agencies. This will be updated during detailed design to ensure EMP and monitoring program is commensurate to the impacts of the subproject.

Table VIII-II: Environmental Monitoring Program

	Field	Stage	Parameters	• Location	Frequency	Standards	Responsibility
1.	Air quality	• Before construction to establish baseline • Construction phase	PM10 SO2 NOx	• Worksite locations • Along water transmission main 1-km interval from PTWs • Construction campsite locations	• 24-hour monitoring once in a season (except monsoons) for the construction period	• National Ambient Air Quality Standards, 2003	Contractor
2.	Noise and vibration levels	• Prior to construction to establish baseline • Construction phase	Equivalent day and night time noise levels	• PTWs location • Along water transmission main 1-km interval from PTWs • Construction campsite locations	• Once in a season (except monsoons) for the construction period	• National Noise Standard Guidelines, 2012	Contractor
3.	Water quality	• Prior to construction to establish baseline • Construction phase	TDS, TSS, pH, hardness, BOD, fecal coliform, total nitrogen, total phosphorus, heavy metals, temperature, DO, hydrocarbons, mineral oils, phenols, cyanide, temperature	• Adjacent to construction sites (to be identified by the (DRTAC or DSMC))	• Twice a year (pre-monsoon and post-monsoon) for the entire period of construction	• National Drinking Water Quality Standards, 2006	Contractor

	Field	Stage	Parameters	• Location	Frequency	Standards	Responsibility
4.	Survival rate of landscaping, tree plantation	• O&M phase	Survival rate	• In the areas where re-plantation/ landscaping proposed	• Twice a year for 2 years	• None	WUSC

Source: IEE Study 2017

E. Institutional Capacity Development Program

422. 411. Considering the limited capability of the Project's key players in environmental management, technical assistance from environmental specialists and capacity development during loan implementation will be needed. Capacity development will consist of hands-on training in implementing the responsibilities in EMP (as well as in EARF) implementation, complemented with a short-term series of lectures/seminars on relevant topics.

423. WUSC cannot monitor the quality of supplied water as prescribed in NDWQS and its Directives. Although monitoring kits and laboratory rooms will be provided, this would not guarantee WUSC can handle monitoring appropriately. DWSSM has five regional laboratories; however, some are not functioning fully due to lack of human resources. Considering that public health is a critical concern associated with water supply, it is recommended that a licensed and accredited laboratory be engaged to conduct water quality monitoring for at least the first 2-3 years of operation with WUSC actively participating in developing its capacity. Water quality monitoring should be carried out in such a way that WUSC will be "learning by doing." After the engagement period, there should be continuing periodic training of new persons to ensure that the capacity of WUSC is sustained. The cost for monitoring during operation is based on the assumption that a licensed laboratory will be engagedin both the monitoring requirements and to train WUSCs. A Water Safety Plan is included in the project design and will oblige the operator to carry out water quality monitoring accordingly. The amount of NPR 500,000 will be provided annually to implement the Plan. There will be sufficient fund to include training by the licensed and accredited laboratory while monitoring water quality.

424. The contractors will be required to conduct environmental awareness programs and orientation to the workers before deployment to the work site. The proposed training project along with the frequency of sessions is presented in ***Table VIII-III.*** The Environmental Safeguard specialist & EMP Field Monitoring Staff are responsible for organizing different training programs for Environmental Management.

Table VIII-III: Training Program for Environmental Management

Items	Pre-construction	Construction	
Training Title	Orientation workshop	Orientation program/ workshop for contractors and supervisory staff	Experiences and best practices sharing

Items	Pre-construction	Construction	
Purpose	To make the participants aware of the environmental safeguard requirements of ADB and GON and how the project will meet these requirements	To build the capacity of the staff for effective implementation of the designed EMPs aimed at meeting the environmental safeguard compliance of ADB and GON	To share the experiences and best practices aimed at learning lessons and improving implementation of EMP
Contents	Module 1: Orientation ADB Safeguards Policy Statement Government of Nepal Environmental Laws and Regulations Module 2: Environmental Assessment Process ADB environmental process, identification of impacts and mitigation measures, formulation of an environmental management plan (EMP), implementation, and monitoring requirements Review of environmental assessment report to comply with ADB requirements Incorporation of EMP into the project design and contracts	Roles and responsibilities of officials/contractors/consultants towards protection of the environment Environmental issues during construction Implementation of EMP Monitoring of EMP implementation Reporting requirements	Experiences on EMP implementation – issues and challenges Best practices followed
Duration	1 day	1 day	1 day on a regular period to be determined by PMO, ICGs, and (provide if PMC/DRTAC or DSMC)
Participants	Executing and implementing agencies, PMO, and PMO staff (technical and environmental) involved in the project implementation	PMO ICGs Contractors	PMO ICGs Contractors

Source: IEE Study, 2017

F. Staffing Requirement and Budget

425. Staffing requirement will include the: (i) deputizing a DWSSM or PMO staff as the PMO environmental safeguards officer; (ii) deputizing WSSDO staff as RPMOS environmental engineers in each subproject town; (iii) engagement of a PMO-environmental safeguards specialist to provide technical assistance and guidance to the PMO and partly to the RPMOS and capacity development/training; and (iv) a DSC environmental safeguards specialist to conduct the IEEs and prepare the IEE reports according to the provisions of this EARF. The costs required for implementing the EMP will cover the following activities:

(i) Updating IEE, preparing and submitting reports and public consultation and disclosure;
(ii) Application for environmental clearances; and
(iii) Implementation of EMP, environmental monitoring program, and long-term surveys.

426. Environmental monitoring during construction will also be straightforward and will involve periodic site observations and interviews with workers and others, plus checks of reports and other documents. This will be conducted by PMO-ESS assisted by the PMO environmental safeguard officer. Therefore, no separate budget is required for the PMO-ESS.

427. The cost of mitigation measures and surveys during construction will be incorporated into the contractor's costs, which will be binding on him for implementation. The contractors will conduct the surveys.

428. The operation phase for mitigation measures are good operating practices to mitigate the environmental impacts of this phase &the responsibility remains to WUSC. WUSC will conduct all monitoring during the operation and maintenance phase. To ensure the delivery of safe drinking water from its catchment to the consumers, there is provision of Water Safety Plan (WSP)for the proposed project. If a licensed laboratory is engaged for the first 2-3 years of operation for training purposes, the cost can be accommodated under the Water Safety Plan. The cost of awareness program & WSP during the contract period is NRs. 500,000.00 under provisional sum.

429. The indicative costs of EMP implementation is shown in ***Table VIII-IV*** given below:

Table VIII-IV: Indicative Cost of EMP Implementation

No.	Particulars	Stages	Unit	Total Number	Rate (NRs.)	Cost (NRs.)	Cost Covered by
A.	**Consultants Costs**						
1.	Environmental safeguard specialist (1 person)	Project Implementation Period	person months	3	100,000	300,000.00	Cost covers only remuneration, which together with budget for travel covered in the PMQAC contract
2.	Social Safeguard Specialist	Entire Project Implementation Period	person months	3	100,000	300,000.00	Cost covers only remuneration, which together with budget for travel covered in the DSMC contract
3.	Support Staffs	Entire Project Implementation Period	person months	24	35,000	840,000.00	Cost covers only remuneration, which together with budget for travel covered in the DSMC contract
B.	**Local Level Monitoring & Mitigation Measures**						
a)	Local Level Monitoring Measures						
1.	Air quality monitoring	Pre-construction (baseline) Construction	No. of sampling activities	4	37,500	150,000.00	Civil works contract
2.	Noise levels monitoring	Pre-construction (baseline) Construction	No. of sampling activities	4	12,500	50,000.00	Civil works contract

No.	Particulars	Stages	Unit	Total Number	Rate (NRs.)	Cost (NRs.)	Cost Covered by
3.	Water Quality	Pre-construction (baseline) Construction Operation and Maintenance (for water supply and wastewater treatment subprojects)	No. of sampling activities	4	12,500	50,000.00	Civil works contract
b)	Mitigation Measures						
1.	Protection Works for Soil Erosion & Land surface Disturbances that includes Prompt Backfilling, Construction of Gabion Wall, RRM, Drainage Structures	Construction					Civil works contract
2.	Implementation of Water Safety Plan	Operation					No additional cost required; it will be managed by WUSC itself
3.	Chlorination	Operation					No additional cost required; it will be managed by WUSC itself
4.	Removal of Algae grown within the reservoir & Disposal of Raw Sludge of Sedimentation Tank	Operation					No additional cost required; it will be managed by WUSC itself
5.	Solid Waste Management	Construction			160,000.00	160,000.00	
6.	Revegetating disturbed slopes & grounds	Construction			50,000.00	50,000.00	
7.	Provision of temporary but well-equipped toilets	Construction			200,000.00	200,000.00	

No.	Particulars	Stages	Unit	Total Number	Rate (NRs.)	Cost (NRs.)	Cost Covered by
8.	Provision of Spoil Disposal Site	Construction			50,000.00	50,000.00	
9.	Provision of Camp Site	Construction			225,000.00	225,000.00	
10.	Provision of Stockpiling Site	Construction			50,000.00	50,000.00	
12.	Temporary Fencing, Use of Reflecting Barrier, Signage, Adequate Lighting	Construction			100,000.00	100,000.00	
13.	Provision of PPE to workers	Construction			150,000.00	150,000.00	
14.	Provision of Planks to provide access to shops & homes	Construction			25,000	25,000	
15.	Emergency Response Preparedness	Construction & Operation			225,000.00	240,000.00	
	Total Cost of Local Level Monitoring & Mitigation Measures					**1,500,000.00**	
C.	**Capacity Building**						
1.	(i) Orientation workshop for officials involved in the project implementation on ADB Safeguard Policy Statement, Government of Nepal environmental laws and regulations, and environmental assessment process;	Module 1- on environmental assessment and review framework (EARF) and EMP implementation to be conducted by PMO-ESS (prior to contract of award for civil works) Module 2 – Any time after Module 1	Lumpsum			400,000	Covered under Output 2 - Improved Institutional Capacity and Project Implementation Platform

No.	Particulars	Stages	Unit	Total Number	Rate (NRs.)	Cost (NRs.)	Cost Covered by
	(ii)induction course contractors, preparing them on environmental management plan (EMP) implementation and environmental monitoring requirements related to mitigation measures; and taking immediate action to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of implementation; and						
	(iii)lessons learned information sharing						
				Total Capacity Building Costs		**400,000.00**	
D.	**Administrative Costs**						
1.	Legislation, permits, and agreements	Permit for excavation, tree-cutting permits etc.	Lumpsum				These consents are to be obtained by contractor at his own expense.
		Environmental assessment and environmental clearances as per ECA and ECR requirements	Lumpsum	1	500,000.00	500,000.00	Covered under the DSMC contract
				Total Administrative Costs		**500,000.00**	
E.	**Other Costs**						

No.	Particulars	Stages	Unit	Total Number	Rate (NRs.)	Cost (NRs.)	Cost Covered by
1.	Public consultations and information disclosure	Information disclosure and consultations during preconstruction and construction phase, including public awareness campaign through media	As per requirement	Lumpsum	350,000	350,000	Covered under PMO budget
2.	Grievance redress mechanism (GRM) implementation	Costs involved in resolving complaints (meetings, consultations, communication, and reporting/ information dissemination)	As per requirement	Lumpsum	200,000	200,000	Covered under PMO budget
3.	Any unanticipated impact due to project implementation	Mitigation of any unanticipated impact arising during construction phase and defect liability period		Lumpsum	Contractor's liability	As per insurance requirement	Civil works contract – contractor's insurance
	Total Indicative Cost of EMP Implementation					**3,690,000.00**	

Source: EARF, July 2018 and IEE Study 2017

430. The above given table shows that the total indicative cost for EMP implementation in NRs. 3,690,000.00. Out of this total amount, the total estimated cost for Local level Monitoring and Mitigation Measures is 1,500,000.00. This has been included under provisional sum in BoQ that includes necessary environmental mitigation measures for the anticipated impacts during the entire construction period.

G. Implementation Schedule

431. Environmental management is implemented from the detailed design phase through to procurement that will continue to construction, and operation phases. ***Table VIII-V*** presents the tentative timeframe of key EMP activities about the subproject implementation schedule. Similarly, ***Table VIII-VI*** presents training for capacity building programs for the project

432. As this IEE is based on the master plan, the given details in the following table are just envisaged and it will be finalized during detailed design phase.

Table VIII-V: Environmental Management Implementation Schedule

Activity			Indicative Time Frame
PROJECT IMPLEMENTATION			
	Detailed Design & Bidding Documents		Q2 Y0
	Procurement		Q3 Y0
	Construction		Q4 Y0 – Q4 Y2
	Contractor Operating Period		Q3 Y2 – Q4 Y3
	Handover to WUSC for Operation		Q3 Y3 – Q1 Y4
	Defects Liability Period		Q3 Y2 – Q4 Y4
ENVIRONMENTAL MANAGEMENT			
	Overall		
	1.	Design Review and Technical Audit Consultant (DRTAC)-Engagement of Environmental Specialist	Starting Q4 Y0 (5 yrs. of intermittent inputs)
	2.	PMO's submission of Environmental Monitoring Report (EMR)	
		- Monthly EMR for project's Monthly Progress Report	- 8th day after effective month
		- Semi-Annual EMR during construction for submission to ADB	- 8th day after effective 6-mo. period
		- Annual EMR for submission to ADB	- 8th day after an effective year
	Before Construction Mobilization		
	1.	Finalization of EMP, (if applicable) revision of IEE	Q2 Y0
	2.	ADB review & approval of revised IEE & EMP.	Q 2 Y0
	3.	Obtaining Government's approval of IEE Report	Q2 Y0 – Q3 Y0
	4.	Community preparation (including disclosure of Final IEE & its EMP)	Q4 Y0
	5.	Establishment of baseline data (as set out in the EMP)	Q4 Y0 (shall have been done before award of contract)
	6.	Preparation of C-EMP by selected Contractor, review of C-EMP	Q4 Y0, before Notice to Proceed is
		Against SPS-compliant EMP.	given
	Construction Period		
		Mobilization to Demobilization	
	1.	Implementation of mitigation measures and conduct of environmental effects monitoring following the C-EMP.	Q4 Y0 – Q4 Y2
	2.	Submission of Environmental Monitoring Report	Q4 Y0 – Q4 Y2

Activity			Indicative Time Frame
		(EMR)	
		- Monthly, by Contractor	5th day of the month following the effective month
		- Quarterly, by Contractor or by Licensed Laboratory	3rd day of the month following the effective quarter
	Operation Period (potentially could start even before DLP is over)		
	1.	Implementation of mitigation measures & monitoring activities as specified in the EMP	Starting anytime between Q3 Y3 & Q1 Y4
	2.	Submission of EMR	anytime between Q3 Y3 & Q1 Y4
		- Monthly, by Operator	5thday of the month following the effective month
		- Quarterly, by Operator or (if applicable) by Licensed Laboratory	3rd day of the month following the effective quarter

Source: IEE Study, 2017

Table VIII-VI: Proposed Topics for Capacity Building/Training

Topic			Target Participants	Timing
1.	**By Environmental Specialists**			
	1.1	Legal Framework	DWSSM, PMO,	Early stage
		▪ Relevant national laws, regulations & standards on EA& management	WSSDO, ICG,	of Output 2
		▪ ADB SPS 2009	RMSO, WUSC (15-18)	
		▪ EA& review procedure under the Project		
	1.2	Environmental Assessment		
		▪ Rapid environmental assessment		
		▪ Initial environmental examination		
	1.3	Some Aspects of EA Process & Environmental Management		
		▪ Meaningful consultation & info disclosure		
		▪ Grievance redress mechanism		
		▪ Environmentally responsible procurement		
		▪ Occupational & community health and safety		
	1.4	EMP Implementation, part 1	DWSSM, PMO,	Early stage
		▪ Institution arrangements & responsibilities	WSSDO, ICG,	of Output 2
		▪ Environmental quality monitoring	RMSO, WUSC,	
		▪ Emergency response	(15-18)	
	1.5	EMP Implementation, part 2		
		▪ Performance monitoring & indicators		
		▪ Environmental monitoring report		
2.	**By External Experts**			

Topic				Target Participants	Timing
	2.1	Other relevant topics, such as:		M0WS, DWSSM,	During
		A	Good engineering and construction practices as mitigation measures	PMO, ICG,	Project's
		B	Climate change adaptation (applicable to eligible activities/works under the Project)	WSSDO, RMSO, DSMC (30)	Capacity Development Program
			B.1 Climate change impacts on infrastructure		
			B.2 Climate-proofing of infrastructure		
		C	Strategic environmental assessment of WSS sector policy, development plans, and programs		
		D	Other relevant topics that may be suggested by MoWS, DWSSM, PMO, ICG& WSSDO		

Source: IEE Study, 2017

IX. INFORMATION DISCLOSURE, CONSULTATION & PARTICIPATION

A. Stakeholder Consultation & Participation

433. 422. Stakeholder consultation and participation is an essential process in project preparation. It is also a part of information disclsoure. It will disseminate as well as collect information regarding the proposed project by involving various stakeholders that includes Key Informant Interviews, Stakeholders Meetings, Focus Group Discussions (FGD), On-site discussions with WUSC and Random Field Interviews. The minutes of various meetings undertaken during field visits are also included in ***Appendix 4.***

434. This stakeholder consultation requires the analysis of stakeholders through the identification of the potential participants and the methods of their involvement. The table given below illustrates the concerned stakeholders of the proposed project that will have either primary or secondary.

Table IX-I:Stakeholder Analysis & Mapping

S.N.	Stakeholders	Primary[2]	Secondary[3]	Stakeholders 'Role or Interest	Level of Influence
1.	Government of Nepal		✓	It is the executive and central body.	High
2.	Ministry of Water Supply (MoWS)		✓	It is the lead executive agency and is responsible for policy coordination, guidance, review of programs, ensuring that all aspects relevant to achieve the objective of the project and for sustaining the improved services to the required level	High
3.	ADB		✓	It supports government of Nepal in improving and enhancing the existing water supply service.	Medium
4.	Department of Water Supply and Sewerage Management		✓	It is the lead implementing agency and works under MoWS with the responsibility of planning, implementation, operation, repair & maintenance of the proposed project.	High
5.	DWASH-CC		✓	It provides coordination in the preparation of local WASH plans with inputs from WASH sector actors and in the effective implementation of the local plans related to this project.	High

[2] Primary Stakeholders: people, groups and institutions affected positively (beneficiaries) or negatively (involuntarily resettled) by the proposed program

[3] Secondary Stakeholders: people, groups and institutions that are important intermediaries in the program delivery process

S.N.	Stakeholders	Primary[2]	Secondary[3]	Stakeholders 'Role or Interest	Level of Influence
5.	UWSSP, PMO, RPMO & DRTAC		✓	It is responsible in successfully implementing the proposed project activities, establishing coordination with ADB & GoN and managing day to day activities at municipality levels.	High
6.	Town Development Fund (TDF)		✓	TDF will assist the project municipality conducting financial appraisal of the proposed project and advice DWSSM on its outcomes prior to the start of detailed design process.	High
7.	Local Bodies (DCC, Municipality & Ward Offices)		✓	It is responsible for establishing coordination with the implementing agency. Here, the municipality will be also responsible for policy compliance as well as for addressing public protests if any.	High
8.	Community Forest User's Group		✓	It is responsible for establishing coordination with the contractor during construction works within the community forest area.	High
9.	Forest Security Personnel		✓	It is responsible for establishing coordination with the contractor during construction works and for establishing harmony between locals and construction workers within the community forest area.	High
8.	DSMC		✓	It will assist PMO & RPMO in the overall planning, implementation and monitoring of the project activities regarding environmental & social safeguards requirements.	High
9.	WUSC		✓	It is responsible for O & M of the proposed water supply system. It will also facilitate the concerned authorities during planning as well as construction phase.	High
10.	Households (Families & Individuals)	✓		They are the main beneficiaries and are benefitted by the provision of enhanced & improved continuous water supply service.	Low
11.	Contractors, Petty Contractors		✓	It is responsible for bidding for works and involved in the construction of the proposed project.	Low
12.	Local Technicians/Plumbers	✓		This group will be benefitted through the increased work opportunities related to construction works of the proposed project.	Low

S.N.	Stakeholders	Primary[2]	Secondary[3]	Stakeholders 'Role or Interest	Level of Influence
13.	Unemployed Locals	✓		This group will be benefitted through the increased work opportunities related to construction works of the proposed project.	Low
14.	Local Vendors	✓		This group will be affected by the pipe laying works for the distribution network of the proposed project at the core Ilam Bazaar area.	Low
15.	Schools & Hospitals	✓		This group will be benefitted by the provision of enhanced and improved continuous water supply service.	Low
16.	Commercial Establishments (Private Enterprises)	✓		This group is benefitted by enhancing their business by supplying items to the construction employees regarding their basic needs.	Low
17.	Scrap Vendors	✓		This group will be benefitted by purchasing the recyclable wastes generated from the construction activities as well as from workers camp.	Low
18.	Local Leaders		✓	This group will facilitate to establish strong coordination between the local people and the project authority.	High

Source: IEE Field Study 2017 and DEDR & DDR,2018

435. The consultations were carried out on various dates at varous locations within the project town for the discussion of the anticipated environmental impacts that may result from the construction of the proposed project. The consultations were undertaken with key stakeholders that includes Local Bodies, Beneficiaries Households, CFUGs, TDF, PMO, RPMO & DRTAC in line with ADB's requirements pertaining to environment and social considerations. The key concerns of the people related to the project that includes Implementation of the safeguard policy framework in field level, Delivering the information regarding safeguard activities to local level, Willingness to pay, Upfront cash collection and People's participation in project implementation were discussed.

436. Several public consultations held at various locations on different dates with key stakeholders are tabulated below:

Table IX-II: Summary of Major Public Consultations carried out by Study Team

Date	Location	No. of Participants	Participants	Topics Discussed	Issues Raised
2/7/2014	Ilam Municipality Office	4 All male	Executive Officer, Engineers, Administrative staff	Institutional set up for implementing the project under ADB assistance Land availability for treatment plant and water tanks Social safeguard issues Socioeconomic survey of the beneficiary households	Institutional set up; whether Municipality or WUSC shall implement the project Land availability and ownership
3/7/2014	District development Office, Meeting hall	45 M=39 F= 6	Chief District Officer, Local Development Officer, Executive officer of Municipality, District Superintended of Police, Divisional engineer, WSSDO, Deputy Project Director, DWSS, representatives from different political parties, Red cross, Lions Club, engineers from line agencies and municipality, PPTA Consultants	Need and existing provision of drinking water and demand from the municipality Existing drinking water supply sources, quantity and quality Affordability for the connection charge and monthly tariff Institutional set up for implementing the project under ADB assistance Social safeguard issues	New sources of water supply and the agreement with the community about new sources (Rate and MewaKhola) Institutional set up; whether Municipality or WUSC will run the project
7/9/ 2014	Maimajuwa VDC	6 M=4 F=2	VDC secretary, VDC officials, local residents	Demand of local residents of the water source of Rate and Mewakhola Consultation and discussion is ongoing with the district authority and the community living around the water source Social safeguard issues	Willingness to provide the source of water from the khola subject to fulfilment of demands
9/9/2014	District development Office, Meeting hall	40 M=36 F=4	Chief District Officer, District Superintended of Police, Divisional engineer, WSSDO, Deputy Project Director, DWSS, representatives from different political parties, Red cross, Lions Club, engineers from line agencies and municipality, PPTA Consultants	Need and existing provision of drinking water and demand from the municipality Existing drinking water supply sources, quantity and quality Affordability for the connection charge and monthly tariff Immediate decision for the Institutional set up for implementing the project under ADB assistance	Upgrading of existing water tanks, treatment plant, meeting the demands of the water source communities Institutional set up on whether Municipality or WUSC will run the project to be finalized by 16 September

Date	Location	No. of Participants	Participants	Topics Discussed	Issues Raised
				Social safeguard issues Compensation for land owner and house owner	
8/2017	Municipality, Ilam	10	Mayor, User's Committee representative, Ward Chairman, Social Expert, engineers, surveyors	Land requirement for the proposed project, environment-related issues, manpower requirements for technical and social survey	If land needs to be purchase, it should be done according to Social Protection Policy; construction works should be carried out ensuring environmental safety and protection; engagement of local human resources for the survey
6/9/2017	Municipality, Ilam	25 Male=8 Female=17	Mayor, Deputy Mayor, Wards Chairman, Water Supply In charge of Municipality, representative of WUSC executive body	Dissemination of project information -- approach, modality, role & responsibilities of various stakeholders The project service area delineation Social and technical survey works in ward no 6,7,8 and 9 of Ilam Municipality Land availability for project and discussion in the context of Social Safeguard Environmental consideration	Engagement of enumerators from local level including female for socio-economic survey Reminder that if land has to be purchased, should be done following social safeguard norms Environmental considerations during construction to avoid negative impact on environment
7-9/9/2017	Hall of Human Rights Association of Ilam	23 M=8 F=17	Social Safeguard Expert/ Sociologist/Design Engineer, Water Supply and Sanitation Engineer & Survey Team	Orientation to staff and stakeholders for social survey	Engagement of 10-12 enumerators from local level including female for socio-economic survey
14/9/2017	DDC Hall, Ilam	35 M=24 F=11	Sociologist/Design Engineer, Water Supply, and Sanitation Engineer & Survey Team -WUSC executive body and advisor team.	Dissemination of project information -- approach, modality, role & responsibilities of various stakeholders Preparation of social and technical survey works	
14/12/2017	Ilam Municipality	100 M=63 F=37	Municipality Mayor, Deputy Mayor, WUSC body, Different Stakeholder More than 80 number local user	Final Design Report Presentation. Use of source and issues Upgrading of existing water tanks, water treatment plant	Meeting the demands of the community at the source area; concerns of indigenous peoples at the source area and weighing solutions; institutional set up
11/02/2018	Municipality	66	WUSC, concerned stakeholders	Presentation of Final Study Report	Proposed source for Ilam WS should be registered within 15 days if not yet so; monthly

Date	Location	No. of Participants	Participants	Topics Discussed	Issues Raised
	Meeting Hall, Ilam			Land requirements for the project Registration of Source with the concerned authority Upfront cash contribution Month Water Tariff Protection from potential impacts	water tariff should be determined in discussion with the Town Development Fund
9/5/2018	Ilam Municipality, View Tower	11 M=9 F=3	Vice Chair of Sandakpur Rural Municipality, WUSC members Sociologist, PMO Consultants, PMO	Water diversion from Gitang, rate and Mewa Khola Social Safeguards issues Indigenous Peoples Issues Fund collected from consumers by WUSC	Consensus and agreement between Sandakpur RM and WUSC to divert 16lps from Gitang source and 10 lps each from Mewa and Rate source; municipalities will address the social safeguards issue in close coordination with stakeholders; Municipal level and District level coordination committee have been formed and will be responsible to assure IPP implementation
9/5/2018	Sandakpur ward no 2 office	25 M=23 F=2	WUSC Member, local Stakeholder, and indigenous people representatives, Safeguard Expert from DRTAC and Consultant, Sociologist PMO.	Discussion over Source use in Rate, Gitang, and Mewa. Local Indigenous people their issue and demand from municipality against the source using	New sources of water supply and the agreement with the communities at the new sources (Rate and Mewa Khola)
10/5/2018	District Coordination Committee Office	11 M=9 F=2	Chair, DCC WUSC members Sociologist, PMO Consultants	Benefit sharing Issues Project Implementation environment	Local governments will ensure benefit sharing; more than 90% of fund by users has already been collected so need to implement the project soon
10/5/2018	DDC meeting hall, Ilam	30 M=21 F=7	WUSC members All political party representatives Media persons Advisors Users, Sociologist, PMO Consultants	Status of Project Benefit Sharing Indigenous Peoples Issue	Need to implement the project soon as consensus between all stakeholders has been established; benefit sharing will be assured by local governments; no indigenous people's issues at present; local governments will ensure that indigenous people's issues, if any, are addressed and that stakeholders are consulted

Source: DEDR & DDR,2018

B. Major Issues Raised by the Stakeholders

437. The major issues raised by the key stakeholders during stakeholder consultation are as follows:

i. The project town is in need of safe, reliable and potable water.
ii. Water shortage problem is acute in the project town during dry season.
iii. People of the project town are relying on untreated but occasionally disinfected water.
iv. The operating system of the existing water supply system is good but the supply system is intermittent.
v. The project should give priority to local people while hiring for the construction activities.
vi. The project must consider solid waste management issues during construction period.
vii. The proposed project must address the socioeconomic problems that may be observed during the construction period at Ilam Bazaar area like Traffic Congestion, Disruption to Local Vendors, Discomfort to the passerby,Noise Pollution, Air Pollution, Damage to the existing facilities etc.
viii. The construction works within the community forest areas should not involve cutting trees as well as destruction of any kind of forest resources.

438. The assurance made by the study team regarding the issues raised by the stakeholders are as follows:

i. The proposed project will address the water shortage problem faced by Ilam municipality.
ii. The proposed project has provision of water treatment system. This will resolve the problems of consumption of either occasional treated or untreated water.
iii. The proposed project has provision of continuous water supply system. This will end the irregular water supply service.
iv. The proposed project with water treatment facility and continuous water supply provision if effectively implemented will address the needs of Ilam municipality residents regarding safe, reliable and potable water.
v. The socioeconomic problems raised by the stakeholders has been considered in IEE study and this IEE study has proposed mitigation measures for these issues. Accordingly, for ensuring the effective implementation of the proposed mitigation measures, EMP will be prepared and the contractor will be enforced to consider, follow and implement the EMP during construction.
vi. The solid waste management plan will be prepared,followed and implemented during the construction phase of the project that includes Spoil Management & Disposal,

Disposal of Dismantled Debris and Management of Construction Wastes & Solid Wastes.

vii. Local workers of Ilam municipality will be given priority for employment to the extent possible however, it requires strong coordination with the concerned contractor.

439. The project envisages that stakeholder consultations will continue during the project period and concerned stakeholders will be invited and encouraged to participate. The PMO and ICG will maintain rapport with WUSC and the municipality. PMO, ICG, Contractors, and WUSC will be open to the public to discuss concerning the progress of the subprojects, adverse impacts, mitigation measures and environmental monitoring and grievances. The stakeholder consultations in future will be as follows.

i. During construction, if change in design, alignment, and location, the PMO and ICG will hold at least one public consultation to solicit perceived impacts, issues, concerns and recommendations from affected communities;

ii. Before construction, the PMO and ICG will conduct an information, education and communication (IEC) campaign among the affected communities about the upcoming construction, its anticipated impacts, the grievance redress mechanism, contact details and location of the PMO and ICG, and status of compliance with the Government's environmental safeguard requirements. Billboards about the subproject, implementation schedule and contact details of the executing agency, PMO-ES, ICG-ESA and Contractors will be set up at strategic locations. The grievance redresses procedure and details will be posted at the offices of the ICG, WUSC and VDC;

iii. During construction, regular random interviews will be conducted by the ICG-ESA every month to monitor environmental concerns of subproject communities;

iv. During operation, periodic random interviews will be conducted by the ICG and WUSC to monitor the environmental concerns of subproject communities;

v. The public consultations and information disclosure will be continuous throughout the project cycle. PMO and ICG will be responsible for designing and implementing such aspects on the ground.

440. The GoN-approved IEE Report (in English), will be available at the offices of PMO, ICG, and WUSC for the perusal of interested parties. Copies may be made available upon formal request. IEE and environmental monitoring reports will be disclosed on the ADB's and STWSSSP website. This will be also as a part of Information Disclosure.

X. GRIEVANCE REDRESS MECHANISM

A. Purpose of the Grievance Redress Mechanism

441. A project-specific grievance redress mechanism (GRM) will be established to receive, evaluate and facilitate resolution of affected persons' concerns, complaints, and grievances related to social, environmental and other concerns on the project. The GRM will aim to provide a time-bound and transparent mechanism to resolve such concerns. The mechanism, developed in consultation with key stakeholders, will ensure that: (i) the basic rights and interests of every person adversely affected by the social and environmental performance of a Project are protected; and (ii) their concerns are effectively and timely addressed.

442. A common GRM will be in place for social, environmental or any other grievances related to the project. The GRM will provide an accessible forum for receiving and facilitating resolution of affected persons' grievances related to the project. Project will publish the sample grievance registration form on its website, and publish it in local language, at the hoarding board of each of the participating WUA or municipalities' office. Every grievance shall be registered with careful documentation of process adopted for each of the grievance handled, as explained below. The environmental and social safeguards officer (ESO/SSO) at the project management office (PMO) will have the overall responsibility for timely grievance redress on environmental and social safeguards issues. The Social Safeguards Officer at the Regional Project Management Office (RPMO) will be the focal person for facilitating the grievance redress at the local level.

443. A municipal-level public awareness campaign will be conducted on a regular basis as shown in the Communication & Public Participation Plan (CAPP) of the project to ensure awareness on the project and its GRM. The social and environmental safeguards experts of the PMQAC and RDSMCs will support the WUA or municipalities in conducting municipality-wide awareness campaigns, which will ensure that all stakeholders including poor and vulnerable are aware of the GRM and project's entitlements.

B. Proposed Set-Up

433. A Grievance Redress Committee (GRC) will be formed at the Municipality level, comprising the Mayor as Chairperson of GRC, and Regional Project Manager RPMO as Secretary. The GRC members will comprise of (1) WUSC Secretary; (2) RPMO Engineer; (3) RPMO social /environmental (as relevant) officer, (4) representative of affected persons, (5) RDSMC's safeguards specialist (social/environment as relevant), (6) a representative of reputable and relevant CBO/SHG/organization working in the project area as invitee[4] , and (7) contractor's representative. The secretary of the GRC will be responsible for convening timely meetings and maintaining minutes of meetings. The concerned social safeguards expert of RDSMC will support the RPMO safeguard's officer and Project Manager of RPMO to ensure that grievances, including those of the poor and vulnerable are addressed. All GRCs shall have at least two women committee members. Along with representatives of the APs, civil society and eminent citizens can be invited as observers in GRC meetings.

[4] If the complaints are related with IP/Dalits/other vulnerable groups, specific NGO/CBO that actively involved in development of these communities shall be involved.

444. The functions of the local GRC are as follows: (i) provide support to affected persons on problems arising from environmental or social disruption; asset acquisition (if necessary); and eligibility for entitlements, compensation and assistance; (ii) record grievances of APs, categorize and prioritize them and provide solutions within 15 days of receipt of complaint by WUA or local bodies; and (iii) ensure feedback to the aggrieved parties about developments regarding their grievances and decisions of the GRC.

445. The GRM procedure is outlined below in detail, with each step having time-bound schedules and responsible persons to address grievances and indicating appropriate persons whose advice is to be sought at each stage, as required:

(i) First Level of GRM (WUA level): The first-level, which is also the most accessible and immediate venue for quick resolution of grievances will be the contractors, RDSMC field engineers and RPMO supervision personnel, who will immediately inform the WUA. Any person with a grievance related to the project works can contact UWSSP to file a complaint. The municipal-level field office of the RPMO, in WUA's building, will document the complaint within 24 hours of receipt of complaint in the field, and WUA or local bodies will immediately address and resolve the issue at field-level with the contractor, supervision personnel of RPMO and RDSMC field engineers within 5 days of receipt of a complaint/grievance. The assigned RDSMC's Social Mobilizer will be responsible to fully document: (i) name of the person, (ii) date of complaint received, (iii) nature of complaint, (iv) location and (v) how the complaint was resolved. If the complaint remains unresolved at the local level within 5 days, the WUA will forward the complaint to the municipality level GRM.

(ii) Second Level of GRM (Municipality level): The complainant will be notified by the WUA that the grievance is forwarded to the Municipality-level GRC. The M level GRC will be called for a meeting, called and chaired by the Mayor. The GRC will recommend corrective measures at the field level and assign clear responsibilities for implementing its decision within 10 days of receipt of complaint by WUA. If the grievance remains unresolved within 10 days of receipt of complaint by WUA, the matter will be referred to the third level. The RPMO Engineer will be responsible for processing and placing all papers before the GRC, recording decisions, issuing minutes of the meetings, providing feedback to complainants and taking follow up actions so that formal orders are issued and decisions are carried out.

(iii) Third Level of GRM (PMO Level): Any unresolved or major issues at Municipality level will be referred to the PMO for final solution. The PMO's Project Director (PD) will have special meeting to find solutions. Decision has to be made within 15 days of receipt of complaint by WUA. The PD will sign off on all grievances received by the PMO. The concerned Deputy Project Director (DPD) and environmental and social safeguards officers (ESO & SSO) of PMO will be involved with support from the PMQAC's social/environment safeguards experts. The SSO will be responsible to convey the final decision to the complainant.

446. The complainant will have to fill up Grievance Redress Form as shown in ***Appendix B*** to file the complaint. All paperwork (details of grievances) needs to be completed by the WUA

member secretary assisted by RDSMC and circulated to the WUA Chairperson and members. At Municipality level, the RPMO Engineer will be responsible for circulation of grievances to the Regional Project Manager, DWSS, Mayor and other GRC members, prior to the scheduled meetings. The RPMO's Engineer will be responsible for follow-through of all escalated grievances. All decisions taken by the GRC will be communicated to the APs by the RPMO's SSO.

447. Despite the project GRM, an aggrieved person shall have access to the country's legal system at any stage and accessing the country's legal system can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM.

448. In the event that the established GRM is not in a position to resolve the issue, the affected person also can use ADB's Accountability Mechanism (AM) through directly contacting (in writing) the Complaint Receiving Officer (CRO) at ADB headquarters or the ADB Nepal Resident Mission. The complaint can be submitted in any of the official languages of ADB's developing member countries (DMCs). The ADB's AM information will be included in UWSSP Information Datasheet (PID), to be published in web and distributed to the affected communities, as part of the project GRM.

449. This GRM procedure is briefly depicted in ***Figure X-I*** given below:

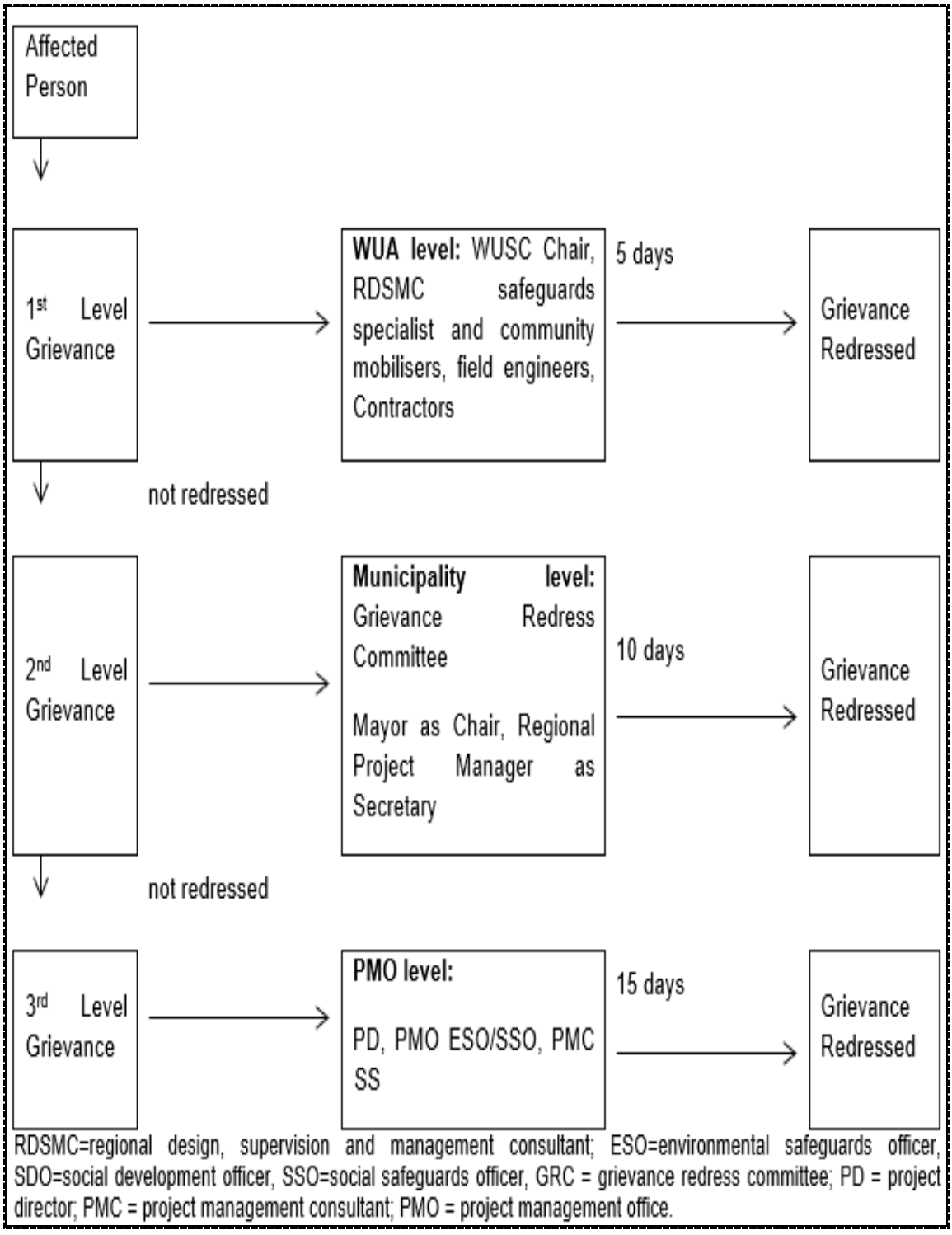

Figure X-I: Grievance Redress Mechanism (Formal Approach)

XI. MONITORING & REPORTING

440. RPMO is the main monitoring agency of the proposed project that will monitor and measure the progress of EMP implementation with assistance from DMSC. The monitoring activities will correspond with the project's risks and impacts, and will be identified in the IEEs for the subprojects. In addition to recording information on the work and deviation of work components from original scope, PMO, RPMOs & DSMC will undertake site inspections and document review to verify compliance with the EMP and progress toward the final outcome. Along with this, Ministry of Water Supply (MoWS) as well as Ministry of Forests & Environment (MoFS) under Government of Nepal will also undertake monitoring process through random field visits to review the project performance.

450. RPMOs will submit monthly monitoring and implementation reports to PMO, who will take follow-up actions, if necessary. PMO will submit semi-annual monitoring reports to ADB. This report will be based on the Sample Semi-Annual Monitoring Report Template given in ***Appendix E*** and Sample Environmental Site Inspection Report given in ***Appendix F***. The subproject budgets will reflect the costs of monitoring and reporting requirements.

451. For subprojects likely to have significant adverse environmental impacts, PMO will retain qualified and experienced external experts to verify its monitoring information. PMO environmental safeguard specialist will document monitoring results, identify the necessary corrective actions, reflect them in a corrective action plan, and for each quarter, will study the compliance with the action plan developed in the previous quarter. Compliance with loan covenants will be screened by the PMO.

452. ADB will review project performance against the MoWS commitments as agreed in the legal documents. The extent of ADB's monitoring and supervision activities will be commensurate with the project's risks and impacts. Monitoring and supervising of social and environmental safeguards will be integrated into the project performance management system. ADB will monitor projects on an ongoing basis until a project completion report is issued. ADB will carry out the following monitoring actions to supervise project implementation:

(i) conduct periodic site visits for projects with adverse environmental or social impacts;
(ii) conduct supervision missions with detailed review by ADB's safeguard specialists/officers or consultants for projects with significant adverse social or environmental impacts;
(iii) review the periodic monitoring reports submitted by PMO to ensure that adverse impacts and risks are mitigated, as planned and as agreed with ADB;
(iv) work with PMO to rectify to the extent possible any failures to comply with their safeguard commitments, as covenanted in the legal agreements, and exercise remedies to re-establish compliance as appropriate; and
(v) prepare a project completion report that assesses whether the objective and desired outcomes of the safeguard plans have been achieved, taking into account the baseline conditions and the results of monitoring.

XII. CONCLUSION

453. The IEE study indicates that:

- The proposed project, its components, are not within or adjacent to environmentally sensitive areas.
- The proposed project will fulfill the increasing water demand of the project town regarding the reliable water supply system. It will definitely address the issues raised by the hardship that people of the project town are facing for safe, reliable & potable water for years.
- The proposed project will bring about: (i) the benefits of access to reliable supply of safe and potable water; (ii) promotion of good hygiene and sanitation practices and reduced health and safety risks as positive impacts; and (iii) enhanced community health, improved quality of life and safe communities as outcomes.
- Along with positive outcomes, the proposed project will also have negative impacts as discussed above in Chapter VI. As per our IEE study, four of the adverse impacts that includes Air Pollution, Noise Pollution, Impacts on Water Quality of nearby rivers and Impact on Sustainability of Works are evaluated as "Very Significant". However, these impacts would not be problematic for the project implementation if the activities that stimulate this impact to occur are properly controlled through the mitigation measures.
- Some of the adverse impacts are also evaluated as Significant. However, these will not be sufficient to threaten or weaken the surrounding resources. Mitigation measures, integral to socially and environmentally responsible construction practices, will be commonly used at construction sites and the contractors will be aware about it. Hence, mitigation measures would not be difficult to implement.
- Similarly, Insignificant impacts can either be avoided or simply mitigated through the proposed mitigation measures.
- The environmental management plan (EMP) as mentioned above in Chapter VIII, if duly considered, followed and implemented during project construction activities, then the environmental issues will not be issues to be worried about.
- If the responsible body mentioned in the EMP matrix shown in the ***Table VIII-1*** properly takes up the responsibility for the implementation of mitigation measures for the likely impacts resulting from the various activities of the project, then, the environment of the project area will be safe and less affected from the project activities.
- Regular monitoring with good operation & maintenance service including prompt action on leaks and complying of the water supplied as prescribed in the National Drinking Water Quality Standards Directives will lessen the risks of the ineffective implementation of the proposed project and will sustain the system.
- Construction of 3 public toilets within the project town will improve the public behavior regarding safe & civilized sanitation practices. It will help to maintain ODF status of the project town.
- None of the anticipated environmental impacts of the proposed project is significant enough to go for either detailed EIA study or further especial study.
- As per ADB Categorization, the proposed project falls under "Category B". As per EPR 1997 (Latest Amendments 2017) Schedule H, this IEE study fulfills the requirements of IEE criteria. This IEE thus fulfills the policy requirements of both the ADB and the GoN. This indicates that IEE study is sufficient for the effective implementation of Ilam Water Supply & Sanitation Project.
- The IEE study shows that project benefits outweigh the risks and these potential risks can be overcome through proper planning and management.

454. Based on the above findings, the classification of the Ilam Water Supply & Sanitation Project as "Category B" is confirmed, no further special study or detailed EIA needs to be undertaken and people of Ilam Municipality will get rid of the hardship of safe, reliable & potable water they have been experiencing for decades.

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APPENDIXES

Appendix 1

Rapid Environmental Assessment Checklist, Preliminary Climate Risk Screening Checklist and No Mitigation Scenario (Scoping Checklist) for Ilam Water Supply & Sanitation Project

RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST FOR ILAM WATER SUPPLY & SANITATION PROJECT

Instructions:

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

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

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

Country/Project Title: **NEP: Urban Water Supply and Sanitation (Sector) Project**

Subproject: **Ilam Water Supply & Sanitation Project**

ScreeningQuestions	Yes	No	Remarks
A.Project Siting:Is the project area			
Densely populated?	√		Ilam Municipality has moderate population density.
Heavy with development activities?	√		The distribution pipeline will partially go through the RoW in core bazaar areas of Ilam Municipality.Development activities are of low moderate intensity.
Adjacent to or within any environmentally sensitive areas?			
Cultural heritage site		√	
Protected Area		√	

ScreeningQuestions	Yes	No	Remarks
Wetland		√	
Mangrove		√	
Estuarine		√	
Buffer zone of protected area		√	
Special area for protecting biodiversity		√	
Bay		√	
B. Potential Environmental Impacts Will the Project cause…			
Pollution of raw water supply from upstream wastewater discharge from communities,industries,agriculture,and		√	
Soil erosion runoff?			
Impairment of historical/cultural monuments/areas and loss/damage to these sites?		√	
Hazard of land subsidence caused by excessive ground water pumping?		√	
Social conflicts arising from displacement of communities ?		√	
Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		√	
Unsatisfactory raw water supply (e.g. excessive pathogens or mineralconstituents)?	√		Basic water treatment is proposed under the Subproject. EMP recommends water quality monitoring as prescribed in the NDWQS & its Directives.
Delivery of unsafe water to distribution system?	√		Design proposes office building that also comprises water quality laboratory to deliver safe water. EMP recommends continuing training of WUSC in water quality monitoring, as prescribed in the
Inadequate protection of intake works or wells, leading to pollution of water supply?	√		Design has considered the safest site for intake regarding environmental pollution and proposes enough measures to mitigate contamination.
Over pumping of ground water, leading to salinization and ground subsidence?		√	
Excessive algal growth in storage reservoir?		√	EMP providesmitigationmeasures.
Increase in production of sewage beyond the capabilities of community facilities?		√	EMP provides mitigation measures.

ScreeningQuestions	Yes	No	Remarks
Inadequate disposalofsludgefrom water treatmentplants?		√	Minimal sludge expected. EMP provides mitigation measures.
Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?		√	
Impairments associated with transmission lines and access roads?	√		EMP provides measures to mitigate impacts on power supply poles in the bazaar that are immediately adjacent to, or onto, road carriageways.
Health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.	√		EMP provides measures to mitigate health and safety impacts from improper handling, potential accidents &/or human error in dosing.
Health and safety hazards to workers from handling and management of chlorine used for disinfection, other contaminants, and biological and physical hazards during project construction and operation?		√	EMP provides measures to mitigate health and safety impacts from improper handling, potential accidents &/or human error in dosing.
Dislocation or involuntary resettlement of people?		√	
Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		√	
Noise and dust from construction activities?	√		EMP provides mitigation measures
Increased road traffic due to interference of construction activities?		√	EMP provides mitigation measures
Continuing soil erosion/silt runoff from construction operations?		√	
Delivery of unsafe water due to poor O&M treatment processes (especially mud accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?	√		EMP incorporates monitoring of distributed water according to the Directives for the NDWQS.

ScreeningQuestions	Yes	No	Remarks
Delivery of water to distribution system, which is corrosive due to inadequate attention to the feeding of corrective chemicals?	√		Concern for corrosion of G.I. pipes caused by the chlorine content in treated water is low. EMP provides mitigation measures.
Accidental leakage of chlorine gas?		√	
Excessive abstraction of water affecting downstream water users?		√	
Competing uses of water?		√	
Increased sewage flow due to increased water supply		√	
Increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant	√		There is no wastewater collection & treatment system. EMP provides mitigation measures.
Large population influx during project construction and operation that causes an increased burden on social infrastructure and services (such as water supply and sanitation systems)?		√	
Social conflicts if workers from other regions or countries are hired?	√		Expected as low concern. Priority will be given to local workers.
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction?	√		EMP provides mitigation measures
Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project area accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	√		EMP provides mitigation measures

Preliminary Climate Risk Screening Checklist

Country/Project Title: Ilam Water Supply & Sanitation Project
Sector:
Subsector:
Division/Department:

Screening Questions		Score	Remarks
Location and design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides	0	Investments in the sample project will not likely be affected by climate change and extreme weather events due to the siting of project. For example, all pipes will be constructed underground no investments will be sited in flood plains etc.
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g. sea-level, peak river flow, reliable water level, peak wind speed etc.)	0	Not likely. There are various sources that will be used for the proposed project. Further source water protection will be carried out.
Materials and maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity, and hydro metrological parameters) affect the selection of project inputs over the life of project outputs (i.e. construction materials)	0	
Performance of Project Outputs	Would climate/weather conditions and related extreme events likely to affect the performance throughout their design life time?	0	Climate conditions will unlikely affect water quantity and quality of water supply system. The water supply schemes will be designed to meet the current and future demand. Further water supply system will be operated and maintained efficiently to reduce system losses. Water safety plans will be implemented to ensure water supplied is safe and potable at all times.

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

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

Result of Initial Screening (Low, Medium, High): _____
Other
Comments:_____
_____
_____
Prepared by: _____

NO MITIGATION SCENARIO (SCOPING CHECKLIST) OF Ilam WSSP

Checklist 1: Scoping Checklist Part 1 - Questions on Project Characteristics

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
1. Will construction, operation or decommissioning of the Project involve actions which will cause physical changes in the locality (topography, land use, changes in waterbodies, etc)?				
1.1	Permanent or temporary change in land use, land cover or topography including increases in intensity of land use?	Yes	Temporary change in land use at the designated stockyards by disposing excess of excavated materials	No, it is short term and is limited to construction period only
1.2	Clearance of existing land, vegetation and buildings?	No		
1.3	Creation of new land uses?	No		
1.4	Pre-construction investigations e.g. boreholes, soil testing?	No		
1.5	Construction works?	Yes	Same as 1.1	
1.6	Demolition works?	Yes	Will require demolition of existing Shikhar Danda RVT and Gadhi Barrack RVT for the construction of new RVT and also require demolition of ROW for excavation works for distribution pipelines	No. The new RVT will be immediately constructed and the demolished ROW will also be readily rehabilitated.
1.7	Temporary sites used for construction works or housing of construction workers?	Yes	Possibility of disposal of the daily wastes to the nearby land or water bodies by the construction workers	No, there will be provision to prohibit such actions.
1.8	Above ground buildings, structures or earthworks including linear structures, cut and fill or excavations?	Yes	Earthworks may bring change in land use disrupting the access to roadside shops and houses.	No, the spoils will be readily disposed, and the immediate backfilling works will be done.
1.9	Underground works including mining or tunnelling?	No		
1.10	Reclamation works?	No		
1.11	Dredging?	No		
1.12	Coastal structures *eg* seawalls, piers?	No		
1.13	Offshore structures?	No		
1.14	Production and manufacturing processes?	No		
1.15	Facilities for storage of goods or materials?	No		
1.16	Facilities for treatment or disposal of solid wastes or liquid effluents?	No		
1.17	Facilities for long term housing of operational workers?	No		
1.18	New road, rail or sea traffic during construction or operation?	No		
1.19	New road, rail, air, waterborne or other transport infrastructure including new or altered routes and stations, ports, airports etc?	No		
1.20	Closure or diversion of existing transport routes or infrastructure	No		

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
	leading to changes in traffic movements?			
1.21	New or diverted transmission lines or pipelines?			
1.22	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?	No		
1.23	Stream crossings?	Yes	It may affect the integrity of biological habitat of the encountered rivers & streams.	No, care will be taken during laying of transmission line.
1.24	Abstraction or transfers of water from ground or surface waters?	Yes	It will abstract water from surface water sources i.e., river which may affect the availability of water.	No, design of this system has been done on the basis of assessment of average monthly flows of the source and the design confirms the reliability of the source.
1.25	Changes in water bodies or the land surface affecting drainage or run-off?	No		
1.26	Transport of personnel or materials for construction, operation or decommissioning?	Yes	Will generate dust and noise by vehicles for transportation of construction materials	No, because transportation of materials will be intermittent.
1.27	Long term dismantling or decommissioning or restoration works?	No		
1.28	Ongoing activity during decommissioning which could have an impact on the environment?	No		
1.29	Influx of people to an area in either temporarily or permanently?	No		
1.30	Introduction of alien species?	No		
1.31	Loss of native species or genetic diversity?	No		
1.32	Any other actions?	No		
2. Will construction or operation of the Project use natural resources such as land, water, materials or energy, especially any resources which are non-renewable or in short supply?				
2.1	Land especially undeveloped or agricultural land?	No		
2.2	Water?	No		
2.3	Minerals?	No		
2.4	Aggregates?	No		
2.5	Forests and timber?	No		
2.6	Energy including electricity and fuels?	No		
2.7	Any other resources?	No		
3. Will the Project involve use, storage, transport, handling or production of substances or materials				

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health?				
3.1	Will the project involve use of substances or materials which are hazardous or toxic to human health or the environment (flora, fauna, water supplies)?	No		
3.2	Will the project result in changes in occurrence of disease or affect disease vectors (eg insect or water borne diseases)?	Yes	The surroundings of the worker's camp may be affected as they may not have access to safe supply of water and good sanitation practice.	No because it is limited to construction period only and it can also be avoided by provision of safe access to water, sanitation and health care
3.3	Will the project affect the welfare of people eg by changing living conditions?	No		
3.4	Are there especially vulnerable groups of people who could be affected by the project eg hospital patients, the elderly?	No		
3.5	Any other causes?	No		
4. Will the Project produce solid wastes during construction or operation or decommissioning?				
4.1	Spoil, overburden or mine wastes?	Yes	The spoil if not readily disposed at safe site, it will occupy the land and may create discomfort to the passer-by.	No, because it is short term and can also be avoided by provision of immediate disposal of the spoils at safe site
4.2	Municipal waste (household and or commercial wastes)?	Yes	The living environment of worker's camp may be polluted by the waste generated by the workers.	No, it is short term
4.3	Hazardous or toxic wastes (including radioactive wastes)?	No		
4.4	Other industrial process wastes?	No		
4.5	Surplus product?	No		
4.6	Sewage sludge or other sludge from effluent treatment?	No		
4.7	Construction or demolition wastes?	Yes	• Air Pollution by the dust generated from the wastes • Discomfort to the passer-by if the wastes are not safely disposed	No, because it is limited to the construction phase only and there will be provision of immediate waste disposal
4.8	Redundant machinery or equipment?	No		
4.9	Contaminated soils or other material?	No		
4.10	Agricultural wastes?	No		
4.11	Any other solid wastes?	No		

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
5. Will the Project release pollutants or any hazardous, toxic or noxious substances to air?				
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources?	No		
5.2	Emissions from production processes?	No		
5.3	Emissions from materials handling including storage or transport?	Yes	Dust generation by the unloading of materials like cement, aggregates etc.	No -there will be regular monitoring
5.4	Emissions from construction activities including plant and equipment?	Yes	Dust generation by construction works like earthworks	No -there will be regular monitoring
5.5	Dust or odours from handling of materials including construction materials, sewage and waste?	Yes	Air pollution by the dust generation during unloading of materials like aggregates.	No -there will be regular monitoring
5.6	Emissions from incineration of waste?			
5.7	Emissions from burning of waste in open air (*eg* slash material, construction debris)?	Yes	The locality of the worker's camp may be affected by the open burning of waste generated from the worker's camp.	No, because it is limited to the local area only and is limited to the duration up to which the labours will be residing.
5.8	Emissions from any other sources?	No		
6. Will the Project cause noise and vibration or release of light, heat energy or electromagnetic radiation?				
6.1	From operation of equipment eg engines, ventilation plant, crushers?	No		
6.2	From industrial or similar processes?	No		
6.3	From construction or demolition?	Yes	• The noise generated from the demolition of ROW for distribution lines may disturb the people residing at core bazaar area.	No because it is short term (limited to construction phase)
6.4	From blasting or piling?	No		
6.5	From construction or operational traffic?	Yes	Moving of vehicles carrying construction materials may affect core area like Ilam Bazaar	No- because it is short term
6.6	From lighting or cooling systems?	No		
6.7	From sources of electromagnetic radiation (consider effects on nearby sensitive equipment as well as people)?	No		
6.8	From any other sources?	No		
7. Will the Project lead to risks of contamination of land or water from releases of pollutants onto the ground or into sewers, surface waters, groundwater, coastal waters or the sea?				
7.1	From handling, storage, use or spillage of hazardous or toxic materials?	No		
7.2	From discharge of sewage or other	Yes	The proposed project may attract people from rural	No, there will be provision of

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
	effluents (whether treated or untreated) to water or the land?		areas that will increase the population of the project area which in turn increase the generation of municipal sewage	treatment facilities and there will be also regular monitoring of this issue.
7.3	By deposition of pollutants emitted to air, onto the land or into water?	Yes	The land nearby the workers camp may be polluted by the daily activities of the workers residing there temporarily.	No because there will be provision of strict monitoring of this area.
7.4	From any other sources?	No		
7.5	Is there a risk of long term buildup of pollutants in the environment from these sources?	No		
8. Will there be any risk of accidents during construction or operation of the Project which could affect human health or the environment?				
8.1	From explosions, spillages, fires etc from storage, handling, use or production of hazardous or toxic substances?	No		
8.2	From events beyond the limits of normal environmental protection e.g. failure of pollution control systems?	No		
8.3	From any other causes?	No		
8.4	Could the project be affected by natural disasters causing environmental damage (*e.g.* floods, earthquakes, landslip, *etc.*)?	No		
9. Will the Project result in social changes, for example, in demography, traditional lifestyles, employment?				
9.1	Changes in population size, age, structure, social groups *etc.*?	Yes	There is chance of in migration due to this project that will affect the existing community, cultural identity, economic conditions etc.	Yes, the entry of new community may bother the existing community groups. The survey also shows that the diversity of culture, custom, tradition, norms and values exist in the project area.
9.2	By resettlement of people or demolition of homes or communities or community facilities e.g. schools, hospitals, social facilities?	No		
9.3	Through in-migration of new residents or creation of new communities?	Yes	Easy & Safe access to water supply and sanitation will attract people from the neighboring remote areas to achieve improved living standards.	Yes, the entry of new community may hurt the sentiments of the existing community.
9.4	By placing increased demands on local facilities or services e.g. housing,			

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
	education, health?			
9.5	By creating jobs during construction or operation or causing the loss of jobs with effects on unemployment and the economy?	Yes	Requirement of labor for the construction works prioritize the local people hence, providing employment opportunities to the local people.	Yes, because the skills they learnt during their employment period can be utilized in the future in other similar kind of works.
9.6	Any other causes?	No		
10. Are there any other factors which should be considered such as consequential development which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality?				
10.1	Will the project lead to pressure for consequential development which could have significant impact on the environment e.g. more housing, new roads, new supporting industries or utilities, etc.?	No		
10.2	Will the project lead to development of supporting facilities, ancillary development or development stimulated by the project which could have impact on the environment e.g.? • supporting infrastructure (roads, power supply, waste or waste water treatment, etc.) • housing development • extractive industries • supply industries other?	No		
10.3	Will the project lead to after-use of the site which could have an impact on the environment?	No		
10.4	Will the project set a precedent for later developments?	Yes	The safe access to water supply and sanitation by this project may create opportunities for other development infrastructures.	Yes, because it will be the important factor for the sustainable development of the town.
10.5	Will the project have cumulative effects due to proximity to other existing or planned projects with similar effects?	No		

Checklist 2: Scoping Checklist Part 2 - Characteristics of the Project Environment (Environmental Sensitivity)

Question - Are there features of the local environment on or around the Project location which could be affected by the Project? • Areas which are protected under international or national or local legislation for their ecological, landscape, cultural or other value, which could be affected by the project? • Other areas which are important or sensitive for reasons of their ecology e.g. • Wetlands, • Watercourses or other waterbodies, • the coastal zone, • mountains, • forests or woodlands • Areas used by protected, important or sensitive species of fauna or flora e.g. for breeding, nesting, foraging, resting, overwintering, migration, which could be affected by the project? • Inland, coastal, marine or underground waters? • Areas or features of high landscape or scenic value? • Routes or facilities used by the public for access to recreation or other facilities? • Transport routes which are susceptible to congestion or which cause environmental problems? • Areas or features of historic or cultural importance?	Yes, the core Ilam bazaar area may be susceptible to traffic congestion during distribution pipeline laying works that may provide discomfort to the passer-by and also may disrupt the access to the roadside shops & houses. Similarly, as the topography of the service area of this project is sloped terrain due to which during pipeline laying works, there is possibility of erosion. Hence, it should be ensured that the trench for pipeline should not be abandoned and the contractor should be recommended to backfill the trench immediately.
Question - Is the Project in a location where it is likely to be highly visible to many people?	Yes. The project area is proposed to serve the Ilam town which includes the core bazaar area due to which it will be highly visible to many people.
Question - Is the Project located in a previously undeveloped area where there will be loss of greenfield land?	No
Question - Are there existing land uses on or around the Project location which could be affected by the Project? For example: • Homes, gardens, other private property, • Industry, • Commerce, • Recreation, • public open space, • community facilities, • agriculture, • forestry, • tourism, • mining or quarrying	No
Question - Are there any plans for future land uses on or around the location which could be affected by the Project?	No
Question - Are there any areas on or around the location which are densely populated or built-up, which could be affected by the Project?	No
Question - Are there any areas on or around the location which are occupied by sensitive land uses which could be affected by the Project? • hospitals, • schools, • places of worship, • community facilities	No
Question - Are there any areas on or around the location which contain important, high quality or scarce resources which could be affected by the Project? For example: • groundwater resources,	No

• surface waters, • forestry, • agriculture, • fisheries, • tourism, • minerals.	
Question - Are there any areas on or around the location of the Project which are already subject to pollution or environmental damage e.g. where existing legal environmental standards are exceeded, which could be affected by the project?	No
Question - Is the Project location susceptible to earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions e.g. temperature inversions, fogs, severe winds, which could cause the project to present environmental problems?	No
Question - Is the Project likely to affect the physical condition of any environmental media? • The atmospheric environment including microclimate and local and larger scale climatic conditions? • Water - e.g. quantities, flows or levels of rivers, lakes, groundwater. Estuaries, coastal waters or the sea? • Soils - e.g. quantities, depths, humidity, stability or erodibility of soils? • Geological and ground conditions?	Yes, the sloped terrain of the project areas indicates the susceptibility to the soil erosion however if precautions are made, the effects can be made insignificant.
Question - Are releases from the Project likely to have effects on the quality of any environmental media? • Local air quality? • Global air quality including climate change and ozone depletion • Water quality – rivers, lakes, groundwater. Estuaries, coastal waters or the sea? • Nutrient status and eutrophication of waters? • Acidification of soils or waters? • Soils • Noise? • Temperature, light or electromagnetic radiation including electrical interference? • Productivity of natural or agricultural systems?	Yes, the construction activities may affect local air quality through dust emissions especially during dry season. It also generates noise pollution by the movement of vehicles for transporting materials, and demolition works of ROW for distribution pipe laying works.
Question - Is the Project likely to affect the availability or scarcity of any resources either locally or globally? • Fossil fuels? • Water? • Minerals and aggregates? • Timber? • Other non-renewable resources? • Infrastructure capacity in the locality - water, sewerage, power generation and transmission, telecommunications, waste disposal roads, rail?	No
Question - Is the Project likely to affect human or community health or welfare? • The quality or toxicity of air, water, foodstuffs and other products consumed by humans? • Morbidity or mortality of individuals, communities or populations by exposure to pollution? • Occurrence or distribution of disease vectors including insects? • Vulnerability of individuals, communities or populations to disease? • Individuals' sense of personal security? • Community cohesion and identity? • Cultural identity and associations? • Minority rights? • Housing conditions? • Employment and quality of employment?	Yes, • This project may offer employment to the local people to involve as a construction worker. This can be viewed as positive impact of the project. • This project also may result in the occurrence or distribution of disease vector due to the temporary settlement of workers as they may not have access to safe water supply and sanitation.

• Economic conditions? • Social institutions?	

Checklist 3: Significance of Impacts

Questions to be Considered	
1. Will there be a large change in environmental conditions?	No
2. Will new features be out-of-scale with the existing environment?	No
3. Will the effect be unusual in the area or particularly complex?	No
4. Will the effect extend over a large area?	No
5. Will there be any potential for trans boundary impact?	No
6. Will many people be affected?	No
7. Will many receptors of other types (fauna and flora, businesses, facilities) be affected?	No
8. Will valuable or scarce features or resources be affected?	No
9. Is there a risk that environmental standards will be breached?	No
10. Is there a risk that protected sites, areas, features will be affected?	No
11. Is there a high probability of the effect occurring?	No
12. Will the effect continue for a long time?	No
13. Will the effect be permanent rather than temporary?	No
14. Will the impact be continuous rather than intermittent?	No
15. If it is intermittent will it be frequent rather than rare?	No
16. Will the impact be irreversible?	No
17. Will it be difficult to avoid, or reduce or repair or compensate for the effect?	No

Appendix 2: Environmental Standards, Sample Forms & Report Template

Appendix A
Relevant Environmental Quality Standards

National Ambient Air Quality Standards for Nepal, 2003

Parameter	Averaging Period	Nepal's Ambient Air Quality Standard (µg/m^3) *	WHO Air Quality Guidelines (µg/m^3) **	
			Global Update 2005	Second Edition ^ 2000
TSP	Annual	-	-	-
	24-hour	230	-	-
PM_{10}	Annual	-	20	-
	24-hour	120	50	-
$PM_{2.5}$	1-year	-	10	-
	24-hour	-	25	-
SO_2	Annual	50	-	
	24-hour	70	20	-
	10-minute	-	500	-
NO_2	1-year	40	40	-
	24-hour	80	-	-
	1-hour	-	200	-
CO	8-hour	10,000	-	10,000
	15-minute	100,000	-	100,000
Pb	1-year	0.5	-	0.5
Benzene	1-year	20	-	-

* National Ambient Air Quality Standards for Nepal, 2003. Obtained from Environment Statistics of Nepal 2011, Government of Nepal, National Planning Commission Secretariat, Central Bureau of Statistics, Kathmandu, Nepal.

** Environmental, Health and Safety General Guidelines, 2007. International Finance Corporation, World Bank Group.

^ Air Quality Guidelines for Europe, Second Edition, 2000. WHO Regional Office for Europe, Copenhagen.

Parameter that either has no national standard value for 24-hour observation or with WHO guideline value for 24-hour observation as more stringent than that specified in the national standards.

National Noise Standard Guidelines, 2012

Receptor / Source	National Noise Standard Guidelines, 2012 (dB)		WHO Guideline Values for Noise Levels Measured Out of Doors * (One Hour L_{Aeq} in dBA)	
	Day	Night	07:00 - 22:00	22:00 - 07:00
Industrial area	75	70	70	70
Commercial area	65	55		
Rural residential area	45	40	55	45
Urban residential area	55	50		
Mixed residential area	63	55		
Quiet area	50	40	-	-
Water pump	65		-	
Diesel generator	90		-	

* Guidelines for Community Noise, WHO, 1999.

Source:Environmental, Health and Safety General Guidelines, 2007. International Finance Corporation, World Bank Group.

Tolerance limits for wastewater to be discharged into inland surface waters from combined wastewater treatment plant (generic standards)

Characteristics	Tolerance Limit
Total Suspended solids, mg/L, Max	50
Particle size of total suspended particles	Shall pass 850-micron Sieve.
pH	5.5 to 9.0
Temperature	Shall not exceed 40 degree C in any section of the stream within 15 meters down-stream from the effluent outlet.
Biochemical oxygen demand (BOD) for 5 days at 20 degree C, mg/L, Max	50
Oils and grease, mg/L, Max	10
Phenolic compounds, mg/L, Max	1
Cyanides (as CN), mg/L, Max	0.2
Sulphides (as S), mg/L, Max	2
Radioactive materials:	
a. Alpha emitters, c/ml, Max	7-Oct
b. Beta emitters, c/ml, Max	8-Oct
Insecticides	Absent
Total residual chlorine, mg/L	1
Fluorides (as F), mg/L, Max	2
Arsenic (as As), mg/L, Max	0.2
Cadmium (as, Cd), mg/L, Max	2
Hexavalent chromium (as Cr), mg/L, Max	0.1
Copper (as Cu), mg/L, Max	3
Lead (as Pb), mg/L, Max	0.1
Mercury (as Hg), mg/L, Max	0.01
Nickel (as Ni), mg/L, Max	3
Selenium (as Se), mg/L, Max	0.05
Zinc (as Zn), mg/L, Max	5
Ammonical nitrogen, mg/L, Max	50
Chemical Oxygen Demand, mg/L, Max	250
Silver, mg/L, Max	0.1

Appendix B
Sample Grievance Redress Form

Sample Grievance Redress Form

(To be available in Nepalese and English)

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

Date	Place of registration			
Contact Information/personal details				
Name	Gender	*Male *Female	Age	
Home Address				
Place				
Phone No.				
E-mail				
Complaint/Suggestion/Comment/Question Please provide the details (who, what, where and how) of your grievance below: If includes as attachment/note/letter, please tick here:				
How do you want us to reach you for feedback or update on your comment/grievance?				

FOR OFFICIAL USE ONLY

Registered by: (Names of official registering grievance)	
Mode of communication: Note/Letter E-mail Verbal/Telephonic	
Reviewed by: (Names/positions of official(s) reviewing grievance)	
Action Taken:	
Whether Action Taken Disclosed:	Yes No
Means of Disclosure:	

Appendix C
Sample Traffic Management Plan

A. Principles

One of the prime objectives of this TMP is to ensure the safety of all the road users along the work zone, and to address the following issues:

(i) the safety of pedestrians, bicyclists, and motorists travelling through the construction zone;
(ii) protection of work crews from hazards associated with moving traffic;
(iii) mitigation of the adverse impact on road capacity and delays to the road users;
(iv) maintenance of access to adjoining properties
(v) Avoid hazards in
(vi) Addressing issues that may delay the project.

B. Operating Policies for TMP

The following principles will help promote safe and efficient movement for all road users (motorists, bicyclists, and pedestrians, including persons with disabilities) through and around work zones while reasonably protecting workers and equipment.

(i) Make traffic safety and temporary traffic control an integral and high-priority element of every project from planning through design, construction, and maintenance.
(ii) Inhibit traffic movement as little as possible.
(iii) Provide clear and positive guidance to drivers, bicyclists, and pedestrians as they approach and travel through the temporary traffic control zone.
(iv) Inspect traffic control elements routinely, both day and night, and make modifications when necessary.
(v) Pay increased attention to roadside safety in the vicinity of temporary traffic control zones.
(vi) Train all persons that select, place, and maintain temporary traffic control devices.
(vii) Keep the public well informed.
(viii) Make appropriate accommodation for abutting property owners, residents, businesses, emergency services, railroads, commercial vehicles, and transit operations.

C. Analyze the impact due to street closure

Apart from the capacity analysis, a final decision to close a particular street and divert the traffic should involve the following steps:

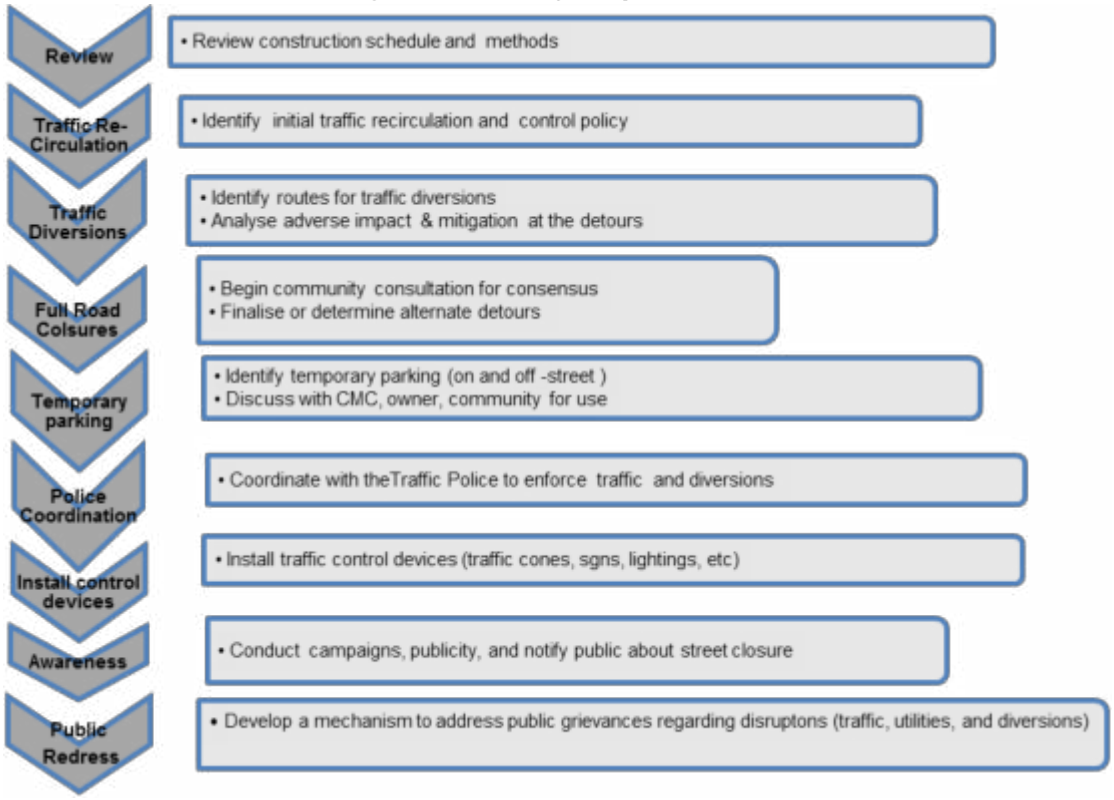
(i) approval from the ICG, local administration to use the local streets as detours;
(ii) consultation with businesses, community members, traffic police, PWD, etc, regarding the mitigation measures necessary at the detours where the road is diverted during the construction;
(iii) determining of the maximum number of days allowed for road closure, and incorporation of such provisions into the contract documents;
(iv) determining if additional traffic control or temporary improvements are needed along the detour route;
(v) considering how access will be provided to the worksite;

(vi) contacting emergency service, school officials, and transit authorities to determine if there are impacts to their operations; and

(vii) developing a notification program to the public so that the closure is not a surprise. As part of this program, the public should be advised of alternate routes that commuters can take or will have to take as result of the traffic diversion.

If full road-closure of certain streets within the area is not feasible due to inadequate capacity of the Detour Street or public opposition, the full closure can be restricted to weekends with the construction commencing on Saturday night and ending on Monday morning prior to the morning peak period.

Figure A1: Policy Steps for the TMP



D. Public awareness and notifications

As per discussions in the previous sections, there will be travel delays during the constructions, as is the case with most construction projects, albeit on a reduced scale if utilities and traffic management are properly coordinated. There are additional grounds for travel delays in the area, as most of the streets lack sufficient capacity to accommodate additional traffic from diverted traffic as a result of street closures to accommodate the works.

The awareness campaign and the prior notification for the public will be a continuous activity which the project will carry out to compensate for the above delays and minimize public claims as result of these problems. These activities will take place sufficiently in advance of the time when the roadblocks or traffic diversions take place at the particular streets. The reason for this is to allow sufficient time for the public and residents to understand the changes to their travel plans. The

project will notify the public about the roadblocks and traffic diversion through public notices, ward level meetings and city level meeting with the elected representatives.

The ICG will also conduct an awareness campaign to educate the public about the following issues:

(i) traffic control devices in place at the work zones (signs, traffic cones, barriers, etc.);
(ii) defensive driving behavior along the work zones; and
(iii) reduced speeds enforced at the work zones and traffic diversions.

It may be necessary to conduct the awareness programs/campaigns on road safety during construction.

The campaign will cater to all types of target groups i.e. children, adults, and drivers. Therefore, these campaigns will be conducted in schools and community centers. In addition, the project will publish a brochure for public information. These brochures will be widely circulated around the area and will also be available at the ICG, and the contractor's site office. The text of the brochure should be concise to be effective, with a lot of graphics. It will serve the following purpose:

(i) Explain why the brochure was prepared, along with a brief description of the project;
(ii) Advise the public to expect the unexpected;
(iii) Educate the public about the various traffic control devices and safety measures adopted at the work zones;
(iv) Educate the public about the safe road user behavior to emulate at the work zones;
(v) Tell the public how to stay informed or where to inquire about road safety issues at the work zones (name, telephone, mobile number of the contact person; and
(vi) Indicate the office hours of relevant offices.

E. Vehicle Maintenance and Safety

A vehicle maintenance and safety program shall be implemented by the construction contractor. The contractor should ensure that all the vehicles are in proper running condition and it comply with roadworthy and meet certification standards of GoN. All vehicles to be used at STWSSP shall be in perfect condition meeting pollution standards of GoN. The vehicle operator requires a pre state of shift checklist. Additional safety precautions will include the requirement for:

- Driver will follow the special code of conduct and road safety rules of Government of Nepal.
- Drivers to ensure that all loads are covered and secured drivers to ensure operation equipment can’t leak materials hauled
- Vehicles will be cleaned and maintained in designed places.

F. Install traffic control devices at the work zones and traffic diversion routes

The purpose of installing traffic control devices at the work zones is to delineate these areas to warn, inform, and direct the road users about a hazard ahead, and to protect them as well as the workers. As proper delineation is a key to achieve the above objective, it is important to install good traffic signs at the work zones. The following traffic control devices are used in work zones:

- Signs
- Pavement Markings

- Channelizing Devices
- Arrow Panels
- Warning Lights

Procedures for installing traffic control devices at any work zone vary, depending on road configuration, location of the work, construction activity, duration, traffic speed and volume, and pedestrian traffic. Work will take place along major roads, and the minor internal roads. As such, the traffic volume and road geometry vary. The main roads carry considerable traffic; internal roads in the new city areas are wide but in old city roads very narrow and carry considerable traffic. However, regardless of where the construction takes place, all the work zones should be cordoned off, and traffic shifted away at least with traffic cones, barricades, and temporary signs (temporary "STOP" and "GO").

The work zone should take into consideration the space required for a buffer zone between the workers and the traffic (lateral and longitudinal) and the transition space required for delineation, as applicable. For the works, a 30 cm clearance between the traffic and the temporary STOP and GO signs should be provided. In addition, at least 60 cm is necessary to install the temporary traffic signs and cones.

Traffic police should regulate traffic away from the work zone and enforce the traffic diversion result from full street closure in certain areas during construction. Flaggers/ personnel should be equipped with reflective jackets at all times and have traffic control batons (preferably the LED type) for regulating the traffic during night time.

In addition to the delineation devices, all the construction workers should wear fluorescent safety vests and helmets in order to be visible to the motorists at all times. There should be provision for lighting beacons and illumination for night constructions.

The ICG and contractor will coordinate with the local administration and traffic police regarding the traffic signs, detour, and any other matters related to traffic. The contractor will prepare the traffic management plan in detail and submit it along with the EMP for the final approval.

Appendix D
Spoil Management Plan

Purpose and application: SMP is to describe how STWSSP will manage the spoil generated and reuse related to design and construction works. This is an integral part of EMP. The objective of SMP is to reuse of spoil from works in accordance with the spoil management hierarchy outlined in this document.

Objectives of SMP: The objectives of SMP are:

- **A** To minimize spoil generation where possible
- **B** Maximize beneficial reuse of spoil from construction works in accordance with spoil management hierarchy
- **C** Mange onsite spoil handling to minimize environmental impacts on resident and other receivers
- **D** Minimize any further site contamination of land, water, soil
- **E** Manage the transportation of spoil with consideration of traffic impacts and transport related emissions

Structure of SMP:

Section 1: Introduction of SMP
Section 2: Legal and other requirements
Section 3: Roles and responsibilities
Section 4: Identification and assessment of spoil aspects and impacts
Section 5: Spoil volumes, characteristics and minimization
Section 6: Spoil reuses opportunities, identification and assessment
Section 7: On site spoil management approach
Section 8: Spoil transportation methodology
Section 9: Monitoring, Reporting, Review, and Improvements

Aspects and potential impacts

The key aspects of potential impacts in relation to SMP are listed in table below

Aspects	Potential Impacts
Air Quality	Potential for high winds generating airborne dust from the stock piles
Sedimentation	Potential for sediment laden site runoff from spoil stockpiles and potential for spillage of spoil from truck on roads
Surface and groundwater	Contamination of surface and ground water
Noise	Associated with spoil handling and haulage and storage
Traffic	Impacts associated with spoil haulage
Land Use	Potential for spoil to be transported to a receivable site that doesn't have permission for storage/disposal
Design specifications	Limitations on opportunities to minimize spoil generation
Sustainability	Limited sites for storage reuse opportunities

Spoil volumes, Characteristics and Minimization

Spoil volume calculations: Estimate the volumes of spoils produced from each of the construction sites.

Characterization of spoil: Based on the type of spoil; characterization is done (sand stone, mud mix materials, reusable materials

Adopt Spoil Reduce, Reuse Opportunities: An overview of the assessment methodology to be used is mentioned below.

- Consideration of likely spoil characteristics
- Identification of possible reuse sites
- Screening of possible reuse opportunities

Identification of possible safe disposal sites for spoil: Those spoils, which can't be reuse, shall be properly disposed in designated areas, such disposal areas should be identified in project locations. Such disposal areas should be safe from environmental aspects, there should not be any legal, and resettlement related issues. Such areas need to be identified and prior cliental approval should be obtained to use it as spoil disposal area. The local administration must be consulted and if required permission should be obtained from them.

Storage and Stockpiling Transportation and Haulage route

Based on the above, the contractor will prepare a SMP as an integral part of EMP and submit it to the DSC for their review and approval.

SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

Summary of follow up time-bound actions to be taken within a set timeframe

Appendixes

F Photos

G Summary of consultations

H Copies of environmental clearances and permits

I Sample of environmental site inspection Report

J Others

Appendix E
Sample Semi-Annual Environmental Monitoring Report Template

This template must be included as an appendix in the EIA/IEE that will be prepared for the project. It can be adapted to the specific project as necessary.

a. Introduction
b. Overall project description and objectives
c. Description of sub-projects
d. Environmental category of the sub-projects
e. Details of site personnel and/or consultants responsible for environmental monitoring
f. Overall project and sub-project progress and status

No.	Sub-Project Name	Status of Sub-Project				List of Works	Progress of Works
		Design	Pre-Construction	Construction	Operational		
		☐	☐	☐	☐		
		☐	☐	☐	☐		

COMPLIANCE STATUS WITH NATIONAL/STATE/LOCAL STATUTORY ENVIRONMENTAL REQUIREMENTS

No.	Sub-Project Name	Statutory Environmental Requirements	Status of Compliance	Action Required

COMPLIANCE STATUS WITH ENVIRONMENTAL LOAN COVENANTS

No. (List schedule and paragraph number of Loan Agreement)	Covenant	Status of Compliance	Action Required

COMPLIANCE STATUS WITH THE ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

a. Provide the monitoring results as per the parameters outlined in the EMP. Append supporting documents where applicable, including Environmental Site Inspection Reports.
b. There should be Reporting on the following items, which can be incorporated in the checklist of routine Environmental Site Inspection Report followed with a summary in the semi-annual Report send to ADB. Visual assessment and review of relevant site documentation during routine site inspection needs to note and record the following:
c. What are the dust suppression techniques followed for site and if any dust was noted to escape the site boundaries;
d. If muddy water was escaping site boundaries or muddy tracks were seen on adjacent roads;
e. adequacy of type of erosion and sediment control measures installed on site, condition of erosion and sediment control measures including if these were intact following heavy rain;

f. Are their designated areas for concrete works, and refueling;
g. Are their spill kits on site and if there are site procedure for handling emergencies;
h. Is there any chemical stored on site and what is the storage condition?
i. Is there any dewatering activities if yes, where is the water being discharged;
j. How are the stockpiles being managed;
k. How is solid and liquid waste being handled on site;
l. Review of the complaint management system;
m. Checking if there are any activities being under taken out of working hours and how that is being managed.

Summary Monitoring Table

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
Design Phase						
Pre-Construction Phase						
Construction Phase						
Operational Phase						

Overall Compliance with CEMP/EMP

No.	Sub-Project Name	EMP/CEMP Part of Contract Documents (Y/N)	CEMP/EMP Being Implemented (Y/N)	Status of Implementation (Excellent/ Satisfactory/ Partially Satisfactory/ Below Satisfactory)	Action Proposed & Additional Measures Required

APPROACH AND METHODOLOGY FOR ENVIRONMENTAL MONITORING OF THE PROJECT

Brief description on the approach and methodology used for environmental monitoring of each sub-project

MONITORING OF ENVIRONMENTAL IMPACTS ON PROJECT SURROUNDINGS (AMBIENT AIR, WATER QUALITY AND NOISE LEVELS)

a. Brief discussion on the basis for monitoring
b. Indicate type and location of environmental parameters to be monitored
c. Indicate the method of monitoring and equipment to be used
d. Provide monitoring results and an analysis of results in relation to baseline data and statutory requirements

As a minimum the results should be presented as per the tables below.

Air Quality Results

Site No.	Date of Testing	Site Location	Parameters (Government Standards)		
			PM10 (µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)

Water Quality Results

Site No.	Date of Sampling	Site Location	Parameters (Government Standards)					
			pH	Conductivity (µS/cm)	BOD (mg/L)	TSS (mg/L	TN (mg/L)	TP (mg/L)

Noise Quality Results

Site No.	Date of Testing	Site Location	LA_{eq} (dBA) (Government Standard)	
			Day Time	Night Time

Appendix F
Sample Environmental Site Inspection Report

Project Name
Contract Number

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

WEATHER CONDITION:
_____

INITIAL SITE CONDITION:_____

CONCLUDING SITE CONDITION:

Satisfactory_____Unsatisfactory_____ Incident_____ Resolved _____ Unresolved _____

INCIDENT:
Nature of incident:
_____
Intervention Steps:
_____
Incident Issues

Resolution

Project Activity Stage	Survey	
	Design	
	Implementation	
	Pre-Commissioning	
	Guarantee Period	

Inspection

Emissions	Waste Minimization
Air Quality	Reuse and Recycling
Noise pollution	Dust and Litter Control
Hazardous Substances	Trees and Vegetation

Site Restored to Original Condition Yes [ ] No [ ]

Signature
_____

Sign off

_____ _____

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

Appendix 3
Proximity Report on Ilam Town Generated by ADB

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Integrated Biodiversity Assessment Tool

Proximity report generated by the Integrated Biodiversity Assessment Tool

Site name	Illam Town, Illam
Latitude/Longitude	26° 54' 34" North, 87° 55' 38" East
Date generated	26th April 2018
Generated by	asiandb
Company	ADB

About this report

This report presents the results of a proximity analysis to identify the biodiversity features and species which are located within 1 km, 5 km and 10 km.

Data used to generate this report

IUCN and UNEP-WCMC, 2017. *The World Database on Protected Areas (WDPA) [On-line], March 2018.*

BirdLife International (on behalf of the KBA Partnership), 2016. *Key Biodiversity Areas: December 2016 version.*

IUCN, 2017. *The IUCN Red List of Threatened Species grid analysis of range maps. Version 2017-3 (December).*

Limitations

This report provides an indication of the potential biodiversity-related features - protected areas, key biodiversity areas and species - close to the specified location. It provides an early indication of potential biodiversity concerns, and can provide valuable guidance in making decisions. For example, this information can be helpful when assessing the potential environmental risk and impact of a site, categorising investments/projects, preparing the terms of reference for an impact assessment, focusing attention on key species of conservation concern and sites of known conservation value, and reviewing the results of an impact assessment.

The report does not provide details of potential indirect, downstream or cumulative impacts. Furthermore, the report should be regarded as a " first-step", providing a set of conservation values sourced from global data sets, and is not a substitute for further investigation and due diligence, especially concerning national and/or local conservation priorities.

For ultimate accuracy, distance calculations are performed by reprojecting the spatial data (as shown through the map viewer) to an equal distance projection, and so may not match precisely the results shown on the map.

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Protected Areas and Key Biodiversity Areas

The following sites are found within the selected buffer distances:

Features within 1 km

Priority Sites for Biodiversity		
Key Biodiversity Area	Mai Valley forests CR/EN, VU, endemic, other	30,000 ha

Features within 5 km

There are no additional features within 5 km.

Features within 10 km

There are no additional features within 10 km.

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IUCN RED LIST OF THREATENED SPECIES

Given suitable habitat, the following species are potentially found close to the area of interest:

Taxonomic group	Scientific Name	Common Name	IUCN Red List category
Amphibians	*Amolops formosus*		LC
Amphibians	*Amolops gerbillus*	Yembung Sucker Frog	LC
Amphibians	*Amolops marmoratus*		LC
Amphibians	*Amolops monticola*		LC
Amphibians	*Duttaphrynus himalayanus*	Himalayan Toad	LC
Amphibians	*Duttaphrynus melanostictus*	Black-spectacled Toad	LC
Amphibians	*Duttaphrynus stomaticus*		LC
Amphibians	*Euphlyctis cyanophlyctis*		LC
Amphibians	*Fejervarya limnocharis*	Asian Grass Frog	LC
Amphibians	*Fejervarya nepalensis*	Nepal Wart Frog	LC
Amphibians	*Fejervarya pierrei*	Pierre's Wart Frog	LC
Amphibians	*Fejervarya syhadrensis*	Bombay Wart Frog	LC
Amphibians	*Fejervarya teraiensis*	Terai Wart Frog	LC
Amphibians	*Hoplobatrachus crassus*	Jerdon's Bullfrog	LC
Amphibians	*Hoplobatrachus tigerinus*	Indian Bullfrog	LC
Amphibians	*Humerana humeralis*		LC
Amphibians	*Hylarana chitwanensis*		NT
Amphibians	*Hylarana tytleri*		LC
Amphibians	*Ichthyophis sikkimensis*	Darjeeling Caecilian	DD
Amphibians	*Megophrys parva*	Concave-crowned Horned Toad	LC
Amphibians	*Microhyla ornata*	Ant Frog	LC
Amphibians	*Nanorana annandalii*	Annandale's Paa Frog	NT
Amphibians	*Nanorana blanfordii*		LC
Amphibians	*Nanorana liebigii*		LC
Amphibians	*Nanorana polunini*		LC
Amphibians	*Occidozyga lima*	Pointed-tongued Floating Frog	LC
Amphibians	*Ombrana sikimensis*		LC
Amphibians	*Philautus jerdonii*	Jerdon's Bubble-nest Frog	DD
Amphibians	*Polypedates leucomystax*	White-lipped Tree Frog	LC
Amphibians	*Polypedates maculatus*	Himalayan Tree Frog	LC
Amphibians	*Polypedates taeniatus*		LC
Amphibians	*Rhacophorus maximus*		LC
Amphibians	*Rhacophorus tuberculatus*		DD
Amphibians	*Scutiger sikimmensis*		LC
Amphibians	*Sphaerotheca breviceps*		LC
Amphibians	*Sphaerotheca maskeyi*		LC
Amphibians	*Theloderma asperum*	Hill Garden Bug-eyed Frog	LC

Amphibians	*Tylototriton verrucosus*	Himalayan Salamander	LC
Amphibians	*Uperodon systoma*	Marbled Balloon Frog	LC
Birds	*Abroscopus albogularis*	Rufous-faced Warbler	LC
Birds	*Abroscopus schisticeps*	Black-faced Warbler	LC
Birds	*Abroscopus superciliaris*	Yellow-bellied Warbler	LC
Birds	*Acanthoptila nipalensis*	Spiny Babbler	LC
Birds	*Accipiter badius*	Shikra	LC
Birds	*Accipiter nisus*	Eurasian Sparrowhawk	LC
Birds	*Accipiter trivirgatus*	Crested Goshawk	LC
Birds	*Accipiter virgatus*	Besra	LC
Birds	*Acridotheres fuscus*	Jungle Myna	LC
Birds	*Acridotheres ginginianus*	Bank Myna	LC
Birds	*Acridotheres tristis*	Common Myna	LC
Birds	*Acrocephalus agricola*	Paddyfield Warbler	LC
Birds	*Acrocephalus concinens*	Blunt-winged Warbler	LC
Birds	*Acrocephalus dumetorum*	Blyth's Reed-warbler	LC
Birds	*Acrocephalus stentoreus*	Clamorous Reed-warbler	LC
Birds	*Actinodura egertoni*	Rusty-fronted Barwing	LC
Birds	*Aegithalos iouschistos*	Rufous-fronted Tit	LC
Birds	*Aegithalos iredalei*	Red-headed Tit	LC
Birds	*Aegithina tiphia*	Common Iora	LC
Birds	*Aegypius monachus*	Cinereous Vulture	NT
Birds	*Aerodramus brevirostris*	Himalayan Swiftlet	LC
Birds	*Aethopyga nipalensis*	Green-tailed Sunbird	LC
Birds	*Aethopyga saturata*	Black-throated Sunbird	LC
Birds	*Aethopyga siparaja*	Crimson Sunbird	LC
Birds	*Agraphospiza rubescens*	Blanford's Rosefinch	LC
Birds	*Alauda gulgula*	Oriental Skylark	LC
Birds	*Alaudala raytal*	Sand Lark	LC
Birds	*Alcedo atthis*	Common Kingfisher	LC
Birds	*Alcedo hercules*	Blyth's Kingfisher	NT
Birds	*Alcedo meninting*	Blue-eared Kingfisher	LC
Birds	*Alcippe nipalensis*	Nepal Fulvetta	LC
Birds	*Alectoris chukar*	Chukar	LC
Birds	*Alophoixus flaveolus*	White-throated Bulbul	LC
Birds	*Amandava amandava*	Red Avadavat	LC
Birds	*Amaurornis phoenicurus*	White-breasted Waterhen	LC
Birds	*Anas acuta*	Northern Pintail	LC
Birds	*Anas crecca*	Common Teal	LC
Birds	*Anastomus oscitans*	Asian Openbill	LC

Birds	*Anhinga melanogaster*	Oriental Darter	NT
Birds	*Anser anser*	Greylag Goose	LC
Birds	*Anser indicus*	Bar-headed Goose	LC
Birds	*Anthipes monileger*	White-gorgeted Flycatcher	LC
Birds	*Anthracoceros albirostris*	Oriental Pied Hornbill	LC
Birds	*Anthus godlewskii*	Blyth's Pipit	LC
Birds	*Anthus hodgsoni*	Olive-backed Pipit	LC
Birds	*Anthus richardi*	Richard's Pipit	LC
Birds	*Anthus roseatus*	Rosy Pipit	LC
Birds	*Anthus rufulus*	Paddyfield Pipit	LC
Birds	*Anthus similis*	Long-billed Pipit	LC
Birds	*Anthus sylvanus*	Upland Pipit	LC
Birds	*Antigone antigone*	Sarus Crane	VU
Birds	*Apus nipalensis*	House Swift	LC
Birds	*Apus pacificus*	Pacific Swift	LC
Birds	*Aquila chrysaetos*	Golden Eagle	LC
Birds	*Aquila fasciata*	Bonelli's Eagle	LC
Birds	*Aquila heliaca*	Eastern Imperial Eagle	VU
Birds	*Aquila nipalensis*	Steppe Eagle	EN
Birds	*Arachnothera longirostra*	Little Spiderhunter	LC
Birds	*Arachnothera magna*	Streaked Spiderhunter	LC
Birds	*Arborophila rufogularis*	Rufous-throated Partridge	LC
Birds	*Arborophila torqueola*	Hill Partridge	LC
Birds	*Ardea alba*	Great White Egret	LC
Birds	*Ardea cinerea*	Grey Heron	LC
Birds	*Ardea purpurea*	Purple Heron	LC
Birds	*Ardeola grayii*	Indian Pond-heron	LC
Birds	*Artamus fuscus*	Ashy Woodswallow	LC
Birds	*Arundinax aedon*	Thick-billed Warbler	LC
Birds	*Asio flammeus*	Short-eared Owl	LC
Birds	*Asio otus*	Northern Long-eared Owl	LC
Birds	*Athene brama*	Spotted Owlet	LC
Birds	*Athene noctua*	Little Owl	LC
Birds	*Aviceda leuphotes*	Black Baza	LC
Birds	*Aythya baeri*	Baer's Pochard	CR
Birds	*Aythya ferina*	Common Pochard	VU
Birds	*Aythya fuligula*	Tufted Duck	LC
Birds	*Aythya nyroca*	Ferruginous Duck	NT
Birds	*Blythipicus pyrrhotis*	Bay Woodpecker	LC
Birds	*Botaurus stellaris*	Eurasian Bittern	LC

Birds	*Brachypteryx cruralis*	Himalayan Shortwing	LC
Birds	*Brachypteryx hyperythra*	Rusty-bellied Shortwing	NT
Birds	*Brachypteryx leucophris*	Lesser Shortwing	LC
Birds	*Brachypteryx montana*	Javan Shortwing	LC
Birds	*Bubo bengalensis*	Rock Eagle-owl	LC
Birds	*Bubo nipalensis*	Spot-bellied Eagle-owl	LC
Birds	*Bubulcus ibis*	Cattle Egret	LC
Birds	*Buceros bicornis*	Great Hornbill	NT
Birds	*Buteo hemilasius*	Upland Buzzard	LC
Birds	*Buteo japonicus*	Japanese Buzzard	LC
Birds	*Buteo refectus*	Himalayan Buzzard	LC
Birds	*Buteo rufinus*	Long-legged Buzzard	LC
Birds	*Butorides striata*	Green-backed Heron	LC
Birds	*Cacomantis passerinus*	Grey-bellied Cuckoo	LC
Birds	*Cacomantis sonneratii*	Banded Bay Cuckoo	LC
Birds	*Calandrella acutirostris*	Hume's Lark	LC
Birds	*Calidris temminckii*	Temminck's Stint	LC
Birds	*Calliope calliope*	Siberian Rubythroat	LC
Birds	*Caprimulgus affinis*	Savanna Nightjar	LC
Birds	*Caprimulgus asiaticus*	Indian Nightjar	LC
Birds	*Caprimulgus jotaka*	Grey Nightjar	LC
Birds	*Caprimulgus macrurus*	Large-tailed Nightjar	LC
Birds	*Carpodacus edwardsii*	Dark-rumped Rosefinch	LC
Birds	*Carpodacus erythrinus*	Common Rosefinch	LC
Birds	*Carpodacus pulcherrimus*	Beautiful Rosefinch	LC
Birds	*Carpodacus rodochroa*	Pink-browed Rosefinch	LC
Birds	*Carpodacus rodopeplus*	Spot-winged Rosefinch	LC
Birds	*Carpodacus sipahi*	Scarlet Finch	LC
Birds	*Carpodacus subhimachalus*	Crimson-browed Finch	LC
Birds	*Carpodacus thura*	Himalayan White-browed Rosefinc	LC
Birds	*Carpodacus vinaceus*	Vinaceous Rosefinch	LC
Birds	*Cecropis daurica*	Red-rumped Swallow	LC
Birds	*Centropus bengalensis*	Lesser Coucal	LC
Birds	*Centropus sinensis*	Greater Coucal	LC
Birds	*Cephalopyrus flammiceps*	Fire-capped Tit	LC
Birds	*Certhia discolor*	Sikkim Treecreeper	LC
Birds	*Certhia hodgsoni*	Hodgson's Treecreeper	LC
Birds	*Certhia nipalensis*	Rusty-flanked Treecreeper	LC
Birds	*Ceryle rudis*	Pied Kingfisher	LC
Birds	*Cettia brunnifrons*	Grey-sided Bush-warbler	LC

Birds	*Cettia castaneocoronata*	Chestnut-headed Tesia	LC
Birds	*Cettia major*	Chestnut-crowned Bush-warbler	LC
Birds	*Chaetornis striata*	Bristled Grassbird	VU
Birds	*Chalcophaps indica*	Grey-capped Emerald Dove	LC
Birds	*Charadrius alexandrinus*	Kentish Plover	LC
Birds	*Charadrius dubius*	Little Ringed Plover	LC
Birds	*Charadrius placidus*	Long-billed Plover	LC
Birds	*Chelidorhynx hypoxanthus*	Yellow-bellied Fairy-fantail	LC
Birds	*Chlidonias hybrida*	Whiskered Tern	LC
Birds	*Chloris spinoides*	Yellow-breasted Greenfinch	LC
Birds	*Chloropsis aurifrons*	Golden-fronted Leafbird	LC
Birds	*Chloropsis hardwickii*	Orange-bellied Leafbird	LC
Birds	*Cholornis unicolor*	Brown Parrotbill	LC
Birds	*Chrysococcyx maculatus*	Asian Emerald Cuckoo	LC
Birds	*Chrysocolaptes guttacristatus*	Greater Flameback	LC
Birds	*Chrysominla strigula*	Bar-throated Minla	LC
Birds	*Chrysomma sinense*	Yellow-eyed Babbler	LC
Birds	*Chrysophlegma flavinucha*	Greater Yellownape	LC
Birds	*Ciconia episcopus*	Asian Woollyneck	VU
Birds	*Ciconia nigra*	Black Stork	LC
Birds	*Cinclidium frontale*	Blue-fronted Robin	LC
Birds	*Cinclus cinclus*	White-throated Dipper	LC
Birds	*Cinclus pallasii*	Brown Dipper	LC
Birds	*Cinnyris asiaticus*	Purple Sunbird	LC
Birds	*Circaetus gallicus*	Short-toed Snake-eagle	LC
Birds	*Circus aeruginosus*	Western Marsh-harrier	LC
Birds	*Circus cyaneus*	Hen Harrier	LC
Birds	*Circus melanoleucos*	Pied Harrier	LC
Birds	*Cissa chinensis*	Common Green Magpie	LC
Birds	*Cisticola exilis*	Golden-headed Cisticola	LC
Birds	*Cisticola juncidis*	Zitting Cisticola	LC
Birds	*Clamator coromandus*	Chestnut-winged Cuckoo	LC
Birds	*Clamator jacobinus*	Jacobin Cuckoo	LC
Birds	*Cochoa purpurea*	Purple Cochoa	LC
Birds	*Cochoa viridis*	Green Cochoa	LC
Birds	*Columba hodgsonii*	Speckled Woodpigeon	LC
Birds	*Columba livia*	Rock Dove	LC
Birds	*Columba palumbus*	Common Woodpigeon	LC
Birds	*Columba pulchricollis*	Ashy Woodpigeon	LC
Birds	*Conostoma aemodium*	Great Parrotbill	LC

Birds	*Copsychus saularis*	Oriental Magpie-robin	LC
Birds	*Coracias affinis*	Indochinese Roller	LC
Birds	*Coracias benghalensis*	Indian Roller	LC
Birds	*Coracina macei*	Indian Cuckooshrike	LC
Birds	*Corvus macrorhynchos*	Large-billed Crow	LC
Birds	*Corvus splendens*	House Crow	LC
Birds	*Coturnix coromandelica*	Rain Quail	LC
Birds	*Coturnix coturnix*	Common Quail	LC
Birds	*Cuculus canorus*	Common Cuckoo	LC
Birds	*Cuculus micropterus*	Indian Cuckoo	LC
Birds	*Cuculus poliocephalus*	Lesser Cuckoo	LC
Birds	*Cuculus saturatus*	Oriental Cuckoo	LC
Birds	*Culicicapa ceylonensis*	Grey-headed Canary-flycatcher	LC
Birds	*Cutia nipalensis*	Himalayan Cutia	LC
Birds	*Cyanecula svecica*	Bluethroat	LC
Birds	*Cyanoderma chrysaeum*	Golden Babbler	LC
Birds	*Cyanoderma pyrrhops*	Black-chinned Babbler	LC
Birds	*Cyanoderma ruficeps*	Rufous-capped Babbler	LC
Birds	*Cyornis magnirostris*	Large Blue-flycatcher	LC
Birds	*Cyornis poliogenys*	Pale-chinned Flycatcher	LC
Birds	*Cyornis rubeculoides*	Blue-throated Blue-flycatcher	LC
Birds	*Cyornis tickelliae*	Tickell's Blue-flycatcher	LC
Birds	*Cyornis unicolor*	Pale Blue-flycatcher	LC
Birds	*Cypsiurus balasiensis*	Asian Palm-swift	LC
Birds	*Delichon dasypus*	Asian House Martin	LC
Birds	*Delichon nipalense*	Nepal House Martin	LC
Birds	*Dendrocitta formosae*	Grey Treepie	LC
Birds	*Dendrocitta vagabunda*	Rufous Treepie	LC
Birds	*Dendrocopos hyperythrus*	Rufous-bellied Woodpecker	LC
Birds	*Dendrocopos macei*	Fulvous-breasted Woodpecker	LC
Birds	*Dicaeum agile*	Thick-billed Flowerpecker	LC
Birds	*Dicaeum chrysorrheum*	Yellow-vented Flowerpecker	LC
Birds	*Dicaeum cruentatum*	Scarlet-backed Flowerpecker	LC
Birds	*Dicaeum erythrorhynchos*	Pale-billed Flowerpecker	LC
Birds	*Dicaeum ignipectus*	Fire-breasted Flowerpecker	LC
Birds	*Dicaeum melanozanthum*	Yellow-bellied Flowerpecker	LC
Birds	*Dicaeum minullum*	Plain Flowerpecker	LC
Birds	*Dicrurus aeneus*	Bronzed Drongo	LC
Birds	*Dicrurus annectens*	Crow-billed Drongo	LC
Birds	*Dicrurus hottentottus*	Hair-crested Drongo	LC

Birds	*Dicrurus leucophaeus*	Ashy Drongo	LC
Birds	*Dicrurus macrocercus*	Black Drongo	LC
Birds	*Dicrurus paradiseus*	Greater Racquet-tailed Drongo	LC
Birds	*Dicrurus remifer*	Lesser Racquet-tailed Drongo	LC
Birds	*Dinopium benghalense*	Black-rumped Flameback	LC
Birds	*Dinopium shorii*	Himalayan Flameback	LC
Birds	*Ducula badia*	Mountain Imperial-pigeon	LC
Birds	*Egretta garzetta*	Little Egret	LC
Birds	*Elanus caeruleus*	Black-winged Kite	LC
Birds	*Emberiza aureola*	Yellow-breasted Bunting	CR
Birds	*Emberiza fucata*	Chestnut-eared Bunting	LC
Birds	*Emberiza lathami*	Crested Bunting	LC
Birds	*Emberiza spodocephala*	Black-faced Bunting	LC
Birds	*Enicurus immaculatus*	Black-backed Forktail	LC
Birds	*Enicurus leschenaulti*	White-crowned Forktail	LC
Birds	*Enicurus maculatus*	Spotted Forktail	LC
Birds	*Enicurus schistaceus*	Slaty-backed Forktail	LC
Birds	*Enicurus scouleri*	Little Forktail	LC
Birds	*Ephippiorhynchus asiaticus*	Black-necked Stork	NT
Birds	*Eremopterix griseus*	Ashy-crowned Sparrow-lark	LC
Birds	*Erpornis zantholeuca*	White-bellied Erpornis	LC
Birds	*Erythrogenys erythrogenys*	Rusty-cheeked Scimitar-babbler	LC
Birds	*Esacus recurvirostris*	Great Thick-knee	NT
Birds	*Eudynamys scolopaceus*	Western Koel	LC
Birds	*Eumyias thalassinus*	Verditer Flycatcher	LC
Birds	*Euodice malabarica*	Indian Silverbill	LC
Birds	*Eurystomus orientalis*	Oriental Dollarbird	LC
Birds	*Falco amurensis*	Amur Falcon	LC
Birds	*Falco chicquera*	Red-headed Falcon	NT
Birds	*Falco naumanni*	Lesser Kestrel	LC
Birds	*Falco peregrinus*	Peregrine Falcon	LC
Birds	*Falco severus*	Oriental Hobby	LC
Birds	*Falco subbuteo*	Eurasian Hobby	LC
Birds	*Falco tinnunculus*	Common Kestrel	LC
Birds	*Ficedula albicilla*	Red-throated Flycatcher	LC
Birds	*Ficedula erithacus*	Slaty-backed Flycatcher	LC
Birds	*Ficedula hodgsoni*	Pygmy Blue-flycatcher	LC
Birds	*Ficedula hyperythra*	Snowy-browed Flycatcher	LC
Birds	*Ficedula parva*	Red-breasted Flycatcher	LC
Birds	*Ficedula ruficauda*	Rusty-tailed Flycatcher	LC

Birds	*Ficedula sapphira*	Sapphire Flycatcher	LC
Birds	*Ficedula strophiata*	Rufous-gorgeted Flycatcher	LC
Birds	*Ficedula superciliaris*	Ultramarine Flycatcher	LC
Birds	*Ficedula tricolor*	Slaty-blue Flycatcher	LC
Birds	*Ficedula westermanni*	Little Pied Flycatcher	LC
Birds	*Francolinus francolinus*	Black Francolin	LC
Birds	*Francolinus gularis*	Swamp Francolin	VU
Birds	*Fringilla montifringilla*	Brambling	LC
Birds	*Fulica atra*	Common Coot	LC
Birds	*Fulvetta vinipectus*	White-browed Fulvetta	LC
Birds	*Gallicrex cinerea*	Watercock	LC
Birds	*Gallinago gallinago*	Common Snipe	LC
Birds	*Gallinago solitaria*	Solitary Snipe	LC
Birds	*Gallinago stenura*	Pintail Snipe	LC
Birds	*Gallinula chloropus*	Common Moorhen	LC
Birds	*Gallus gallus*	Red Junglefowl	LC
Birds	*Gampsorhynchus rufulus*	White-hooded Babbler	LC
Birds	*Garrulax albogularis*	White-throated Laughingthrush	LC
Birds	*Garrulax caerulatus*	Grey-sided Laughingthrush	LC
Birds	*Garrulax leucolophus*	White-crested Laughingthrush	LC
Birds	*Garrulax monileger*	Lesser Necklaced Laughingthrush	LC
Birds	*Garrulax ocellatus*	Spotted Laughingthrush	LC
Birds	*Garrulax pectoralis*	Greater Necklaced Laughingthrush	LC
Birds	*Garrulax rufogularis*	Rufous-chinned Laughingthrush	LC
Birds	*Garrulus bispecularis*	Plain-crowned Jay	LC
Birds	*Gecinulus grantia*	Pale-headed Woodpecker	LC
Birds	*Geokichla citrina*	Orange-headed Thrush	LC
Birds	*Geokichla wardii*	Pied Thrush	LC
Birds	*Glareola lactea*	Little Pratincole	LC
Birds	*Glareola maldivarum*	Oriental Pratincole	LC
Birds	*Glaucidium brodiei*	Collared Owlet	LC
Birds	*Glaucidium cuculoides*	Asian Barred Owlet	LC
Birds	*Glaucidium radiatum*	Jungle Owlet	LC
Birds	*Gracula indica*	Southern Hill Myna	LC
Birds	*Gracula religiosa*	Common Hill Myna	LC
Birds	*Gracula robusta*	Nias Hill Myna	CR
Birds	*Gracula venerata*	Tenggara Hill Myna	EN
Birds	*Gracupica contra*	Asian Pied Starling	LC
Birds	*Graminicola bengalensis*	Indian Grass-babbler	LC
Birds	*Grammatoptila striata*	Striated Laughingthrush	LC

Birds	*Grus grus*	Common Crane	LC
Birds	*Gyps bengalensis*	White-rumped Vulture	CR
Birds	*Gyps fulvus*	Griffon Vulture	LC
Birds	*Gyps himalayensis*	Himalayan Griffon	NT
Birds	*Gyps tenuirostris*	Slender-billed Vulture	CR
Birds	*Halcyon coromanda*	Ruddy Kingfisher	LC
Birds	*Halcyon pileata*	Black-capped Kingfisher	LC
Birds	*Halcyon smyrnensis*	White-breasted Kingfisher	LC
Birds	*Haliaeetus albicilla*	White-tailed Sea-eagle	LC
Birds	*Haliaeetus leucoryphus*	Pallas's Fish-eagle	EN
Birds	*Haliastur indus*	Brahminy Kite	LC
Birds	*Harpactes erythrocephalus*	Red-headed Trogon	LC
Birds	*Hemiprocne coronata*	Crested Treeswift	LC
Birds	*Hemipus picatus*	Bar-winged Flycatcher-shrike	LC
Birds	*Hemitesia pallidipes*	Pale-footed Bush-warbler	LC
Birds	*Hemixos flavala*	Ashy Bulbul	LC
Birds	*Heterophasia capistrata*	Rufous Sibia	LC
Birds	*Heterophasia gracilis*	Grey Sibia	LC
Birds	*Heterophasia picaoides*	Long-tailed Sibia	LC
Birds	*Heteroxenicus stellatus*	Gould's Shortwing	LC
Birds	*Hieraaetus pennatus*	Booted Eagle	LC
Birds	*Hierococcyx nisicolor*	Whistling Hawk-cuckoo	LC
Birds	*Hierococcyx sparverioides*	Large Hawk-cuckoo	LC
Birds	*Hierococcyx varius*	Common Hawk-cuckoo	LC
Birds	*Hirundapus caudacutus*	White-throated Needletail	LC
Birds	*Hirundapus cochinchinensis*	Silver-backed Needletail	LC
Birds	*Hirundo rustica*	Barn Swallow	LC
Birds	*Hodgsonius phaenicuroides*	White-bellied Redstart	LC
Birds	*Horornis brunnescens*	Hume's Bush-warbler	LC
Birds	*Horornis flavolivaceus*	Aberrant Bush-warbler	LC
Birds	*Horornis fortipes*	Brownish-flanked Bush-warbler	LC
Birds	*Houbaropsis bengalensis*	Bengal Florican	CR
Birds	*Hydrophasianus chirurgus*	Pheasant-tailed Jacana	LC
Birds	*Hydrornis nipalensis*	Blue-naped Pitta	LC
Birds	*Hypothymis azurea*	Black-naped Monarch	LC
Birds	*Hypsipetes leucocephalus*	Black Bulbul	LC
Birds	*Ibidorhyncha struthersii*	Ibisbill	LC
Birds	*Icthyophaga humilis*	Lesser Fish-eagle	NT
Birds	*Icthyophaga ichthyaetus*	Grey-headed Fish-eagle	NT
Birds	*Ictinaetus malaiensis*	Black Eagle	LC

Birds	*Iduna caligata*	Booted Warbler	LC
Birds	*Indicator xanthonotus*	Yellow-rumped Honeyguide	NT
Birds	*Irena puella*	Asian Fairy-bluebird	LC
Birds	*Ixobrychus cinnamomeus*	Cinnamon Bittern	LC
Birds	*Ixobrychus sinensis*	Yellow Bittern	LC
Birds	*Ixos mcclellandii*	Mountain Bulbul	LC
Birds	*Jynx torquilla*	Eurasian Wryneck	LC
Birds	*Ketupa zeylonensis*	Brown Fish-owl	LC
Birds	*Kittacincla malabarica*	White-rumped Shama	LC
Birds	*Lalage melanoptera*	Black-headed Cuckooshrike	LC
Birds	*Lalage melaschistos*	Black-winged Cuckooshrike	LC
Birds	*Lanius cristatus*	Brown Shrike	LC
Birds	*Lanius schach*	Long-tailed Shrike	LC
Birds	*Lanius tephronotus*	Grey-backed Shrike	LC
Birds	*Larus brunnicephalus*	Brown-headed Gull	LC
Birds	*Larus ichthyaetus*	Pallas's Gull	LC
Birds	*Larus ridibundus*	Black-headed Gull	LC
Birds	*Larvivora brunnea*	Indian Blue Robin	LC
Birds	*Leiopicus auriceps*	Brown-fronted Woodpecker	LC
Birds	*Leiopicus mahrattensis*	Yellow-crowned Woodpecker	LC
Birds	*Leioptila annectens*	Rufous-backed Sibia	LC
Birds	*Leiothrix argentauris*	Silver-eared Mesia	LC
Birds	*Leptoptilos dubius*	Greater Adjutant	EN
Birds	*Leptoptilos javanicus*	Lesser Adjutant	VU
Birds	*Leucosticte nemoricola*	Plain Mountain-finch	LC
Birds	*Lewinia striata*	Slaty-breasted Rail	LC
Birds	*Limosa limosa*	Black-tailed Godwit	NT
Birds	*Linaria flavirostris*	Twite	LC
Birds	*Liocichla phoenicea*	Red-faced Liocichla	LC
Birds	*Lioparus chrysotis*	Golden-breasted Fulvetta	LC
Birds	*Locustella certhiola*	Pallas's Grasshopper-warbler	LC
Birds	*Locustella lanceolata*	Lanceolated Warbler	LC
Birds	*Locustella luteoventris*	Brown Grasshopper-warbler	LC
Birds	*Locustella tacsanowskia*	Chinese Grasshopper-warbler	LC
Birds	*Locustella thoracica*	Spotted Grasshopper-warbler	LC
Birds	*Lonchura punctulata*	Scaly-breasted Munia	LC
Birds	*Lonchura striata*	White-rumped Munia	LC
Birds	*Lophophanes dichrous*	Grey-crested Tit	LC
Birds	*Lophophorus impejanus*	Himalayan Monal	LC
Birds	*Lophotriorchis kienerii*	Rufous-bellied Eagle	LC

Birds	*Lophura leucomelanos*	Kalij Pheasant	LC
Birds	*Loriculus vernalis*	Vernal Hanging-parrot	LC
Birds	*Loxia curvirostra*	Red Crossbill	LC
Birds	*Machlolophus spilonotus*	Yellow-cheeked Tit	LC
Birds	*Machlolophus xanthogenys*	Black-lored Tit	LC
Birds	*Macropygia unchall*	Barred Cuckoo-dove	LC
Birds	*Malacocincla abbotti*	Abbott's Babbler	LC
Birds	*Mareca strepera*	Gadwall	LC
Birds	*Megaceryle lugubris*	Crested Kingfisher	LC
Birds	*Megalurus palustris*	Striated Grassbird	LC
Birds	*Melanochlora sultanea*	Sultan Tit	LC
Birds	*Mergus merganser*	Goosander	LC
Birds	*Merops leschenaulti*	Chestnut-headed Bee-eater	LC
Birds	*Merops orientalis*	Asian Green Bee-eater	LC
Birds	*Merops philippinus*	Blue-tailed Bee-eater	LC
Birds	*Microhierax caerulescens*	Collared Falconet	LC
Birds	*Micropternus brachyurus*	Rufous Woodpecker	LC
Birds	*Milvus migrans*	Black Kite	LC
Birds	*Minla ignotincta*	Red-tailed Minla	LC
Birds	*Mirafra assamica*	Bengal Bushlark	LC
Birds	*Mixornis gularis*	Pin-striped Tit-babbler	LC
Birds	*Monticola cinclorhyncha*	Blue-capped Rock-thrush	LC
Birds	*Monticola rufiventris*	Chestnut-bellied Rock-thrush	LC
Birds	*Monticola solitarius*	Blue Rock-thrush	LC
Birds	*Motacilla alba*	White Wagtail	LC
Birds	*Motacilla cinerea*	Grey Wagtail	LC
Birds	*Motacilla citreola*	Citrine Wagtail	LC
Birds	*Motacilla flava*	Western Yellow Wagtail	LC
Birds	*Motacilla maderaspatensis*	White-browed Wagtail	LC
Birds	*Mulleripicus pulverulentus*	Great Slaty Woodpecker	VU
Birds	*Muscicapa dauurica*	Asian Brown Flycatcher	LC
Birds	*Muscicapa ferruginea*	Ferruginous Flycatcher	LC
Birds	*Muscicapa sibirica*	Dark-sided Flycatcher	LC
Birds	*Mycerobas affinis*	Collared Grosbeak	LC
Birds	*Mycerobas carnipes*	White-winged Grosbeak	LC
Birds	*Mycerobas melanozanthos*	Spot-winged Grosbeak	LC
Birds	*Mycteria leucocephala*	Painted Stork	NT
Birds	*Myiomela leucura*	White-tailed Blue Robin	LC
Birds	*Myophonus caeruleus*	Blue Whistling-thrush	LC
Birds	*Myzornis pyrrhoura*	Fire-tailed Myzornis	LC

Birds	*Neophron percnopterus*	Egyptian Vulture	EN
Birds	*Netta rufina*	Red-crested Pochard	LC
Birds	*Nettapus coromandelianus*	Cotton Pygmy-goose	LC
Birds	*Niltava grandis*	Large Niltava	LC
Birds	*Niltava macgrigoriae*	Small Niltava	LC
Birds	*Niltava sundara*	Rufous-bellied Niltava	LC
Birds	*Niltava vivida*	Small Vivid Niltava	LC
Birds	*Ninox scutulata*	Brown Boobook	LC
Birds	*Nisaetus cirrhatus*	Changeable Hawk-eagle	LC
Birds	*Nisaetus nipalensis*	Mountain Hawk-eagle	LC
Birds	*Numenius arquata*	Eurasian Curlew	NT
Birds	*Nycticorax nycticorax*	Black-crowned Night-heron	LC
Birds	*Nyctyornis athertoni*	Blue-bearded Bee-eater	LC
Birds	*Oriolus chinensis*	Black-naped Oriole	LC
Birds	*Oriolus kundoo*	Indian Golden Oriole	LC
Birds	*Oriolus tenuirostris*	Slender-billed Oriole	LC
Birds	*Oriolus traillii*	Maroon Oriole	LC
Birds	*Oriolus xanthornus*	Black-hooded Oriole	LC
Birds	*Orthotomus sutorius*	Common Tailorbird	LC
Birds	*Otus lettia*	Collared Scops-owl	LC
Birds	*Otus spilocephalus*	Mountain Scops-owl	LC
Birds	*Otus sunia*	Oriental Scops-owl	LC
Birds	*Pandion haliaetus*	Osprey	LC
Birds	*Parus major*	Great Tit	LC
Birds	*Parus monticolus*	Green-backed Tit	LC
Birds	*Passer cinnamomeus*	Russet Sparrow	LC
Birds	*Passer domesticus*	House Sparrow	LC
Birds	*Passer montanus*	Eurasian Tree Sparrow	LC
Birds	*Pavo cristatus*	Indian Peafowl	LC
Birds	*Pelargopsis capensis*	Stork-billed Kingfisher	LC
Birds	*Pelecanus philippensis*	Spot-billed Pelican	NT
Birds	*Pellorneum ruficeps*	Puff-throated Babbler	LC
Birds	*Pericrocotus brevirostris*	Short-billed Minivet	LC
Birds	*Pericrocotus cinnamomeus*	Small Minivet	LC
Birds	*Pericrocotus ethologus*	Long-tailed Minivet	LC
Birds	*Pericrocotus flammeus*	Scarlet Minivet	LC
Birds	*Pericrocotus roseus*	Rosy Minivet	LC
Birds	*Pericrocotus solaris*	Grey-chinned Minivet	LC
Birds	*Periparus ater*	Coal Tit	LC
Birds	*Periparus rubidiventris*	Rufous-vented Tit	LC

Birds	*Pernis ptilorhynchus*	Oriental Honey-buzzard	LC
Birds	*Petrochelidon fluvicola*	Streak-throated Swallow	LC
Birds	*Phaenicophaeus tristis*	Green-billed Malkoha	LC
Birds	*Phalacrocorax carbo*	Great Cormorant	LC
Birds	*Phoenicurus coeruleocephala*	Blue-capped Redstart	LC
Birds	*Phoenicurus frontalis*	Blue-fronted Redstart	LC
Birds	*Phoenicurus fuliginosus*	Plumbeous Water-redstart	LC
Birds	*Phoenicurus hodgsoni*	Hodgson's Redstart	LC
Birds	*Phoenicurus leucocephalus*	White-capped Water-redstart	LC
Birds	*Phoenicurus ochruros*	Black Redstart	LC
Birds	*Phylloscopus affinis*	Tickell's Leaf-warbler	LC
Birds	*Phylloscopus burkii*	Green-crowned Warbler	LC
Birds	*Phylloscopus cantator*	Yellow-vented Warbler	LC
Birds	*Phylloscopus castaniceps*	Chestnut-crowned Warbler	LC
Birds	*Phylloscopus chloronotus*	Lemon-rumped Leaf-warbler	LC
Birds	*Phylloscopus fuligiventer*	Smoky Warbler	LC
Birds	*Phylloscopus fuscatus*	Dusky Warbler	LC
Birds	*Phylloscopus griseolus*	Sulphur-bellied Warbler	LC
Birds	*Phylloscopus humei*	Hume's Leaf-warbler	LC
Birds	*Phylloscopus inornatus*	Yellow-browed Warbler	LC
Birds	*Phylloscopus maculipennis*	Ashy-throated Warbler	LC
Birds	*Phylloscopus magnirostris*	Large-billed Leaf-warbler	LC
Birds	*Phylloscopus occipitalis*	Western Crowned Leaf-warbler	LC
Birds	*Phylloscopus poliogenys*	Grey-cheeked Warbler	LC
Birds	*Phylloscopus pulcher*	Buff-barred Warbler	LC
Birds	*Phylloscopus reguloides*	Blyth's Leaf-warbler	LC
Birds	*Phylloscopus tristis*	Siberian Chiffchaff	LC
Birds	*Phylloscopus trochiloides*	Greenish Warbler	LC
Birds	*Phylloscopus whistleri*	Whistler's Warbler	LC
Birds	*Phylloscopus xanthoschistos*	Grey-hooded Warbler	LC
Birds	*Pica pica*	Eurasian Magpie	LC
Birds	*Picoides canicapillus*	Grey-capped Woodpecker	LC
Birds	*Picoides nanus*	Indian Pygmy Woodpecker	LC
Birds	*Picumnus innominatus*	Speckled Piculet	LC
Birds	*Picus chlorolophus*	Lesser Yellownape	LC
Birds	*Picus guerini*	Black-naped Woodpecker	LC
Birds	*Picus xanthopygaeus*	Streak-throated Woodpecker	LC
Birds	*Pitta sordida*	Western Hooded Pitta	LC
Birds	*Plegadis falcinellus*	Glossy Ibis	LC
Birds	*Ploceus benghalensis*	Black-breasted Weaver	LC

Birds	*Ploceus manyar*	Streaked Weaver	LC
Birds	*Ploceus megarhynchus*	Finn's Weaver	VU
Birds	*Ploceus philippinus*	Baya Weaver	LC
Birds	*Pluvialis fulva*	Pacific Golden Plover	LC
Birds	*Pnoepyga albiventer*	Scaly-breasted Cupwing	LC
Birds	*Pnoepyga immaculata*	Nepal Cupwing	LC
Birds	*Pnoepyga pusilla*	Pygmy Cupwing	LC
Birds	*Podiceps cristatus*	Great Crested Grebe	LC
Birds	*Pomatorhinus ferruginosus*	Coral-billed Scimitar-babbler	LC
Birds	*Pomatorhinus ruficollis*	Streak-breasted Scimitar-babbler	LC
Birds	*Pomatorhinus schisticeps*	White-browed Scimitar-babbler	LC
Birds	*Pomatorhinus superciliaris*	Slender-billed Scimitar-babbler	LC
Birds	*Porphyrio porphyrio*	Purple Swamphen	LC
Birds	*Prinia atrogularis*	Black-throated Prinia	LC
Birds	*Prinia cinereocapilla*	Grey-crowned Prinia	VU
Birds	*Prinia crinigera*	Striated Prinia	LC
Birds	*Prinia flaviventris*	Yellow-bellied Prinia	LC
Birds	*Prinia gracilis*	Graceful Prinia	LC
Birds	*Prinia hodgsonii*	Grey-breasted Prinia	LC
Birds	*Prinia inornata*	Plain Prinia	LC
Birds	*Prinia socialis*	Ashy Prinia	LC
Birds	*Procarduelis nipalensis*	Dark-breasted Rosefinch	LC
Birds	*Prunella strophiata*	Rufous-breasted Accentor	LC
Birds	*Psarisomus dalhousiae*	Long-tailed Broadbill	LC
Birds	*Pseudibis papillosa*	Red-naped Ibis	LC
Birds	*Psilopogon asiaticus*	Blue-throated Barbet	LC
Birds	*Psilopogon cyanotis*	Blue-eared Barbet	LC
Birds	*Psilopogon franklinii*	Golden-throated Barbet	LC
Birds	*Psilopogon haemacephalus*	Coppersmith Barbet	LC
Birds	*Psilopogon lineatus*	Lineated Barbet	LC
Birds	*Psilopogon virens*	Great Barbet	LC
Birds	*Psittacula alexandri*	Red-breasted Parakeet	NT
Birds	*Psittacula cyanocephala*	Plum-headed Parakeet	LC
Birds	*Psittacula eupatria*	Alexandrine Parakeet	NT
Birds	*Psittacula himalayana*	Slaty-headed Parakeet	LC
Birds	*Psittacula krameri*	Rose-ringed Parakeet	LC
Birds	*Psittacula roseata*	Blossom-headed Parakeet	NT
Birds	*Pteruthius aeralatus*	White-browed Shrike-babbler	LC
Birds	*Pteruthius melanotis*	Black-eared Shrike-babbler	LC
Birds	*Pteruthius rufiventer*	Black-headed Shrike-babbler	LC

Birds	*Pteruthius xanthochlorus*	Green Shrike-babbler	LC
Birds	*Ptyonoprogne rupestris*	Eurasian Crag Martin	LC
Birds	*Pycnonotus cafer*	Red-vented Bulbul	LC
Birds	*Pycnonotus flaviventris*	Black-crested Bulbul	LC
Birds	*Pycnonotus jocosus*	Red-whiskered Bulbul	LC
Birds	*Pycnonotus striatus*	Striated Bulbul	LC
Birds	*Pyrrhocorax pyrrhocorax*	Red-billed Chough	LC
Birds	*Pyrrhoplectes epauletta*	Gold-naped Finch	LC
Birds	*Pyrrhula erythaca*	Grey-headed Bullfinch	LC
Birds	*Pyrrhula erythrocephala*	Red-headed Bullfinch	LC
Birds	*Pyrrhula nipalensis*	Brown Bullfinch	LC
Birds	*Rallina eurizonoides*	Slaty-legged Crake	LC
Birds	*Rallus indicus*	Eastern Water Rail	LC
Birds	*Regulus regulus*	Goldcrest	LC
Birds	*Rhipidura albicollis*	White-throated Fantail	LC
Birds	*Rhipidura aureola*	White-browed Fantail	LC
Birds	*Riparia chinensis*	Asian Plain Martin	LC
Birds	*Riparia diluta*	Pale Sand Martin	LC
Birds	*Rostratula benghalensis*	Greater Painted-snipe	LC
Birds	*Sarcogyps calvus*	Red-headed Vulture	CR
Birds	*Saroglossa spilopterus*	Spot-winged Starling	LC
Birds	*Sasia ochracea*	White-browed Piculet	LC
Birds	*Saxicola caprata*	Pied Bushchat	LC
Birds	*Saxicola ferreus*	Grey Bushchat	LC
Birds	*Saxicola insignis*	White-throated Bushchat	VU
Birds	*Saxicola leucurus*	White-tailed Stonechat	LC
Birds	*Saxicola torquatus*	Common Stonechat	LC
Birds	*Saxicoloides fulicatus*	Indian Robin	LC
Birds	*Schoeniparus castaneceps*	Rufous-winged Fulvetta	LC
Birds	*Schoeniparus cinereus*	Yellow-throated Fulvetta	LC
Birds	*Scolopax rusticola*	Eurasian Woodcock	LC
Birds	*Sibia nipalensis*	Hoary-throated Barwing	LC
Birds	*Sitta cinnamoventris*	Chestnut-bellied Nuthatch	LC
Birds	*Sitta frontalis*	Velvet-fronted Nuthatch	LC
Birds	*Sitta himalayensis*	White-tailed Nuthatch	LC
Birds	*Spatula clypeata*	Northern Shoveler	LC
Birds	*Spatula querquedula*	Garganey	LC
Birds	*Spelaeornis caudatus*	Rufous-throated Wren-babbler	NT
Birds	*Spilopelia senegalensis*	Laughing Dove	LC
Birds	*Spilopelia suratensis*	Western Spotted Dove	LC

Birds	*Spilornis cheela*	Crested Serpent-eagle	LC
Birds	*Spinus thibetanus*	Tibetan Siskin	LC
Birds	*Stachyris humei*	Blackish-breasted Babbler	NT
Birds	*Stachyris nigriceps*	Grey-throated Babbler	LC
Birds	*Sterna acuticauda*	Black-bellied Tern	EN
Birds	*Sterna aurantia*	River Tern	NT
Birds	*Streptopelia decaocto*	Eurasian Collared-dove	LC
Birds	*Streptopelia orientalis*	Oriental Turtle-dove	LC
Birds	*Streptopelia tranquebarica*	Red Turtle-dove	LC
Birds	*Strix leptogrammica*	Brown Wood-owl	LC
Birds	*Sturnia malabarica*	Chestnut-tailed Starling	LC
Birds	*Sturnia pagodarum*	Brahminy Starling	LC
Birds	*Surniculus dicruroides*	Fork-tailed Drongo-cuckoo	LC
Birds	*Suthora fulvifrons*	Fulvous Parrotbill	LC
Birds	*Suthora nipalensis*	Black-throated Parrotbill	LC
Birds	*Sylviparus modestus*	Yellow-browed Tit	LC
Birds	*Synoicus chinensis*	Asian Blue Quail	LC
Birds	*Sypheotides indicus*	Lesser Florican	EN
Birds	*Taccocua leschenaultii*	Sirkeer Malkoha	LC
Birds	*Tachybaptus ruficollis*	Little Grebe	LC
Birds	*Tadorna ferruginea*	Ruddy Shelduck	LC
Birds	*Tadorna tadorna*	Common Shelduck	LC
Birds	*Tarsiger chrysaeus*	Golden Bush-robin	LC
Birds	*Tarsiger cyanurus*	Orange-flanked Bush-robin	LC
Birds	*Tarsiger hyperythrus*	Rufous-breasted Bush-robin	LC
Birds	*Tarsiger indicus*	White-browed Bush-robin	LC
Birds	*Tarsiger rufilatus*	Himalayan Bush-robin	LC
Birds	*Tephrodornis pondicerianus*	Common Woodshrike	LC
Birds	*Tephrodornis virgatus*	Large Woodshrike	LC
Birds	*Terpsiphone affinis*	Oriental Paradise-flycatcher	LC
Birds	*Tesia cyaniventer*	Grey-bellied Tesia	LC
Birds	*Tesia olivea*	Slaty-bellied Tesia	LC
Birds	*Threskiornis melanocephalus*	Black-headed Ibis	NT
Birds	*Tichodroma muraria*	Wallcreeper	LC
Birds	*Tickellia hodgsoni*	Broad-billed Warbler	LC
Birds	*Timalia pileata*	Chestnut-capped Babbler	LC
Birds	*Treron apicauda*	Pin-tailed Green-pigeon	LC
Birds	*Treron bicinctus*	Orange-breasted Green-pigeon	LC
Birds	*Treron curvirostra*	Thick-billed Green-pigeon	LC
Birds	*Treron phayrei*	Ashy-headed Green-pigeon	NT

Birds	*Treron phoenicopterus*	Yellow-footed Green-pigeon	LC
Birds	*Treron sphenurus*	Wedge-tailed Green-pigeon	LC
Birds	*Tringa glareola*	Wood Sandpiper	LC
Birds	*Tringa nebularia*	Common Greenshank	LC
Birds	*Tringa stagnatilis*	Marsh Sandpiper	LC
Birds	*Tringa totanus*	Common Redshank	LC
Birds	*Trochalopteron affine*	Black-faced Laughingthrush	LC
Birds	*Trochalopteron erythrocephalum*	Chestnut-crowned Laughingthrush	LC
Birds	*Trochalopteron lineatum*	Streaked Laughingthrush	LC
Birds	*Trochalopteron squamatum*	Blue-winged Laughingthrush	LC
Birds	*Trochalopteron subunicolor*	Scaly Laughingthrush	LC
Birds	*Troglodytes troglodytes*	Northern Wren	LC
Birds	*Turdoides striata*	Jungle Babbler	LC
Birds	*Turdus albocinctus*	White-collared Blackbird	LC
Birds	*Turdus atrogularis*	Black-throated Thrush	LC
Birds	*Turdus boulboul*	Grey-winged Blackbird	LC
Birds	*Turdus maximus*	Tibetan Blackbird	LC
Birds	*Turdus rubrocanus*	Chestnut Thrush	LC
Birds	*Turdus ruficollis*	Rufous-throated Thrush	LC
Birds	*Turdus unicolor*	Tickell's Thrush	LC
Birds	*Turnix suscitator*	Barred Buttonquail	LC
Birds	*Turnix sylvaticus*	Common Buttonquail	LC
Birds	*Turnix tanki*	Yellow-legged Buttonquail	LC
Birds	*Tyto alba*	Common Barn-owl	LC
Birds	*Tyto longimembris*	Eastern Grass-owl	LC
Birds	*Upupa epops*	Common Hoopoe	LC
Birds	*Urocissa erythroryncha*	Red-billed Blue Magpie	LC
Birds	*Urocissa flavirostris*	Yellow-billed Blue Magpie	LC
Birds	*Vanellus cinereus*	Grey-headed Lapwing	LC
Birds	*Vanellus duvaucelii*	River Lapwing	NT
Birds	*Vanellus indicus*	Red-wattled Lapwing	LC
Birds	*Vanellus malabaricus*	Yellow-wattled Lapwing	LC
Birds	*Vanellus vanellus*	Northern Lapwing	NT
Birds	*Yuhina bakeri*	White-naped Yuhina	LC
Birds	*Yuhina flavicollis*	Whiskered Yuhina	LC
Birds	*Yuhina gularis*	Stripe-throated Yuhina	LC
Birds	*Yuhina nigrimenta*	Black-chinned Yuhina	LC
Birds	*Yuhina occipitalis*	Rufous-vented Yuhina	LC
Birds	*Zapornia akool*	Brown Crake	LC
Birds	*Zapornia bicolor*	Black-tailed Crake	LC

Birds	*Zapornia fusca*	Ruddy-breasted Crake	LC
Birds	*Zapornia pusilla*	Baillon's Crake	LC
Birds	*Zoonavena sylvatica*	White-rumped Spinetail	LC
Birds	*Zoothera dauma*	Scaly Thrush	LC
Birds	*Zoothera dixoni*	Long-tailed Thrush	LC
Birds	*Zoothera major*	Amami Thrush	NT
Birds	*Zoothera marginata*	Dark-sided Thrush	LC
Birds	*Zoothera monticola*	Long-billed Thrush	LC
Birds	*Zoothera salimalii*	Himalayan Forest Thrush	LC
Birds	*Zosterops palpebrosus*	Oriental White-eye	LC
Fishes	*Aborichthys elongatus*		LC
Fishes	*Acanthocobitis botia*	Striped Loach	LC
Fishes	*Amblyceps apangi*		LC
Fishes	*Amblyceps arunchalensis*		EN
Fishes	*Amblyceps laticeps*		LC
Fishes	*Amblypharyngodon microlepis*	Indian Carplet	LC
Fishes	*Anguilla bengalensis*	Indian Mottled Eel	NT
Fishes	*Badis badis*		LC
Fishes	*Bagarius yarrelli*		NT
Fishes	*Bangana ariza*	Ariza Labeo	LC
Fishes	*Batasio batasio*		LC
Fishes	*Batasio fasciolatus*		LC
Fishes	*Chagunius chagunio*		LC
Fishes	*Channa gachua*	Dwarf Snakehead	LC
Fishes	*Channa marulius*		LC
Fishes	*Cirrhinus mrigala*	Mrigal	LC
Fishes	*Cirrhinus reba*	Reba Carp	LC
Fishes	*Erethistoides ascita*		DD
Fishes	*Esomus danrica*	Flying barb	LC
Fishes	*Gagata cenia*		LC
Fishes	*Garra annandalei*	Annandale garra	LC
Fishes	*Gibelion catla*	Catla	LC
Fishes	*Glossogobius giuris*	Bareye Goby	LC
Fishes	*Glyptothorax botius*		LC
Fishes	*Glyptothorax indicus*	Catfish	LC
Fishes	*Heteropneustes fossilis*	Stinging catfish	LC
Fishes	*Johnius coitor*	Big-eyed Jewfish	LC
Fishes	*Labeo angra*	Angra Labeo	LC
Fishes	*Labeo bata*	Minor Carp	LC
Fishes	*Lepidocephalichthys irrorata*	Loktak Loach	LC

Fishes	*Lepidocephalichthys menoni*		DD
Fishes	*Lepidocephalus guntea*	Peppered Loach	LC
Fishes	*Megarasbora elanga*	Bengala Barb	LC
Fishes	*Monopterus albus*	Rice swampeel	LC
Fishes	*Mystus carcio*		LC
Fishes	*Nandus nandus*		LC
Fishes	*Nangra assamensis*		LC
Fishes	*Nangra nangra*	Kosi Nangra	LC
Fishes	*Neoeucirrhichthys maydelli*		LC
Fishes	*Neolissochilus dukai*		DD
Fishes	*Neolissochilus spinulosus*		DD
Fishes	*Neotropius atherinoides*		LC
Fishes	*Notopterus notopterus*		LC
Fishes	*Olyra kempi*		LC
Fishes	*Ompok bimaculatus*		NT
Fishes	*Ompok pabo*		NT
Fishes	*Oreichthys cosuatis*		LC
Fishes	*Pangio pangia*		LC
Fishes	*Parachiloglanis hodgarti*	Torrent Catfish	LC
Fishes	*Pseudapocryptes elongatus*		LC
Fishes	*Pseudecheneis crassicauda*		DD
Fishes	*Pseudolaguvia muricata*		DD
Fishes	*Psilorhynchus gracilis*	Rainbow minnow	LC
Fishes	*Psilorhynchus nepalensis*		LC
Fishes	*Psilorhynchus pseudecheneis*	Stone Carp	LC
Fishes	*Psilorhynchus sucatio*	River stone carp	LC
Fishes	*Rasbora daniconius*	Slender Barb	LC
Fishes	*Schistura inglisi*		VU
Fishes	*Schistura multifasciata*		LC
Fishes	*Setipinna phasa*	Gangetic Hairfin Anchovy	LC
Fishes	*Silonia silondia*	Silong Catfish	LC
Fishes	*Sisor rabdophorus*		LC
Fishes	*Sperata aor*	Long-whiskered Catfish	LC
Fishes	*Tenualosa ilisha*	Hilsa	LC
Fishes	*Trichogaster chuna*		LC
Fishes	*Trichogaster fasciata*		LC
Fishes	*Trichogaster lalius*		LC
Fishes	*Wallago attu*		NT
Invertebrates	*Acanthopotamon martensi*		LC
Invertebrates	*Aciagrion azureum*		LC

Invertebrates	*Aciagrion hisopa*		LC
Invertebrates	*Aciagrion pallidum*		LC
Invertebrates	*Acisoma panorpoides*	Grizzled Pintail	LC
Invertebrates	*Aethriamanta brevipennis*		LC
Invertebrates	*Agriocnemis clauseni*		LC
Invertebrates	*Agriocnemis femina*		LC
Invertebrates	*Agriocnemis lacteola*		LC
Invertebrates	*Agriocnemis pygmaea*	Wandering Midget	LC
Invertebrates	*Amphiallagma parvum*		LC
Invertebrates	*Anaciaeschna jaspidea*		LC
Invertebrates	*Anax ephippiger*	Vagrant Emperor	LC
Invertebrates	*Anax guttatus*	Lesser Green Emperor	LC
Invertebrates	*Anax imperator*	Blue Emperor	LC
Invertebrates	*Anax indicus*		LC
Invertebrates	*Anax nigrofasciatus*	Blue-spotted Emperor	LC
Invertebrates	*Angulyagra oxytropis*		LC
Invertebrates	*Anisopleura comes*		LC
Invertebrates	*Anisopleura subplatystyla*		LC
Invertebrates	*Archibasis oscillans*		LC
Invertebrates	*Argiocnemis rubescens*	Red-tipped Shadefly	LC
Invertebrates	*Assiminea beddomeana*		LC
Invertebrates	*Auriculodes gangetica*		DD
Invertebrates	*Bayadera indica*		LC
Invertebrates	*Bellamya bengalensis*		LC
Invertebrates	*Bithynia cerameopoma*		LC
Invertebrates	*Bithynia lithoglyphoides*		DD
Invertebrates	*Bithynia pulchella*		LC
Invertebrates	*Brachydiplax chalybea*		LC
Invertebrates	*Brachydiplax farinosa*		LC
Invertebrates	*Brachydiplax sobrina*		LC
Invertebrates	*Brachythemis contaminata*		LC
Invertebrates	*Bradinopyga geminata*		LC
Invertebrates	*Brotia costula*		LC
Invertebrates	*Calicnemia eximia*		LC
Invertebrates	*Calicnemia miles*		LC
Invertebrates	*Calicnemia pulverulans*		LC
Invertebrates	*Caliphaea confusa*		LC
Invertebrates	*Camacinia gigantea*		LC
Invertebrates	*Camptoceras austeni*		DD
Invertebrates	*Camptoceras lineatum*		LC

Invertebrates	*Camptoceras terebra*		DD
Invertebrates	*Cephalaeschna acutifrons*		DD
Invertebrates	*Cephalaeschna viridifrons*		LC
Invertebrates	*Cercion malayanum*		LC
Invertebrates	*Ceriagrion azureum*		LC
Invertebrates	*Ceriagrion cerinorubellum*		LC
Invertebrates	*Ceriagrion coromandelianum*		LC
Invertebrates	*Ceriagrion fallax*		LC
Invertebrates	*Ceriagrion olivaceum*		LC
Invertebrates	*Cerithium coralium*	Coral Cerith	LC
Invertebrates	*Chloropetalia selysi*		VU
Invertebrates	*Clenchiella microscopica*		LC
Invertebrates	*Clithon reticularis*		LC
Invertebrates	*Coeliccia didyma*		LC
Invertebrates	*Copera ciliata*		LC
Invertebrates	*Copera marginipes*		LC
Invertebrates	*Copera vittata*		LC
Invertebrates	*Corbicula assamensis*		LC
Invertebrates	*Corbicula aurea*		DD
Invertebrates	*Corbicula striatella*		LC
Invertebrates	*Cratilla lineata*		LC
Invertebrates	*Cratilla metallica*		LC
Invertebrates	*Cristaria plicata*		DD
Invertebrates	*Crocothemis erythraea*	Broad Scarlet	LC
Invertebrates	*Davidius aberrans*		LC
Invertebrates	*Davidius davidii*		LC
Invertebrates	*Diplacodes trivialis*		LC
Invertebrates	*Ellobium aurisjudae*	Judas Ear Cassidula	LC
Invertebrates	*Epophthalmia vittata*		LC
Invertebrates	*Epophthalmia vittigera*		LC
Invertebrates	*Erhaia banepaensis*		DD
Invertebrates	*Erhaia chandeshwariensis*		DD
Invertebrates	*Erhaia sugurensis*		DD
Invertebrates	*Euphaea ochracea*		LC
Invertebrates	*Ferrissia baconi*		LC
Invertebrates	*Ferrissia verruca*		LC
Invertebrates	*Gabbia orcula*		LC
Invertebrates	*Gabbia stenothyroides*		LC
Invertebrates	*Gangetia miliacea*		LC
Invertebrates	*Globitelphusa bakeri*		DD

Invertebrates	*Globitelphusa planifrons*		DD
Invertebrates	*Gynacantha subinterrupta*		LC
Invertebrates	*Gyraulus barrackporensis*		LC
Invertebrates	*Gyraulus convexiusculus*		LC
Invertebrates	*Gyraulus euphraticus*		LC
Invertebrates	*Gyraulus labiatus*		LC
Invertebrates	*Himalayapotamon atkinsonianum*		LC
Invertebrates	*Himalayapotamon babaulti*		DD
Invertebrates	*Himalayapotamon bifarium*		DD
Invertebrates	*Himalayapotamon monticola*		DD
Invertebrates	*Idionyx stevensi*		LC
Invertebrates	*Indocnemis orang*		LC
Invertebrates	*Indoplanorbis exustus*		LC
Invertebrates	*Intha umbilicalis*		LC
Invertebrates	*Iravadia ornata*		LC
Invertebrates	*Iravadia princeps*		DD
Invertebrates	*Ischnura forcipata*		LC
Invertebrates	*Ischnura senegalensis*	Tropical Bluetail	LC
Invertebrates	*Lamellidens consobrinus*		LC
Invertebrates	*Lamellidens corrianus*		LC
Invertebrates	*Lamellidens generosus*		LC
Invertebrates	*Lamellidens jenkinsianus*		LC
Invertebrates	*Lamellidens lamellatus*		LC
Invertebrates	*Lamellidens marginalis*		LC
Invertebrates	*Lamellidens narainpirensis*		LC
Invertebrates	*Lamellidens phenchooganjensis*		LC
Invertebrates	*Lamellidens unioides*		DD
Invertebrates	*Lecythoconcha lecythis*		LC
Invertebrates	*Lestes concinnus*	Dusky Spreadwing	LC
Invertebrates	*Lestes dorothea*		LC
Invertebrates	*Lestes nodalis*		LC
Invertebrates	*Lestes thoracicus*		LC
Invertebrates	*Lestes umbrinus*		DD
Invertebrates	*Lestes viridulus*		LC
Invertebrates	*Libellago lineata*		LC
Invertebrates	*Lymnaea acuminata*		LC
Invertebrates	*Lymnaea andersoniana*		LC
Invertebrates	*Lymnaea luteola*		LC
Invertebrates	*Lymnaea persica*		LC
Invertebrates	*Lyriothemis cleis*		LC

Invertebrates	*Macrobrachium altifrons*		LC
Invertebrates	*Macrobrachium hendersoni*		LC
Invertebrates	*Macrobrachium nepalense*		DD
Invertebrates	*Macromia flavocolorata*		LC
Invertebrates	*Macromia flavovittata*		DD
Invertebrates	*Macromia pallida*		DD
Invertebrates	*Maydelliathelphusa edentula*		NT
Invertebrates	*Maydelliathelphusa harpax*		LC
Invertebrates	*Maydelliathelphusa lugubris*		LC
Invertebrates	*Maydelliathelphusa masoniana*		LC
Invertebrates	*Megalestes irma*		DD
Invertebrates	*Mekongia crassa*		LC
Invertebrates	*Melanoides pyramis*		LC
Invertebrates	*Melanoides tuberculata*		LC
Invertebrates	*Mieniplotia scabra*		LC
Invertebrates	*Musculium goshaitanensis*		DD
Invertebrates	*Nerita articulata*		LC
Invertebrates	*Neritina obtusa*		LC
Invertebrates	*Neritina platyconcha*		DD
Invertebrates	*Neritina smithi*		LC
Invertebrates	*Neritina sulculosa*		LC
Invertebrates	*Neritina violacea*	Red-mouth Nerite Snail	LC
Invertebrates	*Nesoxenia lineata*		LC
Invertebrates	*Neurobasis chinensis*		LC
Invertebrates	*Novaculina gangetica*		LC
Invertebrates	*Nychogomphus duaricus*		LC
Invertebrates	*Onthophagus sikkimensis*		DD
Invertebrates	*Onychargia atrocyana*		LC
Invertebrates	*Onychogomphus risi*		DD
Invertebrates	*Orolestes selysi*		LC
Invertebrates	*Orthetrum chrysis*		LC
Invertebrates	*Orthetrum japonicum*		LC
Invertebrates	*Orthetrum luzonicum*		LC
Invertebrates	*Orthetrum testaceum*		LC
Invertebrates	*Orthetrum triangulare*		LC
Invertebrates	*Paludomus blanfordiana*		LC
Invertebrates	*Paludomus conica*		LC
Invertebrates	*Paludomus regulata*		LC
Invertebrates	*Paludomus stephanus*		LC
Invertebrates	*Pantala flavescens*	Wandering Glider	LC

Invertebrates	*Paracercion melanotum*	Eastern Lilysquatter	LC
Invertebrates	*Paragomphus lindgreni*		DD
Invertebrates	*Parreysia andersoniana*		LC
Invertebrates	*Parreysia bonneaudi*		LC
Invertebrates	*Parreysia caerulea*		LC
Invertebrates	*Parreysia corrugata*		LC
Invertebrates	*Parreysia favidens*		LC
Invertebrates	*Parreysia involuta*		LC
Invertebrates	*Parreysia lima*		LC
Invertebrates	*Parreysia occata*		LC
Invertebrates	*Parreysia olivaria*		LC
Invertebrates	*Parreysia pachysoma*		LC
Invertebrates	*Parreysia rajahensis*		LC
Invertebrates	*Parreysia shurtleffiana*		LC
Invertebrates	*Parreysia sikkimensis*		LC
Invertebrates	*Parreysia theobaldi*		LC
Invertebrates	*Parreysia triembolus*		LC
Invertebrates	*Physunio micropteroides*		DD
Invertebrates	*Pila globosa*		LC
Invertebrates	*Pila theobaldi*		LC
Invertebrates	*Pisidium annandalei*		LC
Invertebrates	*Pisidium atkinsonianum*		LC
Invertebrates	*Pisidium casertanum*	Caserta Pea Mussel	LC
Invertebrates	*Pisidium chandanbariensis*		DD
Invertebrates	*Pisidium clarkeanum*		LC
Invertebrates	*Pisidium ellisi*		LC
Invertebrates	*Pisidium kuiperi*		DD
Invertebrates	*Pisidium nevillianum*		LC
Invertebrates	*Pisidium prasongi*		LC
Invertebrates	*Platylestes platystylus*		LC
Invertebrates	*Polymesoda expansa*	Marsh Clam	LC
Invertebrates	*Pomacea lineata*		LC
Invertebrates	*Procambarus clarkii*	Red Swamp Crayfish	LC
Invertebrates	*Pseudagrion rubriceps*		LC
Invertebrates	*Pseudotramea prateri*		DD
Invertebrates	*Radix auricularia*		LC
Invertebrates	*Radix brevicauda*		LC
Invertebrates	*Radix hookeri*		DD
Invertebrates	*Radix viridis*		LC
Invertebrates	*Rhinocypha biforata*		LC

Invertebrates	*Rhyothemis variegata*		LC
Invertebrates	*Scaphula celox*		LC
Invertebrates	*Scaphula deltae*		LC
Invertebrates	*Segmentina calatha*		LC
Invertebrates	*Segmentina cantori*		DD
Invertebrates	*Segmentina trochoidea*		LC
Invertebrates	*Septaria lineata*		LC
Invertebrates	*Sermyla riqueti*		LC
Invertebrates	*Solenaia soleniformis*		LC
Invertebrates	*Sphaerium indicum*		LC
Invertebrates	*Stenothyra blanfordiana*		LC
Invertebrates	*Stenothyra deltae*		LC
Invertebrates	*Stenothyra echinata*		DD
Invertebrates	*Stenothyra foveolata*		DD
Invertebrates	*Stenothyra monilifera*		LC
Invertebrates	*Stenothyra ornata*		LC
Invertebrates	*Stenothyra soluta*		LC
Invertebrates	*Stenothyra woodmasoniana*		DD
Invertebrates	*Stylogomphus inglisi*		LC
Invertebrates	*Sympetrum hypomelas*		LC
Invertebrates	*Tanysiphon rivalis*		LC
Invertebrates	*Tarebia granifera*		LC
Invertebrates	*Tarebia lineata*		LC
Invertebrates	*Theodoxus reticularis*		LC
Invertebrates	*Thiara paludomoidea*		LC
Invertebrates	*Thiara rudis*		LC
Invertebrates	*Tholymis tillarga*	Old World Twister	LC
Invertebrates	*Tramea basilaris*	Keyhole Glider	LC
Invertebrates	*Tramea limbata*	Ferruginous Glider	LC
Invertebrates	*Trichopotamon sikkimensis*		LC
Invertebrates	*Tricula godawariensis*		DD
Invertebrates	*Tricula mahadevensis*		VU
Invertebrates	*Tricula montana*		LC
Invertebrates	*Trithemis aurora*		LC
Invertebrates	*Trithemis kirbyi*	Orange-winged Dropwing	LC
Invertebrates	*Trithemis pallidinervis*	Dancing Dropwing	LC
Invertebrates	*Urothemis signata*		LC
Invertebrates	*Vestalaria smaragdina*		LC
Invertebrates	*Vestalis apicalis*		LC
Invertebrates	*Vestalis gracilis*		LC

Invertebrates	*Zygonyx iris*		LC
Invertebrates	*Zygonyx torridus*	Ringed Cascader	LC
Invertebrates	*Zyxomma petiolatum*	Long-tailed Duskdarter	LC
Mammals	*Ailurus fulgens*	Red Panda	EN
Mammals	*Aonyx cinereus*	Asian Small-clawed Otter	VU
Mammals	*Arctictis binturong*	Binturong	VU
Mammals	*Arctonyx albogularis*	Northern Hog Badger	LC
Mammals	*Arielulus circumdatus*	Bronze Sprite	LC
Mammals	*Axis axis*	Chital	LC
Mammals	*Axis porcinus*	Hog Deer	EN
Mammals	*Bandicota bengalensis*	Lesser Bandicoot Rat	LC
Mammals	*Bandicota indica*	Greater Bandicoot Rat	LC
Mammals	*Belomys pearsonii*	Hairy-footed Flying Squirrel	DD
Mammals	*Bos gaurus*	Gaur	VU
Mammals	*Callosciurus pygerythrus*	Hoary-bellied Squirrel	LC
Mammals	*Canis aureus*	Golden Jackal	LC
Mammals	*Canis lupus*	Gray Wolf	LC
Mammals	*Cannomys badius*	Lesser Bamboo Rat	LC
Mammals	*Capricornis thar*	Himalayan Serow	NT
Mammals	*Caprolagus hispidus*	Hispid Hare	EN
Mammals	*Chimarrogale himalayica*	Himalayan Water Shrew	LC
Mammals	*Coelops frithii*	Tail-less Leaf-nosed Bat	LC
Mammals	*Crocidura attenuata*	Grey Shrew	LC
Mammals	*Cuon alpinus*	Dhole	EN
Mammals	*Cynopterus sphinx*	Greater Shortnosed Fruit Bat	LC
Mammals	*Dacnomys millardi*	Millard's Rat	DD
Mammals	*Dremomys lokriah*	Orange-bellied Himalayan Squirrel	LC
Mammals	*Elephas maximus*	Asian Elephant	EN
Mammals	*Eonycteris spelaea*	Dawn Bat	LC
Mammals	*Episoriculus macrurus*	Arboreal Brown-toothed Shrew	LC
Mammals	*Eptesicus serotinus*	Serotine	LC
Mammals	*Eptesicus tatei*	Sombre Bat	DD
Mammals	*Euroscaptor micrura*	Himalayan Mole	LC
Mammals	*Falsistrellus affinis*	Chocolate Pipistrelle	LC
Mammals	*Felis chaus*	Jungle Cat	LC
Mammals	*Golunda ellioti*	Indian Bush-rat	LC
Mammals	*Harpiocephalus harpia*	Lesser Hairy-winged Bat	LC
Mammals	*Hemitragus jemlahicus*	Himalayan Tahr	NT
Mammals	*Herpestes auropunctatus*	Small Indian Mongoose	LC
Mammals	*Herpestes edwardsii*	Indian Grey Mongoose	LC

Mammals	*Hipposideros armiger*	Great Himalayan Leaf-nosed Bat	LC
Mammals	*Hipposideros cineraceus*	Least Leaf-nosed Bat	LC
Mammals	*Hipposideros lankadiva*	Indian Leaf-nosed Bat	LC
Mammals	*Hipposideros pomona*	Andersen's Leaf-nosed Bat	LC
Mammals	*Hylopetes alboniger*	Particolored Flying Squirrel	LC
Mammals	*Hystrix brachyura*	Malayan Porcupine	LC
Mammals	*Kerivoula picta*	Painted Woolly Bat	LC
Mammals	*Leopoldamys edwardsi*	Edwards's Long-tailed Giant Rat	LC
Mammals	*Lutra lutra*	Eurasian Otter	NT
Mammals	*Lutrogale perspicillata*	Smooth-coated Otter	VU
Mammals	*Macaca assamensis*	Assam Macaque	NT
Mammals	*Macaca mulatta*	Rhesus Monkey	LC
Mammals	*Manis pentadactyla*	Chinese Pangolin	CR
Mammals	*Marmota himalayana*	Karakoram Marmot	LC
Mammals	*Martes flavigula*	Yellow-throated Marten	LC
Mammals	*Megaderma lyra*	Greater False Vampire	LC
Mammals	*Melogale personata*	Large-toothed Ferret Badger	LC
Mammals	*Moschus leucogaster*	Himalayan Muskdeer	EN
Mammals	*Muntiacus vaginalis*	Northern Red Muntjac	LC
Mammals	*Murina cyclotis*	Round-eared Tube-nosed Bat	LC
Mammals	*Murina huttoni*	White-bellied Tube-nosed Bat	LC
Mammals	*Murina tubinaris*	Scully's Tube-nosed Bat	LC
Mammals	*Mus booduga*	Little Indian Field Mouse	LC
Mammals	*Mus cervicolor*	Fawn-colored Mouse	LC
Mammals	*Mus cookii*	Ryley's Spiny Mouse	LC
Mammals	*Mus musculus*	House Mouse	LC
Mammals	*Mus saxicola*	Brown Spiny Mouse	LC
Mammals	*Mus terricolor*	Earth-colored Mouse	LC
Mammals	*Mustela kathiah*	Yellow-bellied Weasel	LC
Mammals	*Mustela sibirica*	Siberian Weasel	LC
Mammals	*Mustela strigidorsa*	Stripe-backed Weasel	LC
Mammals	*Myotis blythii*	Lesser Mouse-eared Myotis	LC
Mammals	*Myotis formosus*	Hodgson's Bat	LC
Mammals	*Myotis muricola*	Nepalese Whiskered Myotis	LC
Mammals	*Myotis nipalensis*	Nepal Myotis	LC
Mammals	*Myotis sicarius*	Mandelli's Mouse-eared Myotis	VU
Mammals	*Myotis siligorensis*	Himalayan Whiskered Myotis	LC
Mammals	*Naemorhedus goral*	Himalayan Goral	NT
Mammals	*Neodon sikimensis*	Sikkim Vole	LC
Mammals	*Neofelis nebulosa*	Clouded Leopard	VU

Mammals	*Niviventer eha*	Little Himalayan Rat	LC
Mammals	*Niviventer fulvescens*	Chestnut White-bellied Rat	LC
Mammals	*Niviventer niviventer*	Himalayan White-bellied Rat	LC
Mammals	*Paguma larvata*	Masked Palm Civet	LC
Mammals	*Panthera pardus*	Leopard	VU
Mammals	*Paradoxurus hermaphroditus*	Common Palm Civet	LC
Mammals	*Pardofelis marmorata*	Marbled Cat	NT
Mammals	*Petaurista elegans*	Spotted Giant Flying Squirrel	LC
Mammals	*Petaurista magnificus*	Hodgson's Giant Flying Squirrel	LC
Mammals	*Petaurista nobilis*	Bhutan Giant Flying Squirrel	NT
Mammals	*Petaurista petaurista*	Red Giant Flying Squirrel	LC
Mammals	*Philetor brachypterus*	Short-winged Pipistrelle	LC
Mammals	*Pipistrellus coromandra*	Coromandel Pipistrelle	LC
Mammals	*Pipistrellus javanicus*	Javan Pipistrelle	LC
Mammals	*Pipistrellus tenuis*	Least Pipistrelle	LC
Mammals	*Prionailurus bengalensis*	Leopard Cat	LC
Mammals	*Prionodon pardicolor*	Spotted Linsang	LC
Mammals	*Pteropus giganteus*	Indian Flying Fox	LC
Mammals	*Rattus andamanensis*	Indochinese Forest Rat	LC
Mammals	*Rattus nitidus*	Himalayan Field Rat	LC
Mammals	*Rattus pyctoris*	Himalayan Rat	LC
Mammals	*Rattus rattus*	House Rat	LC
Mammals	*Rattus tanezumi*	Oriental House Rat	LC
Mammals	*Ratufa bicolor*	Black Giant Squirrel	NT
Mammals	*Rhinolophus affinis*	Intermediate Horseshoe Bat	LC
Mammals	*Rhinolophus ferrumequinum*	Greater Horseshoe Bat	LC
Mammals	*Rhinolophus lepidus*	Blyth's Horseshoe Bat	LC
Mammals	*Rhinolophus luctus*	Great Woolly Horsehoe Bat	LC
Mammals	*Rhinolophus macrotis*	Big-eared Horseshoe Bat	LC
Mammals	*Rhinolophus pearsonii*	Pearson's Horseshoe Bat	LC
Mammals	*Rhinolophus pusillus*	Least Horseshoe Bat	LC
Mammals	*Rhinolophus sinicus*	Chinese Horseshoe Bat	LC
Mammals	*Rusa unicolor*	Sambar	VU
Mammals	*Scotomanes ornatus*	Harlequin Bat	LC
Mammals	*Scotophilus heathii*	Greater Asiatic Yellow House Bat	LC
Mammals	*Scotophilus kuhlii*	Lesser Asiatic Yellow House Bat	LC
Mammals	*Semnopithecus hector*	Tarai Gray Langur	NT
Mammals	*Semnopithecus schistaceus*	Nepal Gray Langur	LC
Mammals	*Sphaerias blanfordi*	Blandford's Fruit Bat	LC
Mammals	*Suncus murinus*	House Shrew	LC

Mammals	*Sus scrofa*	Wild Boar	LC
Mammals	*Tadarida teniotis*	European Free-tailed Bat	LC
Mammals	*Taphozous longimanus*	Long-winged Tomb Bat	LC
Mammals	*Tatera indica*	Indian Gerbil	LC
Mammals	*Tupaia belangeri*	Northern Treeshrew	LC
Mammals	*Tylonycteris pachypus*	Lesser Bamboo Bat	LC
Mammals	*Ursus thibetanus*	Asiatic Black Bear	VU
Mammals	*Vandeleuria oleracea*	Asiatic Long-tailed Climbing Mouse	LC
Mammals	*Viverra zibetha*	Large Indian Civet	LC
Mammals	*Viverricula indica*	Small Indian Civet	LC
Mammals	*Vulpes bengalensis*	Bengal Fox	LC
Mammals	*Vulpes vulpes*	Red Fox	LC
Plants	*Anacyclus pyrethrum*	Atlas Daisy	VU
Plants	*Isachne globosa*	Swamp Millet	LC
Plants	*Magnolia punduana*		DD
Plants	*Medicago sativa*	Alfalfa	LC
Plants	*Pistacia khinjuk*		LC
Plants	*Prunus bifrons*		DD
Reptiles	*Ahaetulla fronticincta*	River Vine Snake	LC
Reptiles	*Atretium schistosum*	Olive Keelback Water Snake	LC
Reptiles	*Batagur dhongoka*	Three-striped Roofed Turtle	EN
Reptiles	*Batagur kachuga*	Red-crowned Roofed Turtle	CR
Reptiles	*Boiga multifasciata*	Many-banded Tree Snake	DD
Reptiles	*Boiga trigonata*	Indian Gamma Snake	LC
Reptiles	*Chitra indica*	Indian Narrow-headed Softshell Tu	EN
Reptiles	*Crocodylus palustris*	Mugger	VU
Reptiles	*Cryptelytrops erythrurus*	Redtail (bamboo) Pit Viper	LC
Reptiles	*Cyrtodactylus gubernatoris*	Sikkimese Bent-toed Gecko	NT
Reptiles	*Dendrelaphis cyanochloris*	Wall's Bronzeback	LC
Reptiles	*Draco maculatus*	Orange-winged Flying Lizard	LC
Reptiles	*Elachistodon westermanni*	Indian Egg-eater	LC
Reptiles	*Eutropis carinata*	Keeled Indian Mabuya	LC
Reptiles	*Gavialis gangeticus*	Gharial	CR
Reptiles	*Geoclemys hamiltonii*	Spotted Pond Turtle	VU
Reptiles	*Gerrhopilus oligolepis*	Few-scaled Worm Snake	DD
Reptiles	*Herpetoreas sieboldii*	Sikkim Keelback	DD
Reptiles	*Japalura tricarinata*	Three Keeled Mountain Lizard	LC
Reptiles	*Japalura variegata*	Variegated Mountain Forest Agama	LC
Reptiles	*Liopeltis stolickzae*	Stolickza's Ringneck	LC
Reptiles	*Lissemys punctata*	Indian Flapshell Turtle	LR/lc

Reptiles	*Lycodon jara*	Yellow-speckled Wolfsnake	LC
Reptiles	*Melanochelys tricarinata*	Tricarinate Hill Turtle	VU
Reptiles	*Melanochelys trijuga*	Indian Black Turtle	LR/nt
Reptiles	*Morenia petersi*	Indian Eyed Turtle	VU
Reptiles	*Nilssonia gangetica*	Indian Softshell Turtle	VU
Reptiles	*Nilssonia hurum*	Indian Peacock Softshell Turtle	VU
Reptiles	*Ophiophagus hannah*	King Cobra	VU
Reptiles	*Ovophis monticola*	Chinese Mountain Pit Viper	LC
Reptiles	*Pangshura smithii*	Brown Roofed Turtle	LR/nt
Reptiles	*Pangshura tecta*	Indian Roofed Turtle	LR/lc
Reptiles	*Pangshura tentoria*	Indian Tent Turtle	LR/lc
Reptiles	*Protobothrops jerdonii*	Yellow Speckled Lancehead	LC
Reptiles	*Protobothrops mucrosquamatus*	Brown Spotted Pitviper	LC
Reptiles	*Psammophis condanarus*	Indo-chinese Sand Snake	LC
Reptiles	*Pseudoxenodon macrops*	Large-eyed False Cobra	LC
Reptiles	*Python bivittatus*	Burmese Python	VU
Reptiles	*Rhabdophis subminiatus*	Red-necked Keelback	LC
Reptiles	*Rhadinophis prasina*	Green Trinket Snake	LC
Reptiles	*Sibynophis collaris*	Collared Black-headed Snake	LC
Reptiles	*Sitana ponticeriana*	Fan Throated Lizard	LC
Reptiles	*Trachischium guentheri*	Gunther's Oriental Worm Snake	LC
Reptiles	*Typhlops diardii*	Indochinese Blindsnake	LC
Reptiles	*Typhlops meszoelyi*	Meszoely's Blind Snake	DD
Reptiles	*Varanus bengalensis*	Common Indian Monitor	LC

About IBAT

The Integrated Biodiversity Assessment Tool (IBAT) provides key decision-makers with access to critical information on biodiversity priority sites to inform risk management and decision-making processes that address potential biodiversity impacts. Developed through a partnership of BirdLife International, Conservation International, International Union for Conservation of Nature (IUCN) and United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), the vision of IBAT is that decisions affecting critical natural habitats are informed by the best scientific information and in turn decision makers will support the quest to collect and enhance the underlying datasets and maintain that scientific information.

Appendix 4
Approval Letter by MoWS & Minutes of Meeting

Approval Letter for the IEE report of Ilam WSSP by MoWS

नेपाल सरकार

खानेपानी मन्त्रालय

सिंहदरबार, काठमाडौं

फोन नं.: ४२९९६९३
फ्याक्स : ९७७-१-४२९१४३३
सिंहदरबार,
काठमाडौं, नेपाल ।

VISIT Nepal Year 2020

पत्र संख्या:- ०६६।६ ८
चलानी नं.:- ९४२

मिति २०७६।०६।०२

खानेपानी खा. पा. आयोजना
आयोजना व्यवस्थापन कार्यालय
दर्ता नं.: ४६४
मिति: ०६।६।१६

श्री खानेपानी तथा ढल व्यवस्थापन विभाग,
पानीपोखरी, काठमाडौं ।

विषय : प्रारम्भिक वातावरणीय परीक्षणको प्रतिवेदन(IEE) स्वीकृती सम्बन्धमा ।

प्रस्तुत विषयमा तहा विभाग मार्फत स्वीकृतिका लागि मन्त्रालयमा प्राप्त भएको तेसो साना सहरी खानेपानी तथा सरसफाई आयोजना, पानीपोखरी काठमाण्डौं प्रस्तावक रहेको **ईलाम नगर सहरी खानेपानी तथा सरसफाई आयोजना (ईलाम)**को परिमार्जित प्रारम्भिक वातावरणीय परीक्षण (IEE) प्रतिवेदन नेपाल सरकार (सचिवस्तर) को मिति २०७६।०६।०२ को निर्णयानुसार स्वीकृत भएको व्यहोरा निर्देशानुसार अनुरोध छ ।

बोधार्थ :
श्री तेसो साना सहरी खानेपानी तथा सरसफाई आयोजना,
आयोजना व्यवस्थापन कार्यालय,
पानीपोखरी, काठमाण्डौं ।

संलग्न :
स्वीकृत प्रारम्भिक वातावरणीय परीक्षण (IEE) प्रतिवेदन २ प्रति ।

(अन्जना महर्जन)
ईन्जिनियर

"नतिजामुखी प्रशासन :समृद्धि र सुशासन"

English Translation of Approval Letter for the IEE report of Ilam WSSP by MoWS

Government of Nepal
Ministry of Water Supply

Phone No: 4211693
Fax: 977-1-4211433
Singhadurbar,
Kathmandu, Nepal

Date: 2076/06/02

To,
The Department of Water Supply & Sewerage Management
Panipokhari, Kathmandu

Subject: In Relation to the Approval of Initial Environment Examination (IEE) Report

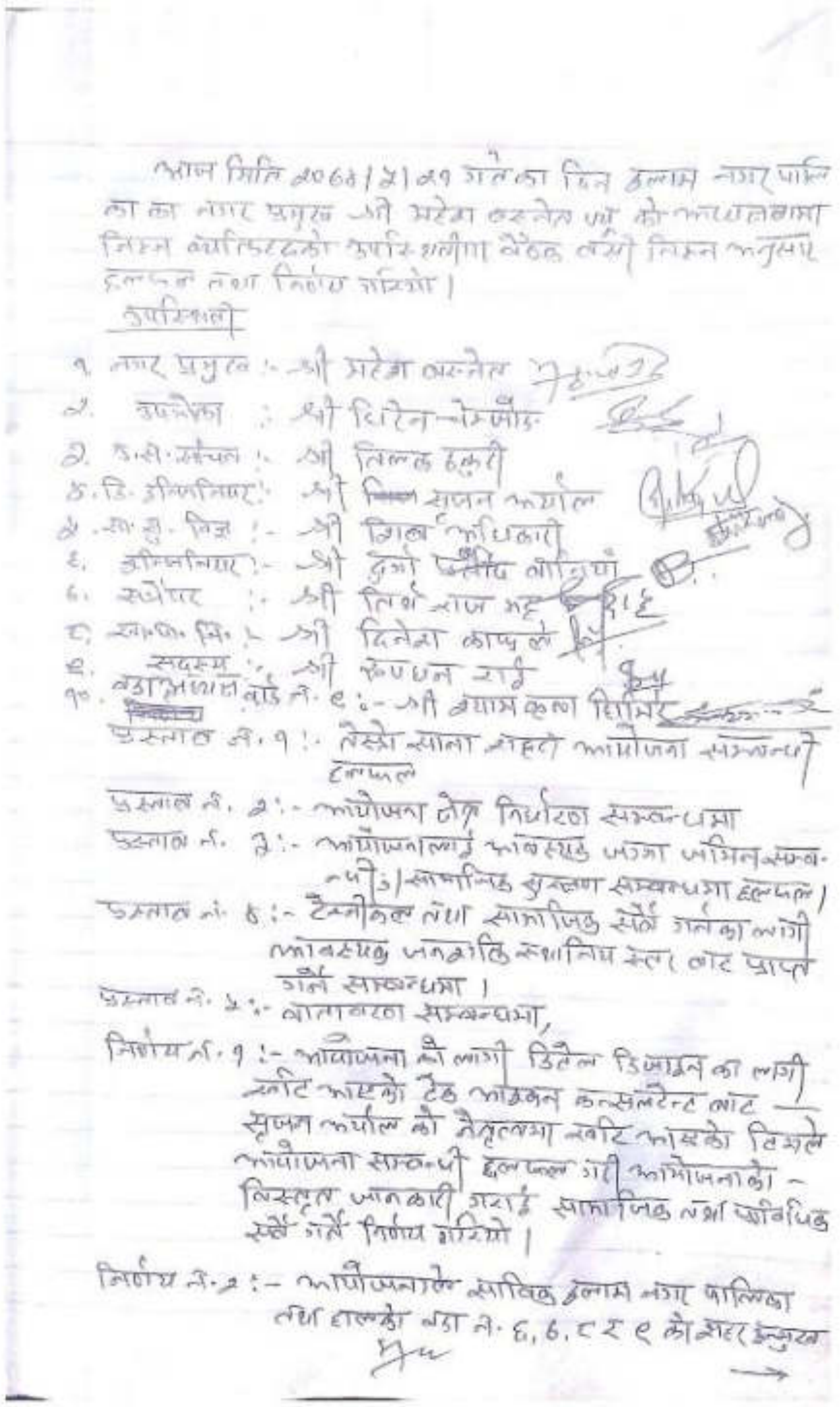
Regarding the above-mentioned subject, it is informed that the updated Initial Environment Examination (IEE) report of Ilam Water Supply & Sanitation Project (Ilam), the proponent of which is Third Small Town Water Supply & Sanitation Project, Panipokhari, Kathmandu, submitted through DWSSM for approval, has been approved as per the decision made by Government of Nepal on 2076/06/02.

Cc:
Third Small Town Water Supply & Sanitation Sector Project
Project Management Office,
Panipokhari, Kathmandu

Attachments:
Approved Initial Environment Examination (IEE) Report 2 Copies

…….
(Anjana Maharjan)
Engineer

MINUTES OF MEETINGS-1



आज मिति २०६८/४/२१ गतेका दिन इलाम नगरपालिकाका नगर प्रमुख श्री महेश बस्नेत ज्यू को अध्यक्षतामा निम्न व्यक्तिहरुको उपस्थितीमा बैठक बसी निम्न अनुसार छलफल तथा निर्णय गरियो।

उपस्थिती

१. नगर प्रमुख :- श्री महेश बस्नेत
२. उपप्रमुख :- श्री हिटेन नेम्बाङ
३. ई.सी. संयोजक :- श्री तिलक ठकुरी
४. डि. इन्जिनियर :- श्री सृजन अर्याल
५. सा.वि.विज्ञ :- श्री मिलन अधिकारी
६. इन्जिनियर :- श्री दुर्गा प्रसाद बाँस्कोटा
७. सर्भेयर :- श्री तिर्थ राज भट्ट
८. सा.प.वि. :- श्री दिनेश काफ्ले
९. सदस्य :- श्री रूपधन राई
१०. वडा अध्यक्ष वार्ड नं. ९ :- श्री श्याम कला घिमिरे

प्रस्ताव नं. १ :- तेस्रो साना शहरी आयोजना सम्बन्धी छलफल

प्रस्ताव नं. २ :- आयोजना क्षेत्र निर्धारण सम्बन्धमा

प्रस्ताव नं. ३ :- आयोजनालाई आवश्यक जग्गा जमिन सम्बन्धी / सामाजिक सुरक्षण सम्बन्धमा छलफल।

प्रस्ताव नं. ४ :- टेक्निकल तथा सामाजिक सर्वे गर्नका लागी आवश्यक जनशक्ति स्थानिय स्तर बाट प्राप्त गर्ने सम्बन्धमा।

प्रस्ताव नं. ५ :- वातावरण सम्बन्धमा,

निर्णय नं. १ :- आयोजनाको लागी डिटेल डिजाइन का लागी खटि आएको टेक आइकन कन्सल्टेन्ट बाट सृजन अर्याल को नेतृत्वमा खटि आएको टिमले आयोजना सम्बन्धी छलफल गरी आयोजनाको विस्तृत जानकारी गराई सामाजिक तथा प्राविधिक सर्वे गर्ने निर्णय गरियो।

निर्णय नं. २ :- आयोजनाको साविक इलाम नगर पालिका तथा हालको वडा नं. ६, ७, ८ र ९ को शहर क्षेत्र

क्षेत्रहरूको विस्तृत सर्वे तथा कार्यान्वयन गर्ने निर्णय गरियो ।

निर्णय नं. ३ :- आयोजना क्षेत्र भित्र आवश्यक भौतिक संरचनाहरू निर्माण गर्नका लागी सम्बन्धित व्यक्तिहरूमा आवश्यकता अनुसार जग्गा जमिन को व्यवस्थापन स्थानिय निकायको समन्वय गर्ने साथै उक्त आवश्यक जग्गा जमिन अधिग्रहण गर्नुपर्ने भएमा सामाजिक सुरक्षा निति अनुरूप गर्ने निर्णय गरियो ।

निर्णय नं. ४ :- टेक्नीकल तथा सामाजिक सर्वे गर्नका लागी आवश्यक जनशक्ति (सम्पूर्ण सर्वे गर्नका लागि) १० देखि १२ जना स्थानिय महिला तथा पुरुष जनशक्ति केही दिनका लागी स्थानिय स्तरबाट उपलब्ध गराउने निर्णय गरियो ।

निर्णय नं. ५ :- माथि उल्लेखित सम्पूर्ण कार्यहरू गर्दा र आयोजनाको निर्माण कार्य गर्दा वातावरण लाई ध्यानमा राख्दै वातावरणमा हुने प्रकारको असर तथा प्रभाव रोक्ने गरी कार्य अगाडी बढाउने निर्णय गरियो ।

English Translation of Minute of Meeting-1

A meeting was organized under the chairmanship of the mayor of Ilam Municipality, Mr. Mahesh Basnet on 6th September, 2017 in the presence of the following mentioned participants. Similarly, discussions were made on the following mentioned topics and decisions were made accordingly under the consent of all.

Participants:

Mayor of the municipality:	Mr. Mahesh Basnet
User's Committee Representative:	Mr. Dhiren Chemjong
Secretary:	Mr.Tilak Thakuri
Design Engineer:	Mr. Srijan Aryal
Social Expert:	Mr. Shiva Adhikari
Engineer:	Mr. Durga Baniya
Surveyor:	Mr. Tirtha Raj Bhatta
	Mr. Dinesh Kafle
Member:	Mr. Rup Dhan Rai
Chairman of Ward no. 9:	Mr. Shyam Krishna Ghimire

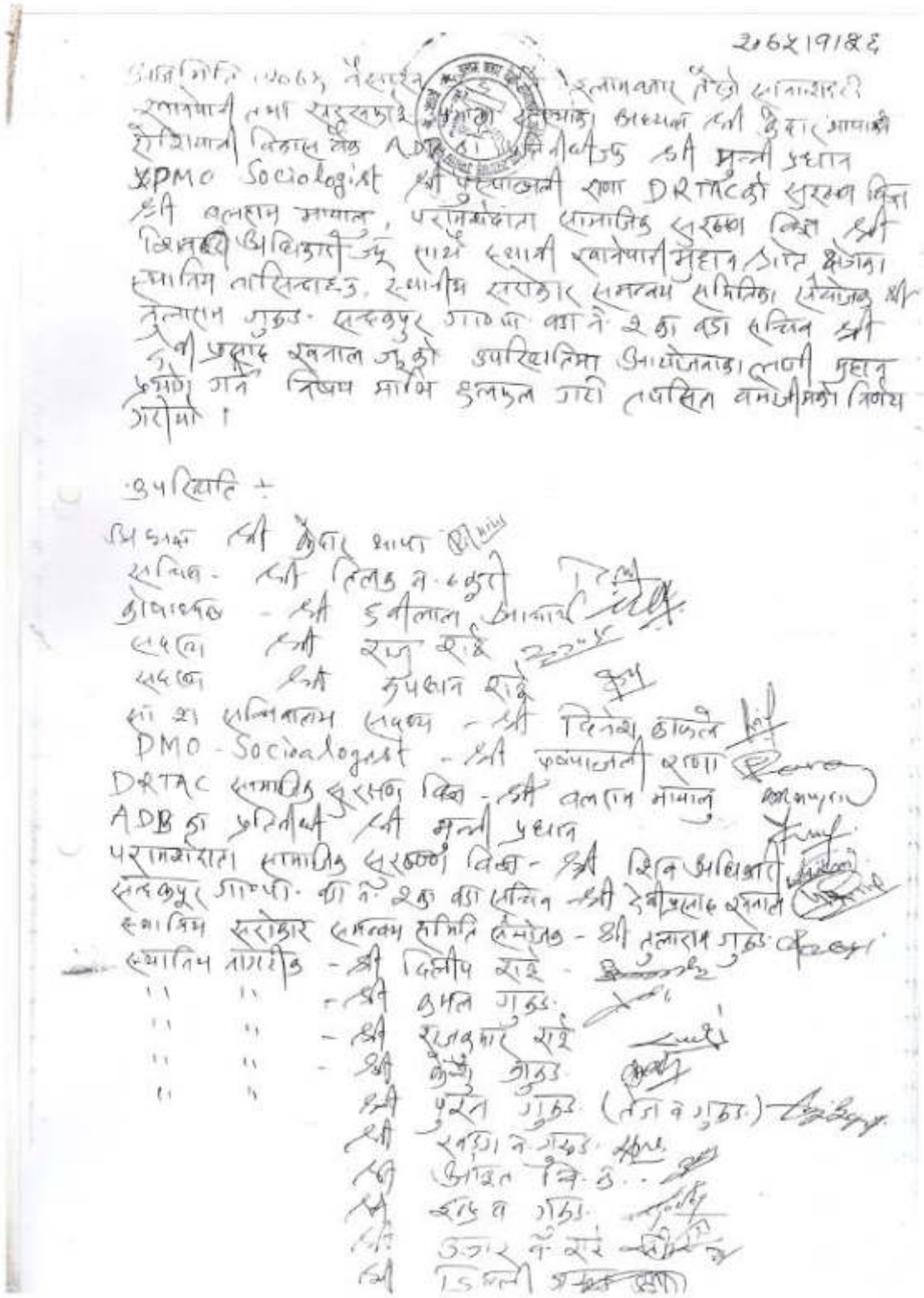
Discussions were made on the following mentioned proposals:

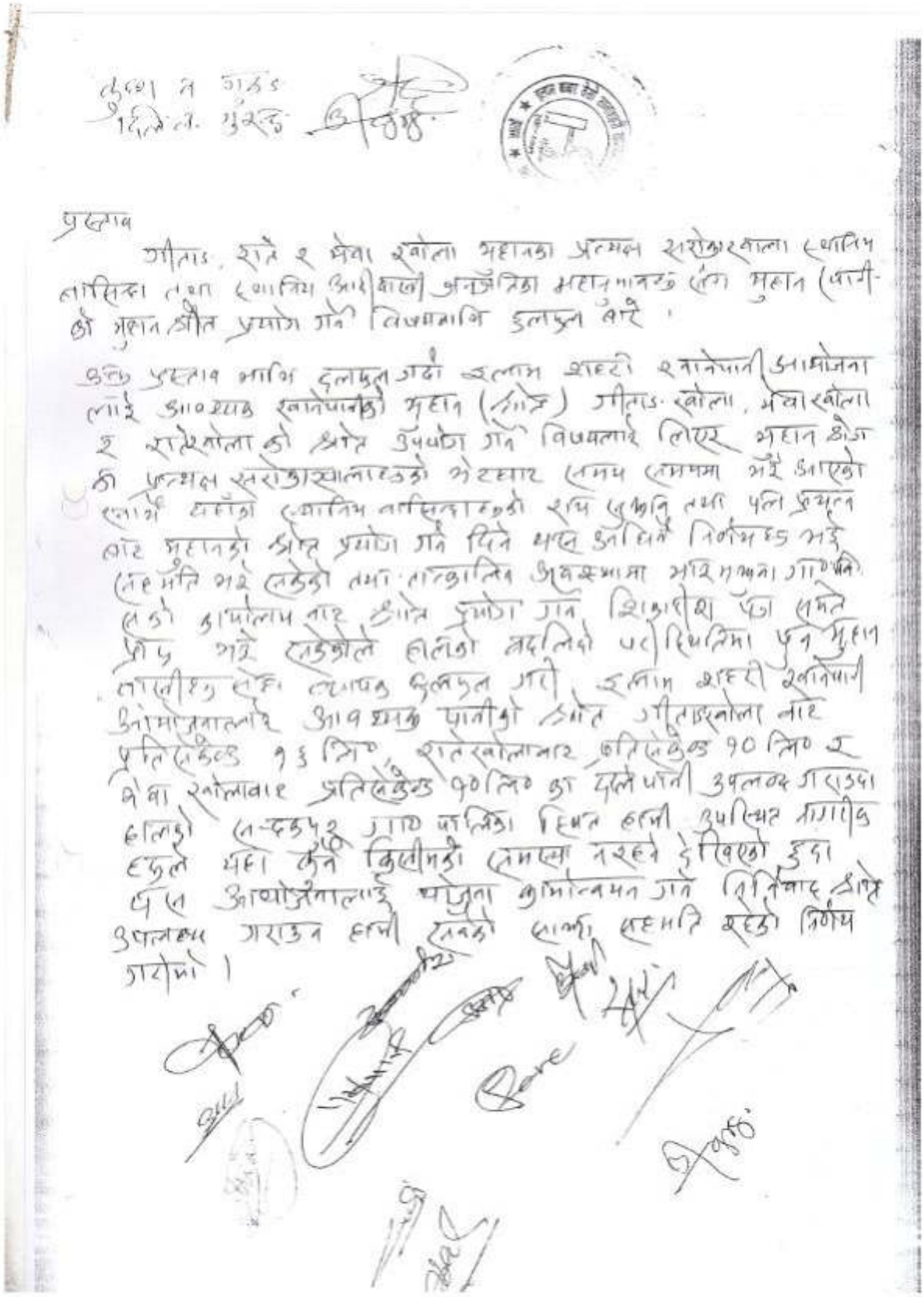
(a) About the proposed project
(b) Proposed Project Area Allocation
(c) Land Requirement for the proposed project
(d) Requirement of Local Manpower for technical & social survey
(e) Environmental Related Issues

The following decisions were made concerning the above-mentioned proposals:

(a) The consultant team (TAEC/ICON JV) led by Mr. Srijan Aryal carried out discussions regarding the proposed project and it has been decided to carry out social & technical survey for the proposed project.
(b) Whole area of ward no. 6 & 7 and partial area of ward no. 8 & 9 of Ilam Municipality has been demarcated for the proposed project.
(c) The concerned local body should manage Land required for the construction of various structural components of this proposed project and if the land needs to be purchased, it should be done according to the Social Protection Policy.
(d) 10 to 12 local human resources (both female & male) required for technical & social (household) survey is to be provided by the concerned local body.
(e) The proposed project construction works will be carried out smoothly ensuring environmental safety & protection.

Minutes of Meeting-2





English Translation of Minute of Meeting-2

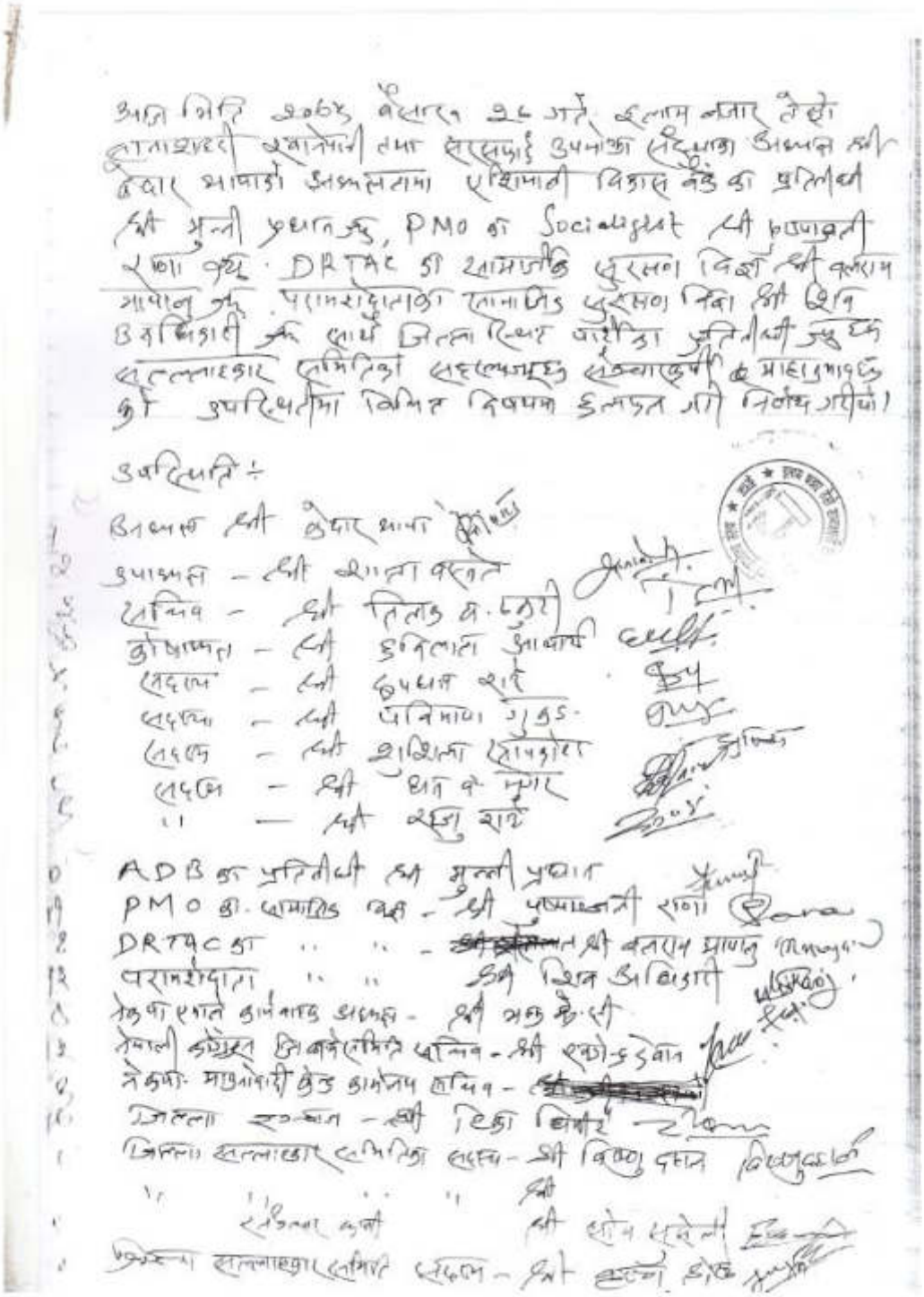
Today dated 9th May, 2018 , a meeting regarding the use of water source for UWSSP in the presence of Mr. Kedar Thapa (Chairman, Ilam Bazaar, WUSC), Ms. Munni Pradhan(ADB representative), Ms. Pushpanjali Rana (PMO Sociologist), Mr. Balaram Mayalu (DRTAC Safeguard Specialist), Mr. Shiva Adhikari (Sageguard Expert from the consultant), local people residing nearby the water source area, Tularam Gurung (Local Stakeholders Committee Facilitator) and Mr. Devi Prasad Khanal (Secretary of ward no. 2 of Sandakpur rural municipality). Similarly, decisions were made accordingly under the consent of all.

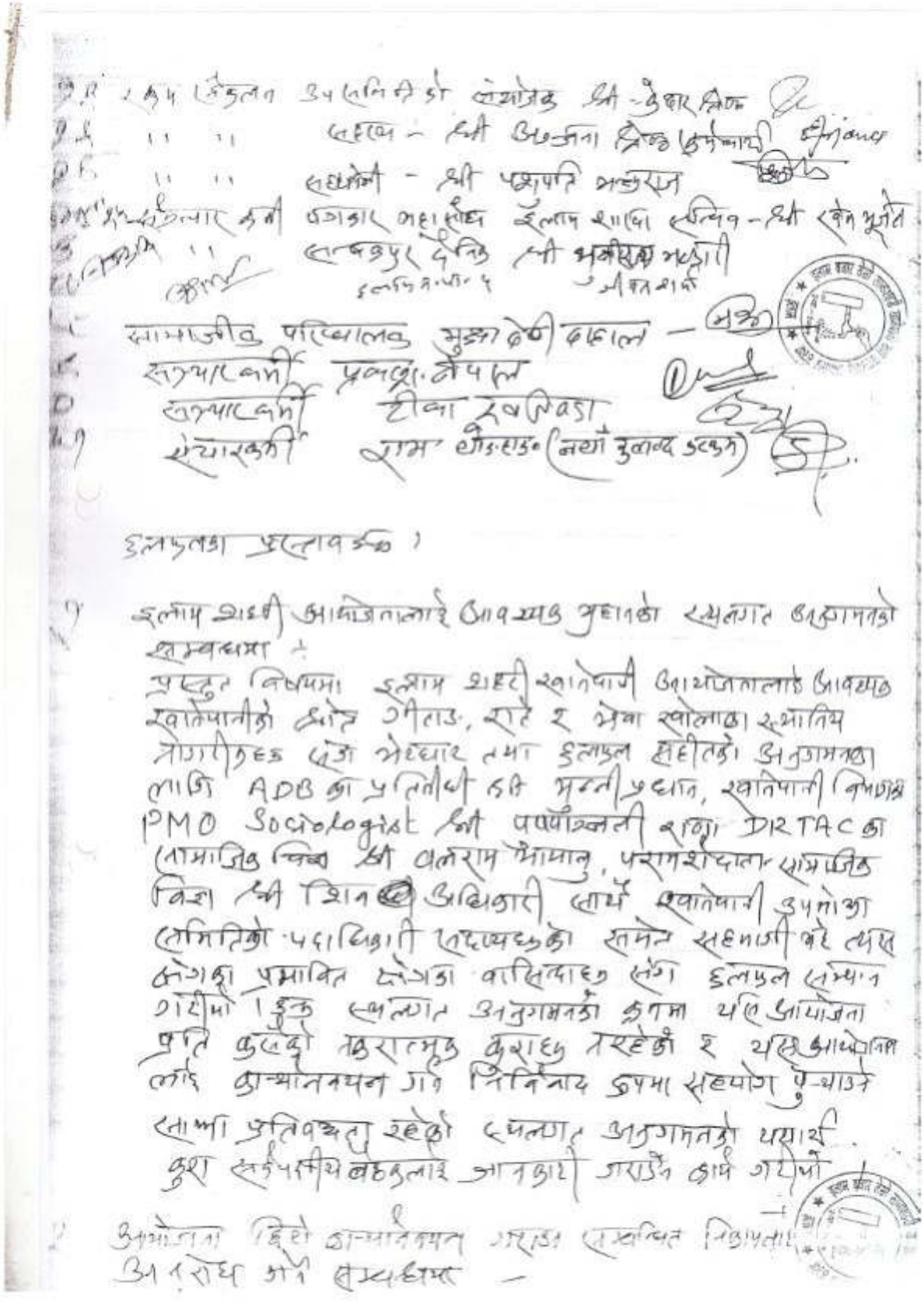
Participants:

Mr. Kedar Thapa (Chairman, Ilam Bazaar, WUSC)
Mr. Tilak Bahadur Thakuri (Secretary, Ilam Bazaar, WUSC)
Mr. Chhabilal Acharya (Treasurer, Ilam Bazaar, WUSC)
Mr. Raju Rai (Member, Ilam Bazaar, WUSC)
Mr. Rupdhan Rai (Member, Ilam Bazaar, WUSC)
Mr. Dinesh Kafle (Member, Small Town Secretariat)
Ms. Pushpanjali Rana (PMO Sociologist)
Mr. Balaram Mayalu (DRTAC Safeguard Expert)
Ms. Munni Pradhan (ADB Representative)
Mr. Shiva Adhikari (Sageguard Expert from the consultant)
Mr. Devi Prasad Khanal (Secretary of ward no. 2 of Sandakpur Rural Municipality)
Tularam Gurung (Local Stakeholders Committee Facilitator)
Mr. Dilip Rai, Local Resident
Mr. Kamal Gurung, Local Resident
Mr. rajkumar Rai, Local Resident
Mr. Keshu Gurung, Local Resident
Mr. Puran Gurung, Local Resident
Mr. Khadga Bahadur Gurung, Local Resident
Mr. Aaita Bishwokarma, Local Resident
Mr. Indra Bahadur Gurung, Local Resident
Mr. Ujar Bahadur Rai Local Resident
Mr. Dilli Gurung Local Resident
Mr. Kush Bahadur Gurung, Local Resident
Mr. Dil Bahadur Gurung, Local Resident

Proposal 1: Regarding the discussion with the concerned local people residing nearby the sources: Gitang, Rate and Mewa Khola for the use of water resources
Decision: The issues raised in the proposal 1 had been repeatedly discussed in the previous meetings and consent has been obtained for the use of concerned water sources from the local people of the source area. For confirmation, this issue has been again raised in this meeting. Decision from the representatives of local people from the source area i.e., Sandakpur Rural Municipality regarding the extraction of 16 lps from Gitang Khola, 10lps from Rate Khola and 10lps from Mewa Khola has been made to allow the use of water resources for the implementation of the proposed UWSSP.

Minutes of Meeting 3





प्रस्तुत विषयमा छलफल गर्दा इलाम बजार तेस्रो साना शहरी
भनि इलाम शहरी खानेपानी तथा सरसफाई आयोजनाको विषय-
मा आज बसेको सर्व पक्षिय बैठकमा प्राप्त राय सुझाव
सकारात्मक रहेकोले यस आयोजनालाई आवश्यक रहेको
पानीको मुहान (श्रोत) जीताङ खोलाबाट प्रतिसेकेण्ड १६ लि०
साहुखोलाबाट प्रतिसेकेण्ड १० लि० मेवारखोलाबाट प्रति-
सेकेण्ड १० लि० का दरले श्रोत उपलब्ध गराउने विषयमा
सर्व अधिक सहमति भई हाल सन्दकपुर गाउ पालिकाको
कार्यालयबाट लिखित सिफारिस समेत संस्थालाई प्राप्त
भई सकेको, आयोजनालाई आवश्यक भएमा इलाम नगर-
पालिका नगरकार्य पालिकाबाट लिखित पत्र प्राप्त भइसकेको
उपभोक्ताहरुले बेहोर्ने इक्विटीको ५% रकम रु.
३८८३१०००।- अक्षरेपी तीन करोड अठासी लाख एकतीस
हजार रकम समेत उपभोक्ता समितिको ने.बं.लि.
मा जम्मा भईसकेको. TDF लोनको जमानत ऋणको
लागि इलाम नगरपालिका नगरकार्यपालिकाले प्रतिबद्धता
जाहेर गरी सकेकाले इलाम शहरी खानेपानी तथा सर-
सफाई आयोजना (इ.न.पा. ६६८२५ कं।) लाई छिटो
कार्यान्वयनको लागि सम्बन्ध निकाय ADB तथा
तेस्रो साना शहरी खानेपानी तथा सरसफाई विभागलाई
(काठमाडौं - पानीपोखरी महाराजगंज) अनुरोध गर्ने
निर्णय गरीयो ।

English Translation of Minute of Meeting-3

Today dated 10th May, 2018 , a meeting regarding various issues in the presence of Mr. Kedar Thapa (Chairman, Ilam Bazaar, WUSC), Ms. Munni Pradhan(ADB representative), Ms. Pushpanjali Rana (PMO Sociologist), Mr. Balaram Mayalu (DRTAC Safeguard Specialist), Mr. Shiva Adhikari (Sageguard Expert from the consultant),District Level Representatives from the Political Parties, Members from Advisors Committee and the media persons. Similarly, decisions were made accordingly under the consent of all.

Participants:
Mr. Kedar Thapa (Chairman, Ilam Bazaar WUSC)
Mr. Shanta Basnet (Vice Chairman, Ilam Bazaar WUSC)
Mr.Tilak Bahadur Thakuri (Secretary, Ilam Bazaar WUSC)
Mr. Chhabilal Acharya (Treasurer, Ilam Bazaar WUSC)
Ms. Pabimaya Gurung, (Member, Ilam Bazaar WUSC)
Ms. Sushila Sapkota, (Member, Ilam Bazaar WUSC)
Mr. Dhan Bahadur Magar , (Member, Ilam Bazaar WUSC)
Mr. Raju Rai (Member, Ilam Bazaar, WUSC)
Mr. Rupdhan Rai (Member, Ilam Bazaar, WUSC)
Ms. Pushpanjali Rana (PMO Sociologist)
Mr. Balaram Mayalu (DRTAC Safeguard Expert)
Ms. Munni Pradhan (ADB Representative)
Mr. Shiva Adhikari (Sageguard Expert from the consultant)
Mr. Bhakta K.C. (Executive Chairman, Nepal Communist Party)
Mr. Khagendra Dewan (Secretary, Nepal Congress District Committee)
Secretary of Nepal Maoist Central Office
Mr. Tika Ghimire, District Incharge
Mr. Bishnu Dahal,Member, District Advisor Committee
Mr. Som Susheli,Member, District Advisor Committee
Mr. Krishna Shrestha, Member, District Advisor Committee
Mr. Kedar Shrestha, Facilitator, Upfront Cash Collection Sub Committee
Ms. Anjana Shrestha, Member, Upfront Cash Collection Sub Committee
Mr. Pashupati Bhakta Raj, Member, Upfront Cash Collection Sub Committee
Mr. Khem Bhujel, Secretary, Federation of Nepali Journalists, Ilam
Mr. B Bhandari, Sandakpur Dainik
Mr. Jeevan Sharma, Ilam Municipality-6
Ms. Mukshya Devi Dahal, Social Mobilizer
Mr. Prakash Nepal, Media Person
Mr. Tika Khatiwada, Media Person
Mr. Ram Thonghang, Media Person, Naya Bualnd Dot Com)

Proposal 1: Regarding the field visit of the required source area for the proposed project

Decision: All the information about the source area visit including the discussion with the local people and their consent for the use of water source has been disclosed to all the participants of the meeting.

Proposal 2: Regarding the request to the concerned authority for the rapid implementation of the propose project

Decision: Regarding the proposal 2, request has been made to the concerned authority, ADB and DRTAC representatives for rapid implementation of the proposed UWSSP (Ilam ward no. 6,7 8 and 9) as there is no interference from the local people regarding source use and land required for the proposed project. Similarly, 5% upfront cash contribution from beneficiaries i.e., NRe 38,851,000.00 has already been deposited in the bank account of WUSC at Nepal Bank Limited and Ilam Municipality has already assured to avail TDF loan.

Appendix 5
Simple Checklists & Sample Survey Questionnaire

OTHER CHECKLISTS

A. CHECKLIST FOR PHYSICO CHEMICAL ENVIRONMENT

Parameters	Description
Topography	Hilly region with gentle slopes
Geology (Rock and Soil Types)	Precambrian to Cambrian Kyanite and sillimanite bearing genesis, biotite schist, Metaquartzite, amphibolite, calc-silicate genesis, orthogenesis and angiogenesis
Erosion and Sedimentation	No such events recorded and observed
Climate	Warm temperate or sub-tropical
Quarry Sites (If any)	No
Land Use	Agricultural land is the dominant followed by forests and residential areas.
Air Quality	Not that severe
Water Quality	Moderate
Noise Level	Not that severe
Drainage Network	No proper drainage system

CHECKLIST OF BIOLOGICAL ENVIRONMENT

Project: Ilam WSSP

CHECKLIST OF FLORA/PLANT LIFE FORMS

Date: September 07, 2017

S.No.	Name of plants	Uses			Others
		Fuel-wood	Fodder	Medicine	
1.	Ainseku			✓	Fruits, Agroforestry
2.	Amala	✓		✓	Edible Fruits
3.	Angeri	✓		✓	
4.	Asuro			✓	
5.	Aule Chaaup			✓	Edible Fruits, Agroforestry, Flowers for oil & perfume
6.	Bakaino			✓	Edible Fruits, Agroforestry
7.	Ban Gahat			✓	Agroforestry
8.	Bar			✓	Edible Fruits, Agroforestry
9.	Barro			✓	Fruits
10.	Bel			✓	Fruits, Agroforestry, Religious
11.	Bhalayo				Edible Oil
12.	Bhote Peepal	✓	✓	✓	Papes Manufacture
13.	Bot Dhayaro				Edible gum, Carpentry, Black Dye
14.	Chilaune			✓	Agroforestry, Dyeing
15.	Chiuri	✓		✓	Edible Fruits, Agroforestry
16.	Chutro			✓	Fruits, Dyeing, Alcohol Drink
17.	Daar	✓			Fruits for flavouring
18.	Dabdabe				Edible Fruits, Agroforestry
19.	Dhobini			✓	Salad Vegetable, " "
20.	Dhuare			✓	
21.	Gitthe Tarul			✓	Edible Tubers
22.	Gwenlo	✓		✓	Edible Fruits
23.	Hallunde			✓	Edible leaves, Agroforestry
24.	Harro			✓	Edible Fruits, Dyeing
25.	Jamun	✓		✓	Edible fruits, Agroforestry
26.	Jhankri Syaula	✓			Agroforestry
27.	Kabro (Seto)			✓	
28.	Kafal			✓	Edible Fruits, Agroforestry
29.	Karam / Karma			✓	
30.	Katus	✓			Edible Seeds, Furniture Making
31.	Khair	✓	✓	✓	Edible Seeds, Dyeing, Tanning
32.	Khanayo			✓	Edible Fruits
33.	Khirro			✓	
34.	Kimbu	✓		✓	Edible Fruits, Agroforestry
35.	Kumbhi			✓	Edible Oil from seeds
36.	Kusum	✓		✓	Edible " " , Edible leaves
37.	Kutmero			✓	Furnitures, Industrial purpose
38.	Lampate				Edible Fruits, Furniture

S.No.	Name of plants	Uses			Others
		Fuel-wood	Fodder	Medicine	
39.	Malato			✓	Agroforestry
40.	Mauwa				Agroforestry
41.	Painyu			✓	Edible Fruits, Agroforestry Dyeing, Carpentry
42.	Phaledo			✓	Agroforestry
43.	Pipal	✓		✓	Religous
44.	Sal	✓		✓	Edible Seeds, Window Frames
45.	Sallo			✓	
46.	Sajh	✓		✓	Furnitures
47.	Seto Aank			✓	Edible leaves, Agroforestry Dyeing, Roofing etc.
48.	Seto Chulsi			✓	
49.	Simali	✓		✓	Edible Seeds, Agroforestry
50.	Sindure	✓		✓	Agroforestry, Preservative
51.	Siris	✓			Agroforestry
52.	Sisam	✓		✓	" , Paper making Plywood, Furnitures
53.	Tanki	✓		✓	Edible Fruits, Vegetables, Agroforestry, Dyeing
54.	Utis	✓		✓	Agroforestry, Dyeing, Tanning, Paper manufacture,

Note:

Project: Ilam WESP

CHECKLIST OF MAMMALS

Date: September 07, 2017

S.N.	Mammals ~~Wild Animals~~	Remarks
1.	Kalo Badar	
2.	Chituwa	
3.	Ban Biralo	
4.	Fyauro	
5.	Syaal	
6.	Musa	
7.	Ban Dhade	
8.	Thulo Nir Biralo	
9.	Lokharke	
10.	Lampokhete Chomero	
11.	Dumsi	
12.	Malsapro	
13.	Rato Badas	
14.	Dhedu	
15.	Musa	
16.	Bwanso	

Note:

Project: Ilam WSSP

CHECKLIST OF BIRDS

Date: September 07, 2017

S.No.	Birds	Remarks
1.	Dhorak Chil	
2.	Chilime	
3.	Basanta	
4.	Malaha Auchil	
5.	Kalpechak	
6.	Koili	
7.	Gothe Latokosero	
8.	Piura	
9.	Dongre Rupi	
10.	Battai	
11.	Nyauli	
12.	Gitar Bhangera	
13.	Kafal Pakyo	
14.	Mayur	
15.	Kalij	
16.	Kaalo Kaag	
17.	Pahadi Biu Kuhiyo	
18.	Lompuchhre Chaite Chara	
19.	Sano Boaz	
20.	Tame Dhukur	
21.	Tuisi Suga	
22.	Luinche	
23.	Jureli	
24.	Sanotame Lahanche	
25.	Gobre Chachas	
26.	Kade Bhyakur	
27.	Lovi Papi Garud	
28.	Pitmuhar Chichilkote	
29.	Munal	

Note:.....
.....
.....

Project: Ilam WSSP

CHECKLIST OF REPTILES, AMPHIBIANS & FISHES

Date: September 07, 2017

S.No.	Reptiles, Amphibians & Fishes	Remarks
1.	Reptiles : Haryou, Adhoo Sarpa, Chiurbire Sarpa, Chheparo, Mausuli	
2.	Amphibians : Lekhali Khasre Bhyaguto, Ahale Bhyaguto	
3.	Fishes :	
	Asala	
	Chuche Buduna	
	Faketa	
	Kabre	
	Katle	
	Singli	
	Gadela	
	Tite	
	Hile	
	Sahar	

Note:.....
.....

Sample Survey Questionnaire

तेस्रो साना शहरी खानेपानी तथा सरसफाई क्षेत्रगत आयोजना

घरधुरी सर्वेक्षण प्रश्नावली

जिल्ला .... नगरपालिका/गा.वि.स .... वडा नं ....
नगर आयोजना .... घर नं. ....
अन्तरवार्ता लिनेको नाम : .... अन्तरवार्ता मिति : ....
सुपरिवेक्षकको नाम : ....

१. सामाजिक-आर्थिक विवरण

(उपयुक्त कोठामा (√) यो चिन्ह लगाउनु होस्)

१.१ अन्तरवार्ता दिनेको नाम :
१.२ घरमूलिको नाम .... लिङ्ग : पुरुष ☐ महिला ☐ ☐
१.३ यस परिवारमा अपाङ्ग भएको कुनै सदस्य हुनु हुन्छ? छ ☐ छैन
१.४ जातजातिमध्ये कुन हो? क) आदिवासी जनजाति ☐ ख) दलित ☐ ग) अल्पसंख्यक ☐ घ) अन्य ☐
(अन्तर्वार्ता लिनेले थरको आधारमा उपयुक्त वर्गमा चिन्ह लगाउने ।)
१.५ अन्तरवार्ता दिने व्यक्तिको नाता ....
१.६ यस परिवारका सदस्यहरूको विवरण दिनुस्

क.सं.	घरमूलिसितको नाता/नाम	उमेर	लिङ्ग	शिक्षा स्तर	पेशा
१					
२					
३					
४					
५					
६					
७					
८					
९					

नोट: पेशा : १. कृषि २. व्यापार ३. नोकरी ४. उद्योगधन्दा
५. रेमिटेन्स (वैदेशिक रोजगार) ६. ज्याला ७. अन्य
शिक्षा : १. निरक्षर २. साक्षर ३. प्राथमिकसम्म ४. माध्यमिकसम्म ५. एस.एल.सी. उत्तीर्ण
६. आई.ए. ७. बि.ए. ८. एम.ए. ९. अन्य
१.७ यस परिवारमा बसोबास गर्ने अन्य सदस्यहरूको सहयोगी डेरावाल कुल संख्या
१.८ यस नगर/शहरमा कहिले देखि बस्दै आउनु भएको छ? वर्ष
स्थायी बसाइ सरेको बसाई सरी आएको भए कुन जिल्लाबाट ....)
१.९ बसाई सर्नुको कारण: प्राकृतिक प्रकोप व्यापार/व्यवसाय शिक्षा द्वन्द्व जिविकोपार्जन सामाजिक मिलाप
१.१० कहिले देखि यस घरमा बस्दै आउनु भएको हो? साल/वर्ष
१.११ यो घर आफ्नै हो? हो होइन यदि हो भने हालको मूल्य कति होला अनुमानित रु.
ख) भाडामा बसेको हो होइन हो भने मासिक घर भाडा कति तिर्नुहुन्छ? रु.
ग) सुकुम्बासी हो होइन
१.१२ यस घरमा भान्छा कोठा बाहेक अन्य कति वटा कोठाहरू छन्?
१ कोठा २ कोठा ३ कोठा ४ कोठा वा सो भन्दा बढि
१.१३ घरको अवलोकन गरी घरको किसिम लेख्ने: पक्की अर्ध पक्की कच्ची
*(**पक्की** : छत ढलान, **अर्ध पक्की** : ढुङ्गा, इट्टाको गारो, टिनको छाना, ढुङ्गा, स्लेट(जस्ता) टायल आदि, **कच्ची** : माटो गारो र खर, टायलले छाएको)*
१.१४ यस परिवारसंग जग्गा जमीन छ? छ छैन
यदि छ भने ५ रोपनी (०.२५ हेक्टर) भन्दा बढि वा ५ रोपनी भन्दा कम
१.१५ यहाँको जग्गाको किसिम: क) खेत वा बारी (असिंचित जग्गा) .... बिघा/रोपनी
ख) खेत वा बारी (सिंचित जग्गा) .... बिघा/रोपनी
१.१६ यहाँले गाई/भैंसी पाल्नु भएकोछ? छ छैन, छ भने कतिवटा? एउटा दुईवटा वा बढि
१.१७ तपाईंको परिवारमा तल उल्लेखित कुन कुन सामान छन्? (भएको सामानको संख्या लेख्ने)

क.सं	सम्पती	संख्या	कैफियत
१	साइकल/रिक्सा		
२	मोटरसाईकल		
३	ठेलागाडा		
४	कार/जिप		
५	मिनीबस/बस		
६	ट्र्याक्टर/ट्रक		
७	रेडियो/क्यासेट		
८	टेलिभिजन/भिडियोसेट		

९	स्टोभ/ग्यास चुलो		
१०	रेफ्रिजेटर		
११	वासिङ्ग मेशिन		
१२	वाटर फिल्टर		
१३	कम्प्युटर		
१४	इमेल/इन्टरनेटको पहुँच		
१५	अन्य भए उल्लेख गर्ने।		

९.१८ यदि मुल पेशा कृषि भए कति महिना खान पुग्छ: ३ महिना ☐ ६ महिना ☐ १२ महिना ☐ यदि नपुग भएमा कसरी धान्नु हुन्छ ?
पसल/घरभाडा तलब पेन्सन अन्य

९.१९ तपाईको परिवारमा औसत मासिक खर्च कति छ ? उल्लेख गर्नुहोस ।

खर्चको शिर्षक र किसिम	मासिक खर्च रु.	कैफियत
(क) कृषि तर्फ		
रसायनिक मल, विउ, किटनाशक आदी खरिद गर्ने		
माटोको तैयारी, रोप्ने, गोड्ने, पानी काट्ने, भिराउने, बुवानी र बिक्री गर्दा हुने खर्च		
अन्य भए (उल्लेख गर्नुस्)		
(क) को जम्मा		
(ख) गैह्र कृषि तर्फ		
खाद्यान्न (अन्न र दैनिक उपभोग्य वस्तु)		
कपडा		
शिक्षा		
घर भाडा/घर मर्मत		
यातायात/सवार		
बिद्युत		
पानी पीत /मर्मत सम्भार		
औषधि/उपचार (पानीबाट हुने रोग)		वार्षिक खर्च
औषधि/उपचार (अन्य रोग)		वार्षिक खर्च
अन्य पारिवारिक कर्मकाण्ड सस्कार आदि उल्लेख गर्ने		वार्षिक खर्च
(ख) को जम्मा		
क+ख को कुल जम्मा		

९.२० तपाईको परिवारको औसत मासिक आय कति छ ? उल्लेख गर्नुहोस ।

आयस्रोत	संलग्न परिवार		प्राप्त हुने आय (रु. मासिक)	कैफियत
	पुरुष	महिला		
(क) कृषि तर्फ				
कृषि उत्पादनको बिक्रीबाट आय (मकै, गहुँ, धान, तरकारी, फलफुल)				
पशुजन्य उत्पादन (दुध, दही, घिउ, मासु, कुखुरा आदि)				
(क) को जम्मा				
(ख) गैह्र कृषि तर्फ				
नोकरी / जागिर				
ज्यालादारी मजदुरी				
पेन्सन/उपदान आदी				
वैदेशीक रोजगार/रेमिटेन्स				
पसल/व्यापार				
उद्योग				
पसल/घर भाडा				
गाडी/बुवानी व्यवसाय				
अन्य भए उल्लेख गर्ने				
(ख) को जम्मा				
क+ख कुल जम्मा				

१.२१ यहाँको परिवारले कुनै ठूलो ऋण बोक्नु परेको छ ? छ [ ] [ ]

२. खानेपानी तथा सरसफाई व्यवस्थापन

२.१ तपाईंको परिवारको लागी खान, खाना पकाउन, नुहाउन, भाँडावर्तन तथा लुगा धुनका लागी प्रयोग गरिने पानीको श्रोत एउटै हो ?
हो [ ] होइन [ ]

२.२ तपाईंको [ ] पानीको [ ] श्रोत कहाँ छ ? घर कम्पाउण्ड भित्र [ ] सार्वजनिक स्थलमा [ ]

२.३ तपाईंको परिवारले पिउन, खाना पकाउनको लागी प्रयोग गर्ने पानीको श्रोत कुन हो ? दैनिक कति लिटर पानी खर्चनु हुन्छ ? कृपया तलको कोठामा ✓ चिन्ह लगाउनुहोस् ।

क.स.	वर्षायाममा	✓	लिटर/ दैनिक	सुख्खा याममा	✓	लिटर/ दैनिक
१	ईनार/कुवा (खुल्ला)	A		ईनार/कुवा (खुल्ला)	A	
२	ईनार/कुवा (ढक्कन भएको)	A		ईनार/कुवा ढक्कन भएको)	A	
३	ट्युबेल/ह्याण्डपम्प	A		ट्युबेल ह्याण्डपम्प	A	
४	डिप ट्युबेल	A		डिप ट्युबेल	A	
५	ईनार/कुवा मेसीनले तान्ने	A		ईनार/कुवा मेसीनले तान्ने	A	
६	सार्वजनिक धारा	A		सार्वजनिक धारा	A	
७	निजी धारा	A		निजी धारा	A	
८	मूल, खोला, नदी, पोखरी	A		मूल खोला, नदी, पोखरी	A	
९	बिक्रेतासँग पानी किनेर	A		बिक्रेतासँग पानी किनेर	A	
१०	वर्षातको पानी संकलन गरेर	A		वर्षातको पानी संकलन गरेर	A	
११	अन्य	A		अन्य	A	
१२	थाहा छैन	A		थाहा छैन	A	

२.४ दैनिक खानेपानी आवश्यक पूर्ति पानी संकलनबारे निम्न विस्तृत विवरण दिनुहोस् ।

क.स.	विवरण	वर्षा याममा				सुख्खा याममा			
		पुरुष	महिला	बालिका	बालक	पुरुष	महिला	बालिका	बालक
१	कति खेप/पटक								
२	लिटर/खेप								
३	कुल परिमाण								
४	पानी ल्याउन लाग्ने समय (मिनेट)/खेप								
	• पानीको मुहान सम्म पुग्न								
	• मुहानमा पर्खनु पर्ने समय								
	• फर्कदा लाग्ने समय								
५	प्रति खेप लाग्ने समय								

नोट : अन्तरवार्ता दिने व्यक्तिले पानीको भाँडो लेरी बोक्ने क्षमता यकिन गरि उल्लेख गर्ने ।

२.५ भाँडा माझ्न, नुहाउन र लुगा धुन तथा अन्य कामको लागी कुन श्रोतको पानी प्रयोग गर्नुहुन्छ ? कति पानी खपत गर्नुहुन्छ? कृपया ☑ चिन्ह लगाउनुहोस् ।

क.स.	वर्षायाममका	✓	लिटर/ दैनिक	सुख्खा याममा	✓	लिटर/ दैनिक
१	ईनार/कुवा (खुल्ला)	A		ईनार/कुवा (खुल्ला)	A	
२	ईनार/कुवा ढक्कन सहित	A		ईनार/कुवा ढक्कन सहित	A	
३	ट्युबेल ह्याण्डपम्प सहित	A		ट्युबेल ह्याण्डपम्प सहित	A	
४	डिप ट्युबेल	A		डिप ट्युबेल	A	
५	ईनार/कुवा मेसीनबाट तान्ने	A		ईनार/कुवा मेसीनबाट तान्ने	A	
६	सार्वजनिक धारा	A		सार्वजनिक धारा	A	

७.	घरकै निजी धारा	A		घरकै निजी धारा	A	
८.	मूल,खोला, नदी, पोखरी	A		मूल खोला, नदी, पोखरी	A	
९.	पानी बिक्रेतासँग किनेर	A		पानी बिक्रेतासँग किनेर	A	
१०.	आकासे पानी संकलन गरेर	A		आकासे पानी संकलन गरेर	A	
११.	अन्य	A		अन्य	A	
१२.	थाहा छैन	A		थाहा छैन	A	

२.६ लुगा धुन र नुहाउन घरबाट पानीको मुहान सम्म जान कति समय लाग्दछ । (यदि श्रोत/मुहान छुट्टाछुट्टै भएमा समय (मिनेटमा) उल्लेख गर्ने)

क। लुगा धुन जाने ☐ नुहाउन ☐ भाँडा माझ्न ☐
ख। वर्षायाममा लाग्ने समय ☐ मिनेट सुख्खा याममा लाग्ने समय ☐ ट

२.७ यदि धाराको पानी यहाँको आवश्यकता परिपूर्तिगर्न पर्याप्त छैन भने कसरी आपूर्ति गर्नु हुन्छ?

पानीको श्रोत	परिमाण लिटर	खर्चनु पर्ने समय (घण्टा) दैनिक	थप खर्च मासिक
कुवा इनार			
आकासे पानी संकलन			
निजी टैंकरबाट पानी किन्ने			
ह्याण्ड पम्प,ट्युबवेल			
मिनरल वाटर जार			
अन्य			

२.८ गाईवस्तुको लागि चाहिने पानी कुन श्रोतबाट कति मात्रामा उपभोग गर्नुहुन्छ ।

क। प्रयोग भएको श्रोत..

ख। परिमाण (लिटर/दैनिक) ....

ग। श्रोतसम्म जान आउन लाग्ने समय (मिनेट)..

३. निजी धारा जडान

३.१ के तपाईले घरमा पाइप धारा जडान गर्नु भएको छ ? छ ☐ छैन ☐ यदि छ भने कति खर्च लाग्यो? रु.

३.२ के तपाई आफ्नो घरमा धारा जोड्न चाहनु हुन्छ ? चाहन्छु ☐ चाहन्न ☐ चाहनु हुन्छ भने कस्तो प्रकारको ☐ जडान गर्न इच्छा राख्नु हुन्छ ?

क। घरभित्र निजी धारा ☐

ख। कम्पाउण्डभित्र निजी धारा

ग। सामुदायिक धारा ☐ ☐

३.३ यदि तपाइको घरमा निजी धारा जडान भएको छैन भने, किन जडान नगरेको ?

क। खर्च गर्ने क्षमता नभएकोले ☐

ख। जडान शुल्क धेरै पर्ने भएकोले ☐

ग। मासिक पानी बिल धेरै आउने भएकोले ☐

घ। पानीको मात्रा पर्याप्त नभएकोले ☐

ङ। पानीको आपूर्ति नियमित नभएकोले ☐

च। यस क्षेत्रमा पाइपलाइन जडान गर्ने व्यवस्था उपलब्ध नभएकोले ☐

छ। पानीको गुणस्तर राम्रो नभएकोले ☐

ज। अन्य कारण उल्लेख गर्ने ☐

झ। थाहा छैन ☐

३.४ हाल तपाईले पानको धारा बापत गएको महिनामा पानीको महशुल कति तिर्नु भयो ? रु ☐

३.५ गएको महिनामा तिरेको बिल देखाउन सक्नु हुन्छ ? (बिल उपलब्ध भए सोको विवरण भर्ने) ☐

क। तिरेको रकम रु ☐ ख। खपत भएको पानीको मात्रा ☐ लिटर

३.६ पानीको बिल कुन ☐ तिर्नुहुन्छ ? ☑ चिन्ह लगाउनुहोस् ☐

क। मासिक निश्चित तोकिएको रकम ☐

ख। मिटर रिडिङ बमोजिम ☐

ग। खानेपानी कार्यालयले भने अनुसार ☐

घ। तिर्नु पर्दैन ☐

ङ। अन्य ☐

च। थाहा छैन ☐

३.७ तपाईलाई पानीको बिल तिर्ने कुन तरिका मन पर्छ ?

क। निश्चित तोकिएको मासिक शुल्क ☐

ख। मिटर रिडिङ बिल अनुसार ☐

३.८ घरको धारामा पानी नआउँदा पनि पानी महशुल तिर्नु पर्छ ? पर्छ ☐

३.९ निजी धाराको पानी बाहेक तपाईले कहिले काँही पानी किन्नु पर्ने भएको ☐ ☐ ☐

वर्षायाममा लिटर ______ सुख्खायाममा लिटर ______ पर्दैन

३.१० निजीस्तरबाट ______ कतावाट किन्दा कति पर्छ ______ दरमा पानी किन्नु भएको छ?

लिटर ______ ______ प्रति लिटरको दर रु. ______

३.११ तपाइको घरका धारा कति भरपर्दा छ ?

- क) पानी निरन्तर आउछ
- ख) पानी कहिले आउँछ र कहिले आउँदैन
- ग) पानी एक दिन बिराएर आउँछ
- घ) पानी प्रत्येक दिन केही घण्टा आउँछ

३.१२ खानेपानी वितरण प्रणाली अवरुद्ध हुदा मर्मत सम्भार गर्दा लाग्ने खर्च व्यहोर्ने जिम्मा कसको हो ?

- क) नेपाल सरकार
- ख) खानेपानी उपभोक्ता सरसफाइ समिति
- ग) समुदाय / छर छिमेकी
- घ) अन्य उल्लेख गर्ने ______

३.१३ खानेपानीको पाइप/धारा मर्मत सुधारको लागि वार्षिक कति रकम खर्च गर्नुहुन्छ ? गर्छु ☐ गर्दिन ☐

३.१४ सार्वजनिक धारा प्रयोग गरे वापत पानी पोत तिर्नु पर्छ

पर्दैन ☐ ☐ भने कति ? रकम ______ मासिक/वार्षिक

३.१५ पानीको गुणस्तर: तपाईंले प्रयोग गर्ने पानीको गुणस्तरमा सन्तुष्ट हुनुहुन्छ छु ☐ छैन ☐

यदि छैन भने, पानीको गुणस्तर सम्बन्धि समस्या कस्ता छन् ?

- अ) पानी गन्हाउँछ
- आ) स्वाद नराम्रो छ
- इ) पानी प्रदुषित/धमिलो छ
- ई) अन्य केहि समस्या भए उल्लेख गर्ने ______

३.१६ यसरी प्रयोग गर्ने पानीको गुणस्तर कायम गर्न के गर्नु हुन्छ

पानीको प्रशोधनका घरेलु विधि	थप खर्च मासिक
उमाल्ने	
फिल्टर गर्ने	
छान्ने	
क्लोरिन (पियुस), आलम, पोटास	
युरो गार्ड	
सोडिस	

सह-लगानी अवधारणा सम्बन्धी प्राथमिकता

४.१ यदि तपाईंको नगरपालिका/गा.वि.स. मा विभिन्न योजना सञ्चालन गर्ने रकम उपलब्ध छ भने निम्नलिखित मध्ये कुन कुन ? योजनालाई पहिलो प्राथमिकता दिनुहुन्छ ?

- क) सडक बत्ती
- ख) कालोपत्रे सडक
- ग) विद्यालय
- घ) अस्पताल
- ङ) व्यवस्थित खानेपानी प्रणाली
- च) पैदलयात्री सडक
- छ) विद्युत
- ज) संचार
- झ) सरसफाई सुविधा
- ञ) सिचाई
- ट) पाटीपौवा धर्मशाला
- ठ) अन्य ______

४.२ यदि तपाई व्यवस्थित खानेपानी वितरण प्रणालीलाई महत्वपूर्ण ठान्नु हुन्छ भने, कस्तो किसिमको खानेपानी वितरण प्रणालीको चाहना गर्नु भएको छ ?

- क) घर / कम्पाउण्डभित्रै व्यक्तिगत/निजी धारा जडान
- ग) शुल्क सहितको सामुदायिक धारा जडान
- घ) सुधारिएको कुवा, ह्यान्डपम्प जडित
- ङ) सुधारिएको कुवा, विद्युतीय पम्प जडित
- च) हाल उपलब्ध सेवामा सुधार आवश्यक छैन
- छ) अन्य (उल्लेख गर्नुहोस्) ______

४.३ यदि तपाईंको घरमा धारा छैन र निजी धारा राख्न इच्छुक हुनुहुन्छ भने, कति रकम सह-लगानी गर्न सक्नुहुन्छ ? कृपया तल दिइएको तालिकामा निजि धारा राख्न कति रकम सम्म लगानी गर्नुहुन्छ लगानीको रकमको सीमामा ☑चिन्ह लगाउनुहोस् ।

क.स.	लगानीको विवरण	☑ चिन्ह लगाउने

१.	१५००० भन्दा माथी	☐
२.	९००१ देखि १५००० सम्म	☐
३.	६००१ देखि ९००० सम्म	☐
४.	३००१ देखि ६००० सम्म	☐
५.	१५०१ देखि ३००० सम्म	☐
६.	१५०० भन्दा कम	☐

४.४ निजी धारा जडान बापत लाग्ने शुल्क व्यहोर्नु पर्नेछ। मन्जुर छ ☐ मन्जुर छैन ☐

४.५ नयाँ खानेपानी योजना शुरु भएमा र सो योजनाबाट चौबिसै घण्टा पर्याप्त मात्रामा गुणस्तरयुक्त पानी उपलब्ध भएको खण्डमा के तपाईले आफ्नो घरमा धारा जडान गर्न इच्छुक हुनु हुन्छ? छ छैन

यदि इच्छुक भए नयाँ नियमानुसार मासिक पानी महशुल तिर्न ☐ बुझाउनु हुन्छ? ☐

छ ☐ छैन ☐ यदि इच्छुक हुनु हुन्छ भने तल दिईएको तालिकामा पानी महशुलको सीमामा ☑ चिन्ह लगाएर आफ्नो ईच्छा व्यक्त गर्नुहोस्।

क्र.सं.	मासिक पानी महशुल	☑ चिन्ह लगाउने
१.	रु ५०० भन्दा माथी	☐
२.	रु ४५१ देखि ५००	☐
३.	रु ४०१ देखि ४५०	☐
४.	रु ३५१ देखि ४००	☐
५.	रु ३०१ देखि ३५०	☐
६.	रु २५१ देखि ३००	☐
६.	रु २०१ देखि २५०	☐
७.	रु १५१ देखि २००	☐

४.६ नयाँ खानेपानी वितरण प्रणालीको व्यवस्था हुन तपाईको परिवारबाट पनि प्रतिबद्धता स्वरुप अग्रिम रकम योगदान गर्नु पर्ने हुन्छ, यसको विचारमा कति प्रतिशत योगदान हुन सक्छ?

लागतको ५% ☐ १०% ☐ १५% ☐

४.७ नयाँ सरसफाई सुविधा (सामुदायिक शौचालय तथा सतही ढल) निर्माणको लागि सह लगानी स्वरुप १५% स्थानीय निकाय र उपभोक्ताले सहलगानी गर्न इच्छुक हुनुहुन्छ? छ छैन

यदि चाहनुहुन्छ भने, कति सम्म? ☐ ☐

४.८ यहाँलाई नभई नहुने तथा भए राम्रो हुने प्राथमिक आवश्यकता कुन हो?

निजी धारा जडान ☐ निजी चर्पी निर्माण ☐ दुवै ☐

५.लैङ्गिक दृष्टिकोणबाट महिला सहभागिता

(आयोजनाको विभिन्न चरणमा महिला सहभागिता सम्बन्धि जानकारी संकलन गर्न प्रत्येक घरधुरीमा, लक्षित समूह छलफलबाट र छुट्टै महिला समूहसँग मात्र सोधिने प्रश्नहरु)

क) महिलाहरुको उपस्थिति र सहभागीता

५.१ आयोजनाकोबारेमा छलफल गर्न कुनै बैठक बोलाईएको थियो ?

थियो ☐ थिएन ☐

५.२ के आयोजनाको छनौट गर्न बैठकमा महिला उपभोक्ताहरुको उपस्थिती थियो ?

थियो ☐ थिएन ☐

यदि थियो भने महिला उपभोक्ताहरुको भूमिका कस्तो थियो ?

सुन्ने मात्र अन्तरक्रियात्मक निर्णायक

५.३ आयोजनाको क्रियाकलापहरुको रेखदेख गर्न के खानेपानी उपभोक्ता तथा सरसफाई समिति संस्था गठन भएको छ ? छ ☐ छैन ☐

५.४ खा.पा.उ.स.समितिका सदस्यहरु मध्ये कति महिला सदस्यहरु छन्? (जानकारी दिने व्यक्तिले खा.पा.उ.स.स.बिच समितिको पदाधिकारी तथा सदस्यहरुको नामावली तथा लगति कर्मचारीको विवरण प्राप्त गरी उपलब्ध गराउने)

ख: लैङ्गिकताका आधारमा कार्य विभाजन

५.५ तलको तालिकामा दिइएको कामहरु अक्सर कस्ले गर्ने गर्दछ?(√)चिन्ह लगाउनुस

दैनिक घण्टामा

क.सं	घरायसि क्रियाकलापहरु	पुरुष	महिला	कुल समय
१	खानेपानी भर्ने, बोक्ने, भण्डारण र प्रयोग गर्ने			
२	भान्छा तयार गर्ने, भाडाँ माझ्ने			
३	बालबालिका र वृद्धवृद्धाको स्याहार			
४	लुगा धुने घर सफा गर्ने			
५	खाद्यान्न भण्डारण तथा तयारी			
६	अन्य			

ग) पारिवारिक व्यवस्थापन, आय श्रोत र अन्य विषयमा महिलाहरुको नियन्त्रण र पहुँच

५.६ तलको तालिकामा उल्लेखित पारिवारिक विषय वा क्षेत्रहरुमा निर्णय गर्दा यहाँको घर परिवारमा महिला/पुरुषको भनाईको सुनुवाई हुन्छ। उपयुक्त कोठामा १,√०चिन्ह लगाउनुस्

क.सं	विषय वा कार्यक्षेत्रहरु	हुन्छ १,√०	हुँदैन १,√०
१	आर्थिक सरोकारका कुराहरु		
२	केटाकेटीको शिक्षा दिक्षा		
३	केटाकेटी र वृद्धवृद्धाको स्वास्थ्य र स्याहार		
४	अचल सम्पत्ति किनबेच (घर जग्गा)		
५	दैनिक क्रियाकलापहरु		
६	सामाजिक विधि व्यवहार, विवाह, व्रतबन्ध, चाडपर्व तथा सामाजिक/पारिवारीक सुसम्बन्धन आदि	•	
७	अन्य		

५.७ यहाँको परिवारमा पारिवारीक सम्पतिका निम्न विषयमा महिलाको पहुँच र स्वामित्व रहेको छ छैन तलको तालिकामा उपयुक्त कोठामा १,√०चिन्ह लगाउनुस्

क.सं	विवरण	पहुँच	स्वामित्व
१	जग्गा जमिन		
२	घर तथा अन्य संरचनाहरु		
३	चल सम्पति/संचित पैसा		
४	दैनिक क्रियाकलापहरु		
५	अन्य		

घ) खा.पा.उ.स.स. तथा समुदायमा महिलाको स्तर (हैसियत) (निम्न बुँदाहरु अन्तरवार्ता लिने व्यक्तिले गरेको अवलोकनका आधार हुनेछ।)

क.सं	विषय	उच्च	मध्यम	निम्न
१	आत्मसम्मानबोध			
२	आत्मविश्वास नेतृत्व क्षमता			
३	दायित्वबोध र क्षमता			
४	स्वाकत, तर्क संगत, धैर्य र मेहनत			
५	अन्य			

६ सम विकासमा पहुँचका आधारमा सामाजिक समावेशी सहभागिता

(आयोजनाको विभिन्न चरणमा गैरलाभान्वित विपन्न वर्गको, आदिवासी जनजाति, दलित तथा पछाडि परेका वर्गको समावेशी सहभागिता सम्बन्धि जानकारी संकलन गर्न प्रत्येक घरधुरीमा, लक्षित समूह छलफलबाट र छुट्टै महिला समूहसँग छलफल गर्दा सोध्ने प्रश्नहरु)

क) आयोजना क्रियाकलापमा गैरलाभान्वित विपन्न वर्गहरु, जातजाति, दलित, अपाङ्गता भएको व्यक्तिको उपस्थिति

६.१ आयोजनाकोबारेमा छलफल गर्न कुनै भेला/बैठकमा समावेशी तवरले बोलाइएको थियो ?

थियो ☐ थिएन ☐

६.२ के आयोजनाको छनौट गर्न बैठकमा समावेशीताको आधारमा सहभागिहरुको उपस्थिती थियो? थियो ☐ थिएन ☐

६.३ के खा.पा.उ.स.स.को गठनमा समावेशीता अंगीकार भएको थियो? थियो ☐ थिएन ☐

ख) निर्णय प्रकियामा समावेशी प्रकृया अपनाएको थियो ?

६.४ आयोजना छनौट गर्ने जनसमुहहरुको कस्तो भूमिका कस्तो थियो ?

उच्च ☐ मध्यम ☐ निम्न ☐

६.५ [illegible]

राम्रो ☐ मध्यम ☐ निम्न ☐

७ स्वास्थ्य र सरसफाइ

क. खानेपानी

१तपाईको विचारमा पानीको गुणस्तर नराम्रो (खराब) भएमा के समस्याहरु देखिन सक्छ ?

(एक भन्दा बढी उत्तर आउन सक्ने)

१.१ दुर्गन्ध आउने / लेसिलो स्वाद ☐

१.२ दाँत बिग्रिने/सडिने

१.३ बिरामी बनाउने

१.४ अन्य (उल्लेख गर्ने) ______

२. के तपाईंलाई पानी भर्ने र राख्ने भाँडो पानी भर्नु र भण्डार गर्नु पूर्व सफा ... थाहा छ? छ ☐ छैन ☐

यदि छ भने, पानी राख्ने भाँडो कसरी सफा गर्नु हुन्छ?

खाली पानी मात्रले ☐ खरानी पानीले ☐ भुस/पिठो र पानीले ☐

साबुन पानीले ☐ अन्य (उल्लेख गर्नुस) ______

३. तपाईं घरमा पानी कसरी राख्नु हुन्छ?

(एक भन्दा बढी उत्तर आउन सक्ने)

३.१ पानी भर्नु पहिले भाँडा सफा गर्ने

३.२ बासी पानी फ्याँक्ने

३.३ पानी राख्ने भाँडो राम्रोसँग ढाकेर/छोपेर राख्ने

३.४ अन्य (उल्लेख गर्ने) ______

४. तपाईं गाग्री वा बाल्टीबाट पानी कसरी निकाल्नुहुन्छ?

४.१ पानी सार्नु अघि अम्खोरा, लोटा, करुवा, मग धोएर

४.२ गिलास, मग, कप गाग्रीमा डुबाएर

४.३ गाग्रीबाट लोटा, अम्खोरा, करुवा, गिलासमा पानी सारेर

४.४ अन्य (उल्लेख गर्ने) ______

ख. चर्पी

१. चर्पी प्रयोगका फाइदाहरु के के छन्? (एकभन्दा बढी उत्तर आउन सक्ने)

१.१ बुढा, बालक तथा बिरामीलाई सुविधा

१.२ घर तथा वातावरण सफा हुने

१.३ गोप्यता हुने

१.४ रोगबाट बचावट हुने

१.५ अन्य (उल्लेख गर्ने) ______

२. के तपाईंलाई दिसाबाट रोग सर्छ भन्ने लाग्छ? ☐ लाग्छ ☐ लाग्दैन

यदि लाग्छ भने, मानिसको दिसाबाट सर्ने रोगहरुको नाम भन्नुहोस्? ______

३. के तपाईंको घरमा चर्पी छ? छ ☐ छैन ☐

३.१ यदि छ भने, कस्तो प्रकारको चर्पी छ? ☐

१ खाल्डे चर्पी

२ भेन्टिलेटेड खाल्डे चर्पी

३ वाटर सिल/पोर फ्लस

४ सिस्टर्न फ्लस

५ अन्य ______

३.२ यदि छ भने, तपाईंको घरमा चर्पी कसकसले प्रयोग गर्नुहुन्छ? ☐

(१. सबैले, २. बच्चा बाहेक सबैले ३. वयस्क र प्रौढले मात्र ४. बिरामी मात्रैले)

३.३ यदि छैन भने, किन चर्पी नबनाउनु भएको हो? ☐

(क. बनाउने तरिका थाहा नभएर, ख. लगानी गर्न नसकेर, ग. खुल्ला मैदानमा दिसा गर्ने बानी भएर, घ. जग्गाको अभावले ङ अन्य (उल्लेख गर्ने) ______)

३.४ यदि छैन भने, दिसा गर्न कहाँ जानुहुन्छ? ☐

(क. खोला/जङ्गल किनार ख. खुल्ला मैदान/ठाउँ ग. घर/सडक छेउ घ. जहाँ सजिलो हुन्छ)

३.५ यदि छैन भने, चर्पी बनाउन कति लगानी गर्न सक्नु हुन्छ? रु ☐

ग. खानेकुराको सरसफाइ

१. खाद्यपदार्थ दूषित हुनबाट कसरी बचाउनुहुन्छ? (एक भन्दा बढी उत्तर आउनसक्ने)

१.१ पकाएको खाना छोपेर/ढाकेर राख्ने

१.२ बासी हुने गरी धेरै नपकाएर

१.३ काँचै खाइने खानेकुरा राम्रोसँग पखालेर धोएर मात्र खाने

१.४ हात राम्रो सफा गरेर मात्र भान्सामा पसेर

१.५ सफा हातले खाना पस्कने

१.६ झाडु लगाई, चुल्हो/भाँडाकुँडा सफा गरेर मात्र खाना पकाउने/खाने

१.७ चुलो चौकी पकाउने भाँडा, इत्यादि सफा राख्ने

१.८ धेरै बासी वा सड्ने गलेका फलफूल तरकारी नखाने

२. के तपाईं खानेकुरा छोपेर/ढाकेर राख्नुहुन्छ? राख्छु ☐ राख्दिन

यदि राख्नुहुन्छ भने, त्यसबाट के के फाइदाहरु छन्? (एक भन्दा बढी उत्तर आउन सक्ने)

२.१ धुलो मैलो, झिंगा, साङ्ला, किरा, तथा घरपालुवा पशुपन्छीबाट बचावट

२.२ मुसा/छुचुन्द्रो/माउसुली/बिरालोबाट बच्न

२.३ खाद्य प्रदूषणबाट हुने रोगबाट बच्न

२.४ अन्य (उल्लेख गर्ने) ....

जीवनजल बनाउने तरिका थाहा छ छैन सोध्ने, यदि थाहा भएमा सहि तरिकाले जीवनजल बनाउने । जीवनजल बनाउने सहि तरिका निम्नअनुसारको छ ।
१. पहिला साबुन पानीले हात सफा गर्ने, २. चिया गिलासको ६ गिलास (एक लिटर) पानी एउटा सफा भाँडोमा हाल्ने (यदि पानी उमालेको भएमा सेलाउन दिने), ३.जीवनजलको एक प्याकेटभित्र भएको धुलो पुरै पानीमा हाली पानीलाई राम्ररी चलाएर धुलोलाई घुल्न दिने ।

घ. व्यक्तिगत सरसफाइ

१. तपाईं र परिवारका अन्य सदस्यले कहिले र के गरेपछि हात धुनुहुन्छ ? धुने भए यस्तो (✓) चिन्ह लगाउनुहोस् र नधुने भए यस्तो (×) चिन्ह लगाउनुहोस । (एक भन्दा बढी उत्तर आउन सक्ने)

क्र. सं.	क्रियाकलाप	५ वर्ष मुनिका बालबालिका		महिला		पुरुष	
		धुने (✓)	नधुने (×)	धुने (✓)	नधुने (×)	धुने (✓)	नधुने (×)
१	खाना खानु अघि						
२	खाना खाएपछि						
३	दिसा गरेपछि						
४	फोहर मैला छोएपछि						
५	कामबाट फर्केपछि						
६	केटाकेटीलाई दिसा पिसाब गराइ सकेपछि						
७	अन्य (उल्लेख गर्ने)						

२. तपाईं र परिवारका अन्य सदस्यले के ले हात धुनुहुन्छ ? धुनेमा यस्तो (✓) चिन्ह लगाउनुहोस् र नधुनेमा यस्तो (×) चिन्ह लगाउनुहोस ।

क्र. सं.	क्रियाकलाप	५ वर्ष मुनिका बालबालिका		महिला		पुरुष	
		धुने (✓)	नधुने (×)	धुने (✓)	नधुने (×)	धुने (✓)	नधुने (×)
१.	पानी मात्रै						
२.	खरानी पानी						
३.	भुस/पिठो पानी						
४.	साबुन पानी						
५.	अन्य (उल्लेख गर्ने)						
जम्मा							

३. तपाईं र परिवारका अन्य सदस्यले कहिले कहिले नुहाउनुहुन्छ ?
नुहाउने भए यस्तो (✓) चिन्ह लगाउनुहोस् र ननुहाउने भए यस्तो (×) चिन्ह लगाउनुहोस ।

क्र.सं.	क्रियाकलाप	बालबालिका	महिला	पुरुष
		(✓) (×)	(✓) (×)	(✓) (×)
१.	प्रत्येक दिन			
२.	एक दिन बिराएर			
३.	हप्तामा २ पटक			
४.	हप्तामा १ पटक			
५.	२ हप्तामा १ पटक			
६.	महिनामा एक पटक			
जम्मा				

ङ. फोहर मैला व्यवस्थापन

१. तपाईंको घरबाट निस्कने ठोस फोहर मैला कहाँ विसर्जन गर्नुहुन्छ ?
१.१ घर नजिक खाल्डोमा
१.२ निजी फोहर संकलनकर्तालाई दिने
१.३ गा.वि.स. /नगरपालिकाको व्यवस्था गरेको खाल्डो वा कन्टेनर
१.४ अन्य (उल्लेख गर्ने) ....

२. ठोस तथा तरल फोहर वस्तुलाई अव्यवस्थित तरिकाले विसर्जन गर्नाले हुने नराम्रा असरहरु के के हुन् ? (एक भन्दा बढी उत्तर आउन सक्ने)
२.१ फोहोर वातावरणमा वृद्धि
२.२ लामखुट्टे, झिंगा, किराहरुको वृद्धि

२.३ रोग सर्नेमा वृद्धि
२.४ अन्य (उल्लेख गर्ने) ____________

३. तपाईंको घरबाट निस्कने फोहोर पानी कहाँ विसर्जन गर्नुहुन्छ ?
३.१ खाल्डोमार्फत/व्यवस्थित ढलमा
३.२ तरकारी बारीमा/करेसा बारीमा
३.३ सार्वजनिक ढलमा
३.४ अन्य (उल्लेख गर्ने) ____________

घ. वस्तुभाउको फोहर व्यवस्थापन

१. के तपाईंले वस्तुभाउ पाल्नु भएको छ ? छ छैन
(यदि छैन भने पानी जन्य सरुवा रोगमा जाने)
यदि छ भने कुन कुन प्रकारका छन् र तिनीहरुलाई कहाँ राख्नु हुन्छ ?

क्र. सं.	वस्तुभाउको प्रकार	घरभित्रै राख्ने	बाहिर छुट्टै गोठमा राख्ने
१	गाई/भैंसी		
२	बंगुर/सुंगुर		
३	बाख्रा		
४	कुखुरा/हाँस		
५	अन्य		

२. वस्तुभाउबाट निस्कने फोहोर कहाँ र कसरी विसर्जन गर्नुहुन्छ ?
२.१ मलखादमा
२.२ आगो बाल्ने/गुँईठा बनाउने
२.३ गोबर ग्यास प्लान्टमा प्रयोग गर्ने
२.४ अन्य (उल्लेख गर्ने) ____________

३. वस्तुभाउको फोहोर मैलाको जथाभावि अव्यवस्थित तवरले विसर्जन गर्दा हुने खराब असरहरु के के हुन् ? (एक भन्दा बढी उत्तर आउन सक्ने)
३.१ वातावरणी फोहोरमा वृद्धि हुने
३.२ लामखुट्टे, झिंगा, किराहरुको वृद्धि हुने
३.३ रोगव्याधि बढ्ने तथा सर्ने
३.४ गाउँ, छरछिमेक तथा नगर अशोभनिय देखिने
३.५ अन्य (उल्लेख गर्ने) ____________

ङ. पानीजन्य सरुवा रोगहरु

१. पानीजन्य सरुवा रोगको कारणहरु के के हुन् ? (एक भन्दा बढी उत्तर आउन सक्ने)
१.१ दूषित पानी प्रयोग गर्दा
१.२ दूषित खाना खाँदा
१.३ घर तथा सार्वजनिक स्थलमा फोहर बढ्नाले
१.४ मानिसको मलमूत्र जथाभावी फ्याल्ने गर्दा
१.५ फोहोर मैला जथाभावी फ्याल्ने गर्दा
१.६ स्वास्थ्य शिक्षा तथा स्वस्थ बानीको अभाव
१.७ सरसफाई र स्वास्थ्य सम्बन्धी ज्ञान र चेतनाको अभावले
१.८ अन्य ____________

२. तपाईंको परिवारमा कोही बिरामी परेमा के गर्नुहुन्छ ? (प्राथमिकता अनुसार नम्बर लेख्ने)
२.१ घरायसी उपचार गर्ने
२.२ धामी, झाँक्री, पुजारी कहाँ लाने
२.३ औषधि पसलमा जाने
२.४ स्वास्थ्य चौकि वा अस्पतालमा जाने
२.५ अन्य (उल्लेख गर्ने)

३. यदि परिवारमा कसैलाई झाडापखाला लागेमा के गर्नुहुन्छ ? (प्राथमिकता अनुसार नम्बर लेख्ने)
३.१ जीवनजल खुवाउने
३.२ घरायसी उपचार गर्ने
३.३ धामी, झाँक्री वा पुजारी कहाँ जाने
३.४ औषधि पसलमा जाने
३.५ स्वास्थ्य चौकि वा अस्पतालमा जाने
३.६ अन्य (उल्लेख गर्ने) ____________

४. गत एक वर्षभित्र परिवारका सदस्यहरु तलका रोगहरु मध्ये कुन कुन रोगबाट बिरामी भए? [illegible]
५. तपाईंको परिवारमा पानीजन्य निम्नलिखित सरुवा रोगबाट कोहि बिरामी परेको भए तलको तालिकामा संख्या उल्लेख गर्नुस् ।

क्र. सं.	रोग	५ वर्ष मुनिका बालबालिका	महिला	पुरुष	वार्षिक खर्च रु.
१	झाडापखाला				
२	आउँ				
३	झुकी				
४	टाईफाईड				
५	हैजा				
६	छाला सम्बन्धी रोग				
७	औसीरोग (मलेरिया)				
८	कमलपित (जण्डीस)				
९	अन्य				
	जम्मा				

६. गत एक वर्षभित्र तपाईको परिवारमा कोही झाडा पखाला तथा पानीजन्य अन्य सरुवा रोगहरुबाट मृत्यु भएको छ ? (मृत्यु अवस्था)

रोग	५ वर्ष मुनिका बालबालिका	महिला	पुरुष
झाडा पखाला			
आउँ			
पानीजन्य अन्य सरुवा रोगहरु			
जम्मा			

७. गत एक वर्षभित्र तपाईको परिवारका सदस्यलाई झाडापखाला र पानीजन्य अन्य सरुवा रोगहरुको उपचारमा कति रकम खर्च गर्नु भयो ?

रोग	खर्च रकम (रु मा)			
	२००० सम्म	२००१-३०००	३००१-५०००	५००० भन्दा माथि
झाडापखाला				
पानीजन्य अन्य सरुवा रोगहरु				
जम्मा				

सहयोगका लागी धन्यवाद ।

APPENDIX 6:
Chlorine Use Guidelines

GUIDELINE VALUE

In humans and animals exposed to chlorine in drinking-water, specific adverse treatment related effects have not been observed.

Chlorine in drinking water is safe for consumption. The small amount of chlorine typically used to disinfect water does not pose risks to human health. The World Health Organization (WHO) has established a guideline value of 5 mg/L for chlorine in drinking water, meaning that such concentrations are considered acceptable for lifelong human consumption. Furthermore, WHO concludes that this value is "conservative," as no adverse effects from chlorine in drinking water were observed in studies reviewed by WHO.

Guideline values for chlorine WHO Guidelines for drinking water quality (2004)

Chlorine	**below 5 milligrams per liter (mg/L)***

*For effective disinfection, there should be a residual concentration of free chlorine of 0.5 mg/L after at least 30 min contact time at pH<8.0

Chlorination does not harm aquatic environments

Chlorinated drinking water is unlikely to be harmful when discharged into aquatic environments. An extensive risk assessment conducted under European Union guidelines examined potential harm from various processes to make drinking water using sodium hypochlorite. This assessment found no significant environmental risks from chlorine or byproducts formed during drinking water chlorination. The DBPs formed in drinking water depend on the nature and quantity of organic matter present as well as on the disinfectant and other treatments used. In drinking water the principal byproducts are trihalomethanes (THMs; mainly chloroform) and haloacetic acids (HAAs), with smaller amounts of other byproducts. Direct 'whole effluent' experiments representing various uses, including drinking water, have shown that no significant amounts of persistent and potentially bioaccumulative substances are formed. Toxicity tests on these mixtures demonstrated that the presence of DBPs did not increase the toxicity.

A major concern from the past was the formation of some highly-chlorinated, high-hazard molecules, such as dioxins, resulting from chlorine used in paper pulp bleaching. However, dioxins were only formed from 'active chlorine' under specific conditions: acid pH and in the presence of certain phenols such as those abundant in the lignin component of wood. There is no significant formation of dioxins or other high-hazard molecules at neutral or alkaline pH. All current uses of 'active chlorine' for microbial control and cleaning take place at alkaline or neutral pH.

Appendix 7
Water Quality Test Reports

NS Lab Accreditation No.: 09-2068/69

Regd. No. 53875/064/065

AASTHA SCIENTIFIC RESEARCH SERVICE PVT. LTD.

P.O. Box No. 4316, Dillibazar, Kathmandu, Nepal
Tel: +977-1-4433748, E-mail: aasthalab2065@gmail.com

(Center for complete scientific solution)

Test Report/Certificate

Report No. : 459/2074
Entry No. : AASTHA – 358– 2074
Sample : Water
Client : TAFC-ICON JV
Source : Geetang Khola, Geetang, Ilam

Date received : 02 – 06 – 2074
Date completed : 04 – 06 – 2074
Sampled By : Client

S. N.	Parameters	Method	Observed Values	National Drinking Water Quality Standard
1.	pH at 26°C	4500-H⁺ APHA AWWA-WEF 2012, 22nd Edition	7.2	6.5 - 8.5
2.	Electrical Conductivity, (µmhos/cm)	2510 B, APHA-AWWA-WEF 2012, 22nd Edition	90	1500
3.	Turbidity, (NTU)	2130 B, APHA AWWA WEF 2012, 22nd Edition	<5	5 (10)
4.	Taste and Odor		N. O.	Not Objectionable
5.	Color, (TCU)	2120 C, APHA - AWWA - WEF 2012, 22nd Edition	0.08	5(15)
6.	Total Hardness as $CaCO_3$, (mg/l)	2340 C, APHA-AWWA-WEF 2012, 22nd Edition	40	500
7.	Total Dissolved Solid, (mg/l)	2540 C, APHA - AWWA - WEF 2012, 22nd Edition	55	1000
8.	Total Residual Chlorine, (mg/l)	4500 - Cl B, APHA - AWWA - WEF 2012, 22nd Edition	<0.10	0.1-0.2
9.	Chloride, (mg/l)	4500-Cl- B, APHA-AWWA-WEF 2012, 22nd Edition	3.72	250
10.	Ammonia, (mg/l)	4500 NH3 D, APHA, AWWA, WPCF, 17th Edition	0.05	1.5
11.	Nitrate, (mg/l)	4500-NO_3 B, APHA-AWWA-WEF 2012, 22nd Edition	2.51	50.0
12.	Aluminum, (mg/l)	3500-Al B, APHA, AWWA, WEF, 22nd Edition	0.029	0.20
13.	Fluoride, (mg/l)	4500 F⁻ D, APHA AWWA - WEF 2012, 22nd Edition	0.08	0.5-1.5
14.	Sulfate, (mg/l)	4500-SO_4^{2-} C, APHA - AWWA - WEF 2012, 22nd Edition	<1.0	250
15.	Mercury*, (mg/l)	3500-Hg-C, APHA-AWWA-WEF, WPCF, 17th Edition	<0.001	0.001
16.	Calcium, (mg/l)	3500 Ca B, APHA AWWA WEF 2012, 22nd Edition	6.4	200
17.	Iron*, (mg/l)	3111 B, APHA - AWWA - WEF 2012, 22nd Edition	<0.05	0.30(3)
18.	Manganese*, (mg/l)		<0.05	0.20
19.	Lead*, (mg/l)		<0.01	0.01
20.	Cadmium*, (mg/l)		<0.003	0.003
21.	Chromium*, (mg/l)		<0.05	0.05
22.	Copper*, (mg/l)		<0.05	1.0
23.	Zinc*, (mg/l)		0.12	3.0
24.	Arsenic, (mg/l)	3500-As B, APHA - AWWA - WEF 2012, 22nd Edition	<0.01	0.05

Remarks: *Water quality meets NDWQS specified limit.*

Analyzed By

Checked By

Authorized By

Note : 1. The issued report refers only to the tested sample and applicable parameters. Endorsement of products is neither inferred nor implied.
2. This report is neither to be reproduced wholly or partially nor can be used as an evidence in the court of law.
3. Liability of our institute is limited to the invoiced detrimands and amount only.
4. Even in the case of stable samples such as limestone, minerals, soil etc. they will not be stored more than six months. 219/220
5. Parameters in * are not accreditated by NBSM.

NS Lab Accreditation No.: 09-2068/69 Regd. No. 53875/064/065

AASTHA SCIENTIFIC RESEARCH SERVICE PVT. LTD.

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(C e n t e r f o r c o m p l e t e s c i e n t i f i c s o l u t i o n)

Test Report/Certificate

Report No. : 460/2074
Entry No. : AASTHA – 358– 2074
Sample : Water
Client : TAEC-ICON JV
Source : Bhadi Khola, Chap Gairi, Ilam

Date received : 02 – 06 – 2074
Date completed : 04 – 06 – 2074
Sampled By : Client

S. N.	Parameters	Method	Observed Values	National Drinking Water Quality Standard
1.	pH at 26°C	4500 H+ APHA-AWWA-WEF 2012, 22nd Edition	7.3	6.5 - 8.5
2.	Electrical Conductivity, (µmhos/cm)	2510 B, APHA AWWA WEF 2012, 22nd Edition	90	1500
3.	Turbidity, (NTU)	2130 B, APHA-AWWA-WEF 2012, 22nd Edition	<5	5 (10)
4.	Taste and Odor	-	N. O.	Not Objectionable
5.	Color, (TCU)	2120 C, APHA - AWWA - WEF 2012, 22nd Edition	0.08	5(15)
6.	Total Hardness as $CaCO_3$, (mg/l)	2340 C, APHA-AWWA-WEF 2012, 22nd Edition	36	500
7.	Total Dissolved Solid, (mg/l)	2540 C , APHA - AWWA - WEF 2012, 22nd Edition	53	1000
8.	Total Residual Chlorine, (mg/l)	4500 - Cl B, APHA - AWWA - WEF 2012, 22nd Edition	<0.10	0.1-0.2
9.	Chloride, (mg/l)	4500-Cl- B, APHA-AWWA-WEF 2012, 22nd Edition	3.72	250
10.	Ammonia, (mg/l)	4500-NH3 D, APHA, AWWA, WPCF, 17th Edition	0.10	1.5
11.	Nitrate, (mg/l)	4500-NO_3- B, APHA-AWWA-WEF 2012, 22nd Edition	2.53	50.0
12.	Aluminum, (mg/l)	3500 Al B, APHA, AWWA, WEF, 22nd Edition	0.031	0.20
13.	Fluoride, (mg/l)	4500 F- D, APHA - AWWA - WEF 2012, 22nd Edition	0.14	0.5-1.5
14.	Sulfate, (mg/l)	4500-SO_4^{2-} C, APHA - AWWA - WEF 2012, 22nd Edition	<1.0	250
15.	Mercury*, (mg/l)	3500-Hg-C, APHA-AWWA-WEF , WPCF, 17th Edition	<0.001	0.001
16.	Calcium, (mg/l)	3500-Ca B, APHA-AWWA-WEF 2012, 22nd Edition	6.4	200
17.	Iron*, (mg/l)	3111 B, APHA - AWWA - WEF 2012, 22nd Edition	<0.05	0.30(3)
18.	Manganese*, (mg/l)		<0.05	0.20
19.	Lead*, (mg/l)		<0.01	0.01
20.	Cadmium*, (mg/l)		<0.003	0.003
21.	Chromium*, (mg/l)		<0.05	0.05
22.	Copper*, (mg/l)		<0.05	1.0
23.	Zinc*, (mg/l)		0.09	3.0
24.	Arsenic, (mg/l)	3500-As B, APHA - AWWA - WEF 2012, 22nd Edition	<0.01	0.05

Remarks: *Water quality meets NDWQS specified limit.*

Analyzed By Checked By Authorized By

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2. This report is neither to be reproduced wholly or partially nor can be used as an evidence in the court of law.
3. Liability of our institute is limited to the invoiced detrimands and amount only.
4. Even in the case of stable samples such as limestone, minerals, soil etc. they will not be stored more than six months. 220/220
5. Parameters in * are not accreditated by NBSM.

Nepal Environmental & Scientific Services (P) Ltd.
G.P.O. Box: 7301, Thapathali, Kathmandu, Nepal
Phone : +977-1-4244989, 4241004, Fax No. : +977-1-4226028, Email: ness@mos.com.np
http://www.nessltd.com

NESS/Lab, M-03/R1.1

QS Test Report / Certificate

NS Accreditation No. Pra. 01/053-54

Entry No. : NCL - 752(W) (2) - 07 - 2019
Sample : River Water (Rate Khola)
Client : TAEC/ICON JV
Sampled By : Client

Date Received : 04 - 07 - 2019
Date Completed : 11 - 07 - 2019
Sampling Date : 02 - 07 - 2019
Location : Ilam

S. N.	Parameters	Test Methods	Observed Values	Generic Effluent Standards Discharged into Inland Surface Water, GoN 2001
1.	pH @ 25°C	Electrometric, 4500 - H^+ B, APHA	7.6	5.5 - 9
2.	Turbidity, (NTU)	Nephelometric, 2130 B, APHA	5	-
3.	Color, (Chromacity Unit)	Spectrophotometric, 2120 C, APHA	0.20	-
4.	Total Hardness as $CaCO_3$, (mg/L)	EDTA Titrimetric, 2340 C, APHA	46	-
5.	Calcium, (mg/L)	EDTA Titrimetric, 3500 - Ca B & 3500 - Mg B APHA	17.63	-
6.	Total Dissolved Solids, (mg/L)	Oven Drying Method, 180°C, 2540 C, APHA	26	-
7.	Sulphate, (mg/L)	Gravimetric Method with Ignition of Residue, 4500 – SO_4^{2-} C, APHA	7.4	-
8.	*Residual Chlorine, (mg/L)	Iodometric Titration, 4500- Cl B: APHA	Nil	-
9.	Chloride, (mg/L)	Argentometric Titration, 4500 – Cl B, APHA	2.97	-
10.	Ammonia, (mg/L)	Direct Nesslerization, 4500 – NH_3 C APHA	0.07	-
11.	Nitrate, (mg/L)	UV Spectrophotometric Screening, 4500 – NO_3 B, APHA	0.81	-
12.	Aluminum, (mg/L)	Eriochrome Cyanine R, 3500 - Al A: APHA	0.05	-
13.	Fluoride, (mg/L)	SPANDS, 4500 – F D, APHA	<0.05	2, max
14.	Iron, (mg/L)	Direct Air – Acetylene AAS, 3111 B, APHA	0.34	-
15.	Manganese, (mg/L)		N. D. (<0.02)	-
16.	Cadmium, (mg/L)		N. D. (<0.003)	2, max
17.	Lead, (mg/L)		0.02	0.1, max
18.	Copper, (mg/L)		0.02	3, max
19.	Zinc, (mg/L)		0.03	5, max
20.	Arsenic, (mg/L)	SDDC, 3114 B: APHA	N. D. (<0.01)	0.2, max
21.	Mercury, (mg/L)	Cold Vapor AAS, 3112 B: APHA	N. D. (<0.0005)	0.01, max

*: Non-accredited Parameter

N. D.: Not Detected

Note: The gravimetric analysis was carried out in controlled temperature condition (20°C).
APHA: American Public Health Association; AAS: Atomic Absorption Spectrophotometer; EDTA: Ethyelenediaminetetraacetic acid; NTU: Nephelometric turbidity unit; UV: Ultraviolet.

Remarks: ***All observed values complied the prescribed effluent standards discharged into inland surface water.***

(Analyzed By) (Checked By) (Authorized Signature)

Note:
1. This report/certificate is in reference to Laboratory Quality Control Manual, QS (018), section OPT.
2. The result listed refer only to the tested samples & applicable parameters. Endorsement of products is neither inferred nor implied.
3. Liability of our institute is limited to the invoiced test parameters & amount only.
4. Samples will be destroyed after one month from the date of issue of test certificate unless otherwise specified.
5. This report should not be reproduced wholly / partially for any advertizing media without our permission.
6. The clients are requested to take back their hazardous samples along with the report/certificate.

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http://www.nesspltd.com

NESS/Lab, M-03/R1.1

QS Test Report / Certificate

NS Accreditation No. Pra. 01/053-54

Entry No. : NCL - 752(W) (2) - 07 - 2019
Sample : River Water (Mewa Khola)
Client : TAEC/ICON JV
Sampled By : Client

Date Received : 04 - 07 - 2019
Date Completed : 11 - 07 - 2019
Sampling Date : 02 - 07 - 2019
Location : Illam

S. N.	Parameters	Test Methods	Observed Values	Generic Effluent Standards Discharged into Inland Surface Water, GoN 2001
1.	pH @ 25°C	Electrometric, 4500 - H^+ B, APHA	7.6	5.5 - 9
2.	Turbidity, (NTU)	Nephelometric, 2130 B, APHA	1	-
3.	Color, (Chromacity Unit)	Spectrophotometric, 2120 C, APHA	0.33	-
4.	Total Hardness as $CaCO_3$, (mg/L)	EDTA Titrimetric, 2340 C, APHA	12	-
5.	Calcium, (mg/L)	EDTA Titrimetric, 3500 - Ca B & 3500 - Mg B APHA	8.81	-
6.	Total Dissolved Solids, (mg/L)	Oven Drying Method, 180°C, 2540 C, APHA	20	-
7.	Sulphate, (mg/L)	Gravimetric Method with Ignition of Residue, 4500 – SO_4^{2-} C, APHA	N.D.(<1)	-
8.	*Residual Chlorine, (mg/L)	Iodometric Titration, 4500- Cl B: APHA	Nil	-
9.	Chloride, (mg/L)	Argentometric Titration, 4500 – Cl^- B, APHA	2.97	-
10.	Ammonia, (mg/L)	Direct Nesslerization, 4500 – NH_3 C APHA	0.06	-
11.	Nitrate, (mg/L)	UV Spectrophotometric Screening, 4500 – NO_3^- B, APHA	0.96	-
12.	Aluminum, (mg/L)	Erichrome Cyanine R, 3500 - Al A: APHA	0.001	-
13.	Fluoride, (mg/L)	SPANDS, 4500 – F D, APHA	<0.05	2, max
14.	Iron, (mg/L)	Direct Air – Acetylene AAS, 3111 B, APHA	0.23	-
15.	Manganese, (mg/L)		N. D. (<0.02)	-
16.	Cadmium, (mg/L)		N.D. (<0.003)	2, max
17.	Lead, (mg/L)		0.03	0.1, max
18.	Copper, (mg/L)		N.D.	3, max
19.	Zinc, (mg/L)		0.03	5, max
20.	Arsenic, (mg/L)	SDDC,, 3114 B: APHA	N. D. (<0.01)	0.2, max
21.	Mercury, (mg/L)	Cold Vapor AAS, 3112 B: APHA	N. D. (<0.0005)	0.01, max

*: Non-accredited Parameter

N. D.: Not Detected

Note: The gravimetric analysis was carried out in controlled temperature condition (20°C).
APHA: American Public Health Association; AAS: Atomic Absorption Spectrophotometer; EDTA: Ethyelenediaminetetraacetic acid; NTU: Nephelometric turbidity unit; UV: Ultraviolet.

Remarks: ***All observed values complied the prescribed effluent standards discharged into inland surface water.***

(Analyzed By) (Checked By) (Authorized Signature)

Note:
1. This report/certificate is in reference to Laboratory Quality Control Manual, QS (018), section OPT.
2. The result listed refer only to the tested samples & applicable parameters. Endorsement of products is neither inferred nor implied.
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Appendix 8
Photographs

1. Mewa Khola

2. Rate Khola

3. Gitang Khola

4. Existing WTP at Charkhade

5. Existing Water Tank at Gumba Danda that needs rehabilitation

6. Existing RVT at Gadithumka

7. Proposed land for RVT 9 - private land belonging to Mr. Gyanendra Kumar Siwakoti;

8. Existing condition of distribution pipelines

9.Training to the social mobilizers for socio-economic survey

10. Meeting with the Mayor of Ilam Municipality

11.Consultation at former Sandakpur VDC ward no 2 Office on May 2018

12. Consultation at DCC Ilam, May 2018

SAUW IEE Review - Information Log

Instructions: Provide information based on IEE submitted by Project Management Office (PMO). This IEE log sheet will serve as record of the review findings, comments, and/or further actions required during implementation. A copy of the IEE log sheet should be (i) provided to PMO for their record and guidance on actions during implementation; (ii) attached in the cleared IEE to be disclosed; (iii) used as reference for review of updated/final IEE and (iv) inputted in the SARD Safeguards Compliance Tracking System.

<table>
<tr><td>Project:</td><td colspan="3">Nepal: Urban Water Supply and Sanitation Project (UWSSP): Ilam Water Supply and Sanitation Subproject</td></tr>
<tr><td>Loan No.:</td><td>3711</td><td>Package No.:</td><td>W05</td></tr>
<tr><td>Components:</td><td colspan="3">
<table>
<tr><td>Source Name</td><td>Existing Sources:
• Bhandi Khola (spring)
• Gitang Khola (perennial stream)

Proposed Sources:
• Rate Khola (perennial stream)
• Mewa Khola (perennial stream)</td></tr>
<tr><td>Source Location</td><td>Existing Sources:
Bhandi Khola :WN-2 of Ilam Municipality
Gitang Khola :WN-2 of Sandakpur Rural Municipality
Proposed Source:
Rate Khola : WN-2 of Sandakpur Rural Municipality
Mewa Khola: WN-2 of Sandakpur Rural Municipality</td></tr>
<tr><td>Safe Yield & Measured Flow</td><td>Safe Yield
Existing Sources:
Bhandi Khola-5lps
Gitang Khola-16lps

Proposed Sources:
Rate Khola-More than 15 lps
Mewa Khola-More than 15 lps

Measured Flow (Lean/Low Flow Season?)
Existing Sources:
Bhandi Khola-???
Gitang Khola-???

Proposed Sources:
Rate Khola-45.17lps
Mewa Khola-55.42lps (During April)</td></tr>
<tr><td>Proposed Tapped Discharge</td><td>Existing Sources:
Bhandi Khola-4lps
Gitang Khola-16lps

Proposed Sources:
Rate Khola-12.5lps
Mewa Khola-13.5lps</td></tr>
<tr><td>Proposed Intakes</td><td>Total : 4 Nos
2 nos of New Stream Intaks ;1 no.at each Rate & Mewa Khola
Rehabilitation of 2 nos of Existing Intakes; 1Existing Stream Intake at Gitang Khola and 1 Existing Spring Intake at Bhandi Khola</td></tr>
</table>
</td></tr>
</table>

	Water treatment plant	**Assuming water from Bhandi Khola does not require any primary treatment** Sedimentation Tanks-2 nos each with 12.5lps capacity HRF: 8 nos (41 lps capacity in total) SSF: 1 no. with some rehabilitation works Disinfection Unit: 1 no.
	Ground Reservoir(Number and Capacity in cum)	**Existing RVTs; 4 nos with total capacity 692.50 cum** 1 no. at Gadhi Barrack -120cum 1 no. at Shikharnagar (JICA)-360cum 1no. at Milan Kendra (JICA)-87.5cum 1no. at Tundikhel (JICA)-125cum **Proposed RVTs; 6 nos with total capacity 700.00 cum** 1 no. at Gumba Danda-50cum 1no. at Campus Danda-50cum 1 no. at Gadhi Barrack-150cum 1 no. at Shikharnagar-150cum (after Demolition of all existing4 RVTs) 1 no. at Golkharka-150cum 1 no. at Tilkini -150cum ***Total Capacity: 1,392.50cum***
	Valve Chamber	Brick Masonry: 20nos. RCC: 10 nos. RRM: 10nos.
	Office(O1)/ Small Guard House (GH1) Medium Guard House(GH2)/Dosing Pump House(DPH) & Chemical Store	O1- 1no. at Shikharnagar (2 storey) GH1- 2 nos. at Gadhi RVT & Tilkini RVT (2 Rooms) GH2- 3 nos. at two WTP locations & Golkharka RVT DPH & Chemical Store- 1no.
	Household Connection	2,866
	Fire Hydrant	12
	River/Stream Crossings	MS truss crossings: 3 nos. • 2 nos. of 25m span at Rate & Sano Mai Khola • 1 no. of 20m span at Soti Khola Simple crossings withSP-4 type concrete saddle blocks: 10 nos. (For DI pipes)
	Transmission Mains	41.975km
	Bulk Distribution Mains	18.130km
	Distribution Mains	109.822km
	Boundary Wall/Fencing	Barbed Wire Fencing at; • Proposed Intakes: 120.00m • Proposed Sedimentation Tank:160.00m • RVT 2 & 3 at Gadhi Danda:125.00m • RVT 6 at Milan Kendra:48.00m Galvanized Chain Link Fencing at; • RVT 1 at Gumba Danda: 154 m^2 • RVT 7 at Campus Area: 100 m^2 • RVT 9 at Golkharka:154 m^2 • RVT 10 at Tilkini:140 m^2
	Internal Approach/Access Roads	Gravel Road; Length:100m & Width:5m RCC Stretches; 100 m^2
	Reinstatement/Resealing Works	Reinstatement of PCC/RCC Pavements: 2500 m^2 Resealing of Blacktopped Roads: 5000 m^2 Resealing of Gravel Roads: 10000 m^2
	Rehabilitation Works	Existing SSF of 3 units
	Demolition Works	4 nos. of Old Masonry RVTs at Shikharnagar

	Sanitation Components	
	Public Toilets	3 nos. (1 no. at 3 locations;Dhobi Dhara, Tundikhel and Adrasha Krishi Bazaar Areas)
Contract Type:	Civil Works	
Date of IEE:	December 2019	

Draft IEE?	**Updated/Revised IEE?**	**Others**
		For immediate action: Provide explicit confirmation in the IEE report if the detailed engineering design information used is the final.

	Activity	**Status**		**Detailed Comments and Further Actions Required**
1.	Environmental assessment has been satisfactorily conducted based on ADB REA Checklist and scoping checklist.[1]	**Yes**	**No**	The IEE report provides information on the safe yields of the four sources of water (Bhandi, Gitang, Rate and Mewa). However, the measured lean/low season flow rates for Bhandi and Gitang were not included in the report. **For immediate action**: (i) Provide lean/low season river flow rates for Bhandi and Gitang streams; (ii) Confirm that the river flow rates given for Rate and Mewa streams correspond to lean/low season flow rates. If not, provide the lean/low season flow rates and use them to assess impact of water withdrawal; and (iii) Undertake further stakeholder consultations to include water supply source sustainability analysis as topic (including information on safe yield calculations during the lean flow seasons and planned mitigation measures for potential impacts, if any, to downstream users). As of the 09 May 2018 consultation meeting, consensus and agreement between Sandakpur RM and WUSC is to divert **10 lps** each from Rate and Mewa rivers. However, the IEE report mentions withdrawal of **12.5 lps** and **13.5 lps**, respectively. **(see Table IX-II).** These designs are above of what were agreed. Ensure to include discussion on this in the consultation meeting.
		X		
2.	Environmental assessment based on	**Yes**	**No**	**For immediate action:** Confirm that the IEE report is based on the final detailed
		???		

[1] ADB Rapid Environmental Assessment Checklist for screening and categorization. Scoping Checklist ("No Mitigation Scenario" Checklist) for scope of IEE, identification of impacts and development of environmental management plan.

	Activity	Status			Detailed Comments and Further Actions Required
	latest project components and design				design. Provide justification that the design tapping/withdrawal rates will not negatively impact the sustainability of river and downstream users.
3.	Statutory Requirements[2]		Forest Clearance		The IEE report explicitly states no trees will be cut. However, for any unanticipated cutting of trees during the implementation phase, ensure that PMO/RPMO obtain appropriate clearance (forest clearance or tree cutting clearance). No civil works will commence unless forest clearance or tree cutting clearance, if required, is obtained. PMO to report status in the SEMR.
			No Objection Certificate		To be obtained by PMO/RPMO if needed. No civil works will commence unless NOC, if required, is obtained. PMO to report status in the SEMR.
			Site Location Clearance		To be obtained by PMO/RPMO if needed. No civil works will commence unless site location clearance, if required, is obtained. PMO to report status in the SEMR.
			Environmental Compliance Certificate		PMO obtained MOWS-approved IEE. On 20 September 2019, PMO reported the MOWS approval in its responses to ADB comments on SEMR for the period January – June 2019. Accordingly, the IEE report was approved by MOWS in September 2019. This will be reported in the SEMR for July – December 2019. **For immediate action**. Revise Table II-VII to reflect that IEE report has been approved by MoWS. Provide copy of approval letter as appendix or annex.
			Permit to Construct (or equivalent)		To be obtained by PMO/RPMO if needed. No civil works will commence unless permit to construct (or equivalent), if required, is obtained. PMO to report status in the SEMR.
			Permit to Operate (or equivalent)		To be obtained by PMO/RPMO if needed. No civil works will commence unless permit to operate (or equivalent), if required, is obtained. PMO to report status in the SEMR.
			Others		
5.		**Adequate**		**Not Adequate**	

[2] If applicable, include date accomplished or obtained.

<table>
<tr><th></th><th>Activity</th><th colspan="5">Status</th><th>Detailed Comments and Further Actions Required</th></tr>
<tr><td rowspan="6"></td><td rowspan="6">Policy, legal, and administrative framework</td><td colspan="3">X</td><td colspan="2"></td><td rowspan="6">Section II discusses the policy, legal and administrative framework of the subproject.</td></tr>
<tr><td colspan="5">Included discussions and requirements of the:</td></tr>
<tr><td>Yes</td><td colspan="4">National regulation/law on EIA</td></tr>
<tr><td>Yes</td><td colspan="4">Environmental agency</td></tr>
<tr><td>Yes</td><td colspan="4">Relevant international environmental agreements</td></tr>
<tr><td>Yes</td><td colspan="4">Environmental standards (IFC’s EHS Guidelines)</td></tr>
<tr><td rowspan="9">6.</td><td rowspan="9">Anticipated environmental impacts and mitigation measures</td><td colspan="3">assessed impacts and risks:</td><td colspan="3">mitigation measures included:</td><td></td></tr>
<tr><td colspan="3"></td><td>Yes</td><td>No</td><td>n/a</td><td></td></tr>
<tr><td></td><td colspan="2">Biodiversity conservation</td><td>X</td><td></td><td></td><td>Protection status of species at the project sites was verified through IUCN Red List and IBAT. All species identified are categorized as Least Concern, except for two species (Common Leopard and Woolly Necked Stork) that are considered Vulnerable. No endangered or critically endangered species was found in the project area.

The IEE report mentions that the nature of the subproject activities will not impact these vulnerable species. Further, the project will not encroach any forest area. The EMP provides measure that contractor/s will not encroach forest areas, otherwise, the legal provisions of the law including penalties will be imposed.</td></tr>
<tr><td></td><td colspan="2">Pollution prevention and abatement</td><td>X</td><td></td><td></td><td></td></tr>
<tr><td></td><td colspan="2">Health and safety</td><td>X</td><td></td><td></td><td>Community and occupational health and safety measures are included.</td></tr>
<tr><td></td><td colspan="2">Physical cultural resources</td><td>X</td><td></td><td></td><td>No PCRs identified at the subproject sites.</td></tr>
<tr><td></td><td colspan="2">Cumulative impacts</td><td></td><td></td><td>X</td><td></td></tr>
<tr><td></td><td colspan="2">Transboundary impacts</td><td></td><td></td><td>X</td><td></td></tr>
<tr><td rowspan="2">7.</td><td rowspan="2">Impacts from Associated Facilities[3]</td><td colspan="2">Addressed</td><td colspan="2">Not Addressed</td><td>Not applicable</td><td rowspan="2"></td></tr>
<tr><td colspan="2"></td><td colspan="2"></td><td>X</td></tr>
<tr><td rowspan="2">8.</td><td rowspan="2">Analysis of Alternatives</td><td colspan="3">Yes</td><td colspan="2">No</td><td rowspan="2">An analysis of alternatives is provided, but this is not required.</td></tr>
<tr><td colspan="3">X</td><td colspan="2"></td></tr>
<tr><td>9.</td><td>EMP budget included</td><td colspan="3">Yes</td><td colspan="2">No</td><td></td></tr>
</table>

[3] ADB SPS (Appendix 1 para 6) defines associated facilities as not funded as part of the project (funding may be provided separately by the borrower/client or by third parties), and whose viability and existence depend exclusively on the project and whose goods or services are essential for successful operation of the project.

	Activity	Status		Detailed Comments and Further Actions Required
		X		Section VIII provides indicative budget of NPR 3,690,000 for EMP implementation.
10.	EMP implementation integrated in FAM/PAM and bid documents	**Yes**	**No**	(i) Included in PAM during loan processing. (ii) Section VIII includes discussion on the inclusion of the EMP in the bid and contract documents. PMO and the RPMO will have the responsibility to ensure compliance with this requirement.
		X		
11.	Consultation and Participation	**Yes**	**No**	(i) Section IX provides summary of consultation activities from 2014 to 2018. There are agreements on river water withdrawal (at Rate and Mewa streams) that are apparently not followed in the design. (ii) Appendix 4 shows a sample minutes of consultative meeting, with translation in the English language. **For immediate action**: Conduct further consultations with all stakeholders, including those stakeholders in the immediate downstream of water supply sources, Ilam Municipality and Sandakpur Rural Municipality. Ensure to: (i) Inform the stakeholders of the final design of the project including the planned withdrawal of **12.5 lps** and **13.5 lps** from Rate and Mewa rivers, respectively. These withdrawal rates are above of the agreed **10 lps** during the 09 May 2018 consultation (see Table IX-II). (ii) Inform the stakeholders with accurate information on water supply source sustainability analysis (include information on safe yield calculations during the lean flow season and planned mitigation measures to potential impacts, if any, to downstream users); (iii) gather and document all concerns of stakeholders and include in the discussions in Section IX of the IEE report; (iv) include all minutes of meetings with corresponding
		X		

	Activity	Status		Detailed Comments and Further Actions Required
				translation in the English language in Appendix 4.
12.	Grievance Redress Mechanism	**Yes**	**No**	
		X		
		Description of GRM.		Section X discusses the GRM.
		GRC members identified.		Section X discusses the GRC membership.
		GRM established and notified?		GRM is established. PMO to confirm in the applicable SEMR that (i) GRM is already notified and GRC members have the capacity to address project-related grievances/complaints, and (ii) contractors are given instructions and orientation on GRM.
13.	Disclosure	To be complied	Endorsement to disclose on ADB website	To be complied after endorsement from PMO is received by ADB.
		To be complied	Disclosed on project website	To be complied by PMO once clearance of the IEE is received from ADB.
		To be complied	Relevant information available to stakeholders and affected people in language and form they understand.	To be complied by PMO once clearance of the IEE is received from ADB.
14.	Mobilized PMO Environment Specialist	**Yes**	**No**	PMO has its Environment Officer who is supervising the implementation of the EMP.
		X		
15.	Mobilized RPMO Environment Specialist	**Yes**	**No**	The Eastern and Western RPMOs are staffed with Environment Officers who were assigned by DWSSM.
		X		
16.	Mobilized PMQAC / DRTAC Environment Specialists	**Yes**	**No**	PMQAC has an environment specialist supporting the RPMOs, while DRTAC has an environment safeguard specialist.
		X		
17.	Mobilized DSMC/RDMSC Environment Specialists	**Yes**	**No**	Section VIII (subsection on Institutional Arrangement) discusses the mobilization of environment specialist. These are now on board.
		X		
18.	Confirm bid and contract documents and/or EMP include requirement for the contractor to appoint EHS supervisor and/or nodal person for environment safeguards	**Yes**	**No**	
		X		Section VIII (subsection on Institutional Arrangement) explains this role and responsibility of the contractor.
19.	If contract awarded already, confirm contractor's appointment of EHS supervisor and/or nodal person for environmental safeguards	**Yes**	**No**	
		X		Section VIII (subsection on Institutional Arrangement) explains contractor has the responsibility to appoint an environment supervisor. However, the contract has been awarded but the PMO confirmed in latest SEMR that contractor is yet to appoint its EHS officer.

	Activity	Status		Detailed Comments and Further Actions Required
				For immediate action: Require contractor to immediately appoint its EHS officer. Ensure that no works should be undertaken unless contractor has appointed its EHS officer.
20.	Awareness training on compliance to safeguard requirements	**Yes** X	**No**	Section VIII discusses the institutional capacity development program, schedule, and topics for the subproject, which PMQAC will supervise. In the SEMR covering the period January – June 2019, details of training activities are included.
21.	Monitoring and Reporting	**Yes** X	**No**	Section XI clarifies the monitoring and reporting roles of stakeholders.
22.	**Others/Remarks**			
	Prepared by: *(name, designation and date)*	Miguel B. Diangan, Jr. Safeguards Specialist (Consultant), SAUW 27 December 2019		
	Noted and Checked By: *(name, designation and date)*	Ninette Pajarillaga Environment Specialist, SAUW		
	Documents/References:	1. Revised IEE of Ilam WSS Subproject 2. EARF of UWSSP.		