

Initial Environmental Examination

Document Stage: Updated
Project Number: 35173-015
February 2020

NEP: Urban Water Supply and Sanitation (Sector) Project – Deurali Hupsekot Urban Water Supply & Sanitation Project, Nawalpur District

Package No: W-16

Prepared by Ministry of Water Supply, Government of Nepal for the Asian Development Bank.

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ABBREVIATIONS

A.D.	Anno Domini
ADB	Asian Development Bank
AM	Accountability Mechanism
BoQ	Bill of Quantities
B.S.	Bikram Sambat
CAPP	Community and Public Participation Plan
CBS	Central Bureau of Statistics
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Wild Fauna & Flora
CO	Carbon Monoxide
CRO	Complaint Receiving Officer
CSA	Concerned Sector Agency
DCC	District Coordination Committee
DDR	Due Diligence Report
DEDR	Detailed Engineering Design Report
DHM	Department of Hydrology & Meteorology
DMA	District Metered Area
DMC	Developing Member Countries
DoR	Department of Roads
DRTAC	Design Review and Technical Audit Consultant
DSMC	Design, Supervision and Management Consultant
DWSSM	Department of Water Supply and Sewerage Management
EA	Executing Agency
EARF	Environmental Assessment and Review Framework
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMR	Environmental Monitoring Report
EO	Environmental Officer
EPA	Environment Protection Act
EPR	Environment Protection Rules
ERDSMC	Eastern Regional Design Supervision and Management Consultant
ES	Environmental Specialist
ESA	Environmental Safeguard Assistant
ESE	Environmental Safeguard Expert
GoN	Government of Nepal

GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
HHs	Households
IBAT	Integrated Biodiversity Assessment Tool
ICESCR	International Covenant on Economic, Social and Cultural Rights
ICG	Implementation Core Group
IEC	Information, Education and Communication
IED	Intelligent Electric Device
IUCN	International Union for Conservation of Nature
IEE	Initial Environmental Examination
LC	Least Concern
MoFE	Ministry of Forest and Environment
MoPE	Ministry of Population & Environment
MoWS	Ministry of Water Supply
MWSS	Manufacturer Waste Scrap Shingles
NAAQS	National Ambient Air Quality Standards
NDWQS	National Drinking Water Quality Standard
NEA	Nepal Electricity Authority
NEPAP	National Environment Policy & Action Plan
no.	Number
NO ₂	Nitrogen Dioxide
NGO	Non-Governmental Organization
NRs	Nepalese Rupees
NTFP	Non-Timber Forest Products
NUDS	Nepal Urban Development Strategy
NVMES	Nepal Vehicles Mass Emission Standards
O&M	Operation and Maintenance
OBA	Output - Based Aid
ODF	Open Defecation Free
PE	Polyethylene
PID	Project Information Datasheet
PID	Proportional Integral Derivative
PLC	Programmable Logic Controller
PM	Particulate Matter
PM _{2.5}	Particulate Matter 2.5 micrometers
PM ₁₀	Particulate Matter 10 micrometers
PMO	Project Management Office

PMQAC	Project Management and Quality Assurance Consultants
PN	Pressure Number
PPHA	Persons Per Hectare
RDSMCs	Regional Design Supervision and Management Consultant
RCC	Reinforced Cement Concrete
REA	Rapid Environmental Assessment
RPMO	Regional Project Management Office
RTU	Remote Controller Unit
RVT	Reservoir Tank
SCADA	Supervisory Control and Data Acquisition
SDG	Sustainable Development Goal
SO ₂	Sulphur Dioxide
SPS	Safeguard Policy Statement
SS	Site Specific
SSTWSSSP	Second Small Towns Water Supply and Sanitation Sector Project
STWSSSP	Small Towns' Water Supply and Sanitation Sector Project
TDF	Town Development Fund
ToR	Terms of Reference
TSTWSSSP	Third Small Town Water Supply & Sanitation Sector Project
UWSSP	Urban Water Supply & Sanitation (Sector) Project
VDC	Village Development Committee
VU	Vulnerable
WHO	World Health Organization
WN	Ward Number
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

°C	Degree Celsius/centigrade
dBa	decibel audible
Ha	hectare/s
HP	Horse Power
Km	kilometer/s
Kph	kilometer/s per hour
Kph	kilometer/s per hour
lps	liter per second
m	meter/s
m ³	cubic meter/s
amsl	Above mean sea level
mg/l	milligram/s per liter
mm	millimeter/s
sq.km.	square kilometer

NOTES

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EXECUTIVE SUMMARY

Introduction

Deurali Hupsekot Water Supply & Sanitation Project is one of the projects proposed under UWSSSP, which will support Nepal in expanding access to community managed water supply & sanitation in 20 project municipalities by drawing on experiences and lessons from three earlier projects funded by ADB. In support of GoN's endeavor, the Asian Development Bank (ADB) funded this Urban Water Supply and Sanitation (Sector) Project (UWSSSP). This project has the following outputs: i) Improved Water Supply and Sanitation Infrastructure in Project Municipalities and ii) Strengthened Institutional and Community Capacities.

The existing water supply system supplies water for 24 hours from the reservoir, however the supply system to each household is intermittent and is limited to only 1-2 hour in a day. The supply system is such that the downstream household will be able to fetch water only after the upstream household closes the taps. This is mainly due to less discharge from sources, less capacity of storage reservoir and small sizes of pipes are used in the distribution system without any design consideration. Hence, the existing water supply system is not able to meet even the current demand of the proposed project town. There is also provision of water treatment plant in the existing water supply system. However, some of the components like Slow Sand Filter needs repair.

Considering the water demand and condition of the existing system, there is a need of the proposed project to upgrade the existing water supply situation within the proposed service area to make drinking water available to the people of service area throughout the year and to provide easy access to safe & reliable water supply service.

The Project area of Deurali Hupsekot Water Supply & Sanitation Project lies in Hupsekot Rural Municipality, Nawalpur District, a hilly region in the Gandaki Province (Province 4) of Nepal. The service area of the proposed project include Ward 1,2, 3 & 4.

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.

Policy, Legal & Administrative Framework

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), 2050 B.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 2015 A.D.); ix) National Water Supply & Sanitation Policy (Draft), 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) and xv) Fifteenth Plan Approach Paper, 2076/77-2080/81
- 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.); and xi) Local Government Operation Act, 2074 B.S. (2017 A.D.); vii).
- 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) **Directives, 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.) and v) Guidelines for Community Noise by WHO, 2055 B.S. (1999 A.D.)

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. ADB's Environmental Safeguards policy principles are defined in SPS (2009), Safeguard Requirements

Analysis of Alternatives

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 21,601 (including rental 2,254) populations as per base year 2018 A.D .

As per Feasibility Study Report by PPTA team, the system design for the town has been done under two scenarios. The optimization of a proposed water supply system can be done regarding system layout, alternative technology, alternative materials and alternative source. In case of Deurali Hupsekot WSSP, the development of system alternatives has been done using alternative source and additional service areas.

Various alternative sources are available in the nearby vicinity to meet the overall demand for this project. The alternative I uses (i) three gravity sources that includes Girubari khola, Betai khola and Pathar khola with combined discharge 39 lps and (ii) one pumping source i.e., Girubari Khola with 12 lps discharge. The total estimated transmission pipe line length from Girubarikhola, Betai khola, Patharkhola and Girubari pumping to Girubari WTP/ RVT site is about 14,077.00m. This alternative will cover for 3,652 HHs of the service area.

The alternative II uses (i) three gravity sources that includes Giruari khola, Betai khola and Pathar khola with combined discharge 39 lps; (ii) one pumping source i.e., Girubari Khola with 12 lps discharge and (iii) two sources that includes Chapaha 1lps (Gaida Pakha Khola) and Sankhadev 5lps (Kuhi Khola). The total estimated transmission pipeline length from Girubarikhola, Betai khola, Patharkhola and Girubari pumping to Girubari WTP/ RVT site is about 14,077.00m. In addition, other two sources are added for Chapaha 1lps (Gaida Pakha Khola) and Sankhadev 5lps (Kuhi Khola) service area. The area is scattered and not match the criteria of UWSSP. The transmission main for Sankhadev settlement is about 17,610.00m. Separate transmission line is provisioned for each source. The transmission line alignment is stable. This option will cover for 4,024 HHs of the service area.

Description of the Project

The project town covers wards 1,2,3 & 4 of Hupsekot Rural Municipality. The proposed project intends to provide both water supply as well as sanitation service. Hence, it comprises both water supply as well as sanitation components which are as follows:

i. Water Supply Components

- a) **Sources/ Intakes:** The study shows that the three gravity sources Girubari khola (26lps), Betai khola (5lps) and Pathar khola (8lps) that have combined tapped discharge 39lps and Girubari khola/ sumpwell pumping that have 11lps tapped discharge, shall be extracted for the new watersupply system.
- b) **Electrical System:** The system has only one stage pumping to pump 11lps water for 20hours daily during design year. All others three sources are gravity system and no need pumping. The sub meter would be enough for electrical works for building and dosing house at each RVT locations.

The electrical system are designed as new together with overhead transmission line. It is envisaged that only one pump will run at a time and other will be an additional. Accordingly, the transformer, generator and other components are designed.

- c) **Transmission Main & Pumping:** The transmission line passes via road, barren land and public land. The site for intakes and transmission route seems stable. But it is reported by WUSC that the transmission route of Girubari khola (gravity) may have land slide in some location occasionally. Hence, to overcome this problem the Girubari sump well has been provisioned though the Girubari intake site has enough discharge. Single stage pumping is designed for Girubari sumpwell.

The total estimated transmission pipe line length from Girubarikhola, Betai khola, Patharkhola and Girubari sumpwell at Dehidanda and Shivalaya WTP/ RVT site is about 13,453.00m.

- d) **Thrust Blocks, Saddle Blocks and Thrust Beam:** Typical thrust blocks have been designed for a pressure of 24 kg/sq cm for both transmission lines and distribution line. Similarly, there is also provision of Thrust Beam & Saddle Blocks for DI pipes that will be laid up in sloppy areas and un-buried portions.
- e) **Water Treatment Plant & Chlorination:** There are existing treatment plants that have been constructed at two locations (Dihidanda & Shivalaya) for each Girubari, Betai and Pathar Khola sources. These treatment plants are of each about 5lps capacity. This will be used in the system with necessary rehabilitation works, washing and placing of filter media with adding deficit filter media. In addition, the components rapid mixture and flocculator have been added in the existing treatment plant, which is not exists. For the remaining discharge 40 lps, new treatment plant has been designed.

The newly proposed water treatment plant comprises Small rapid flash mixture (1 unit), Baffle Channel Flocculator (2 units), Sedimentation tanks (4 units), Roughening Filters (4 units) and an emergency feeder line consisting of a solution tank connected with feeding

tank for chlorination. As per design, Bleaching powder 9.61kg / day and 13.56kg / day required during base and design year respectively.

- f) **Service Reservoir:** The system is designed by using multi reservoir concept. The capacities of reservoirs are RVT1 - 2 nos each 400cum at Dihidanda, RVT 2- 400cum 1 no. at Shivalaya for Jhyalbas area. But the service area has been separated due to topography of the town. There are existing reservoirs at each location having capacity of 250cum and 150 cum respectively. These reservoirs are very old age and not considered in the new system. In RVT-1 location, the first RVT of 400cum shall be built and supply water to existing system then only another RVT of 400 cum will be built. Existing reservoir site may be further damage during construction due to mobility of equipment. The total storage requirement for the system at the end of the design period shall be about 1200m³. This capacity is split and will be constructed at various location.
- g) **Distribution Main and District Metering Area:** The PE-100 pipes of outer dia 50mm to 200mm and DI 150mm to 300mm dia have been used in the design of the distribution system. The minimum pipe size used in the design is PE100- 50mm, which governs the velocity. PE100 pipe above 4 kg/cm² pressure are proposed in the distribution network design as per technical requirement. But, PE100 PN 6 pipe of 50mm and 63mm pipes are not used in the design due to technical difficulties to join the pipe with electrofusion technology. Instead of these, PN10 pipes are used. All PE pipes will be joined using electrofusion technology. The washout and air valve have been arranged in the distribution system in control valve/ pipe valve chamber, where possible. In some nodes the residual head is considered high to maintain the residual head in the downstream node.

The pipeline is designed by adding 10% extra length of actual one. The estimated distribution pipe is taken as 10% more than the actual one for PE pipe up to 90mm dia. and 5% more than the actual one for remaining all pipes. The length of pipe is 149,964.00m.

The distribution system is designed in consideration with District Metering Area (DMA). Each DMA will have bulk meter to determine the flow into respective service area. There are 7 DMAs in total service area to supply water from service reservoir. DMA boundary is fixed depending upon the elevation difference, location and easy for operation and maintenance.

- h) **Household Connections:** The household shall connect the tap to their household directly from main distribution pipe. The average 15m length of 20mm dia. PE 100-PN16 pipe with ferrule, compression joint, joined with GI fittings and valves up to meter for each HH connection. There will be 3,664 connections including individual and institutional connections in the system during base year.

Two types of tap stands have been designed for the project. At the end of the design period, it is anticipated that about 89.80% of the total household shall have fully plumbed, 10.20% of the total household shall be served through yard connection. The poor house connect tap at free of cost through OBA. There will be total 5,071 fully plumb and 576-yard taps will be connected during design year.

In total, there will be 5,659 connection including institutional 12 connections during design year.

- i) **Appurtenances:** This consists of Bulkmeter, Wash out Valves, Air Valves, Control Valves, Pressure Relief Valves, SCAD Valves and Fire Hydrants. There are 26 washout valves, 20 air valves and 129 gate valves proposed in the whole system.
- j) **Valve Chambers:** Two 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 have been provided in non-vehicular areas and rural area. In other vehicular carriageway and city area, chambers constructed with RCC has been provided. In total, there are 62nos. pipe valve boxes and 45nos washout/ air release/ control valve chambers designed in the distribution system.
- k) **Generator House:** A Generator house is designed at Girubari sump well site. Generator supplies power mainly for pump installed at sump well, when there is no regular power from NEA. The generator of 50kVA (rated power) shall be used to pump the water during power failure at the town.
- l) **Laboratory Building cum WUSC Office Building, Guard House and Dosing House:** A two storied laboratory building cum WUSC office building has been designed and proposed to be built in Jhyalbas bazaar. WUSC will provide the land for the construction of office. The Guard house type -2 will be at WTP/ RVT-1 and 2 sites, guard house type- 1 will be at sump well site. The preliminary water quality test kits are arranged for regular water quality monitoring. It is included in the project components of the system.
- m) **Boundary Wall & Retaining Wall:** The retaining wall has been proposed at new WTP site at various location. In some case, boundary wall will be above retaining wall and some cases boundary wall will be from foundation. Metal post with chain-link fencing above brick masonry wall has been proposed to protect the structures such as sump well/ intake, office building, reservoir sites, generator house, WTPs etc. as necessary.

ii. Sanitation Components

The survey revealed that there are not any public toilets or institutional toilets within the project town. Hence, the basic sanitation requirement of the proposed project is the construction of public toilets for institution as well as general public for the betterment of facilities in this area. There is provision of two institutional toilets & two public toilets under the sanitation components of this proposed project. This also involves provision of one tractor for solid waste collection which will promote awareness in disposing of solid waste properly and will control haphazard dumping of solid waste. These sanitation components will contribute towards the betterment of sanitation facilities in this area. These facilities also inculcate behavior of toilet use as well as of effective solid waste management among students and the general public. Hence, the proposed project also will address basic sanitation issues through the provision of toilets and solid waste management.

Description of the Environment

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.

Regarding this, details on various physical environmental aspects like Landforms & Topography, Geology & Soil, Water Resources, Climate, Air Quality, Acoustic Environment and biological features like Flora, Fauna, Aquatic Life, Protected Areas & Community Forest Areas were collected through simple checklist, REA checklist, professional judgment and interaction with the locals & the concerned bodies during field study. No existence of protected areas within the project area was observed during the field study. However, the study shows that some portion of transmission mains pass through the community forest despite of which there is no requirement of cutting trees except clearance of some bushes.

During field study, details on the socio-economic environment that includes Demographic Features, Caste/Ethnic Groups, Economic Features, Education & Skills and Community Infrastructures were also collected through simple questionnaire method followed by household survey and interaction with the locals.

Anticipated Environmental Impacts and Mitigation Measures

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.

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 has been sub divided into three categories based upon the project phase that includes i) Design Phase, ii) Construction Phase and iii) Operation Phase.

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 & Land Surface Disturbances, Spoil Disposal & Gully 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, Haphazard Disposal of Dismantled Debris, Impacts on Water Bodies, Impacts on Flora & Fauna, Impact on Aquatic Life, Impact on Water

Quality of nearby rivers, Workers & Community Health & Safety Hazards, and Damage to the existing Utilities, Traffic Congestion, Public Protests, Disruption to Local Vendor's Business, Mobilization of Child Labour, Occupational Health & Safety Hazards, Delivery of Unsafe Water, Impact on Recipient Water Bodies and Impact of Sustainability of Works.

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.

Information Disclosure, Consultation & Participation

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

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 STWSSSP. 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) Representative of reputable and relevant CBO/SHG/organization working in the project area as invitee¹ , and
- (7) Contractor's representative

Environmental Management Plan

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:

- (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.

The total estimated local level monitoring and mitigation cost for the project is NRs. 2,000,000.00.

Monitoring & Reporting

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 (MoFS) under Government of Nepal will also undertake monitoring process through random field visits to review the project performance.

Conclusion

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) the benefits of easy access to reliable supply of safe and potable drinking water;
- ii) promotion of good hygiene and sanitation practices and reduced health and safety risks as positive impacts; and

¹ 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.

- iii) enhanced community health, improved quality of life and safe communities as outcomes.

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 Deurali Hupsekot 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
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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 & sanitation in 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 Institutional 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 Hopse (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-1** given below depicts the compliance matrix of the subproject selection criteria as per EARF.

Table I-1: Compliance Matrix on the subproject selection criteria in the EARF

Sub project	Sub project Components	Subproject Selection Criteria	Compliance Status	Remarks
<i>A. General Criteria</i>				
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 8
	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 core Jhyalbaas area 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 core Jhyaalbaas area, 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 Deurali Hupsekot WSSP • Appendix 4:Proximity Report generated by ADB on Hupsekot 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 Deurali Hupsekot 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 Deurali Hupsekot 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-1.
		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 5.
		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 however, the cost for the construction of this approach road will be incurred by WUSC itself.
	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/sump well 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 7 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 Deurali Hupsekot Water Supply & Sanitation Project lies in Hupsekot Rural Municipality, Nawalpur District, a hilly region in the Gandaki Province (Province 4) of Nepal. The municipality lies between 27° 74' 0" N Latitude and 83° 98' 0" E Longitude. The town is located about 8 km away from Danda bazaar (near Kawasoti) east-west highway. The distance from Kathmandu to Kawasoti 178 km, Kawasoti to Danda Bazaar (bifurcating junction called Sahid Chowk) 3 km and Sahid Chowk to WUSC office/ Jhyalbas 8km.

10. The climate of the project area is mild and generally warm and temperate. In winter, there is much less rainfall in Nawalpur than in summer. This location is classified as Cwa by Köppen and Geiger. The average annual temperature at Nawalpur is 24.2°C. In a year, the average rainfall is 1811 mm, which is higher than 1400 mm, the average precipitation of Nepal. The nearest climatological station no. 0704 is situated at Beluwa, Girubari. The required data from this station is used for the project.

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

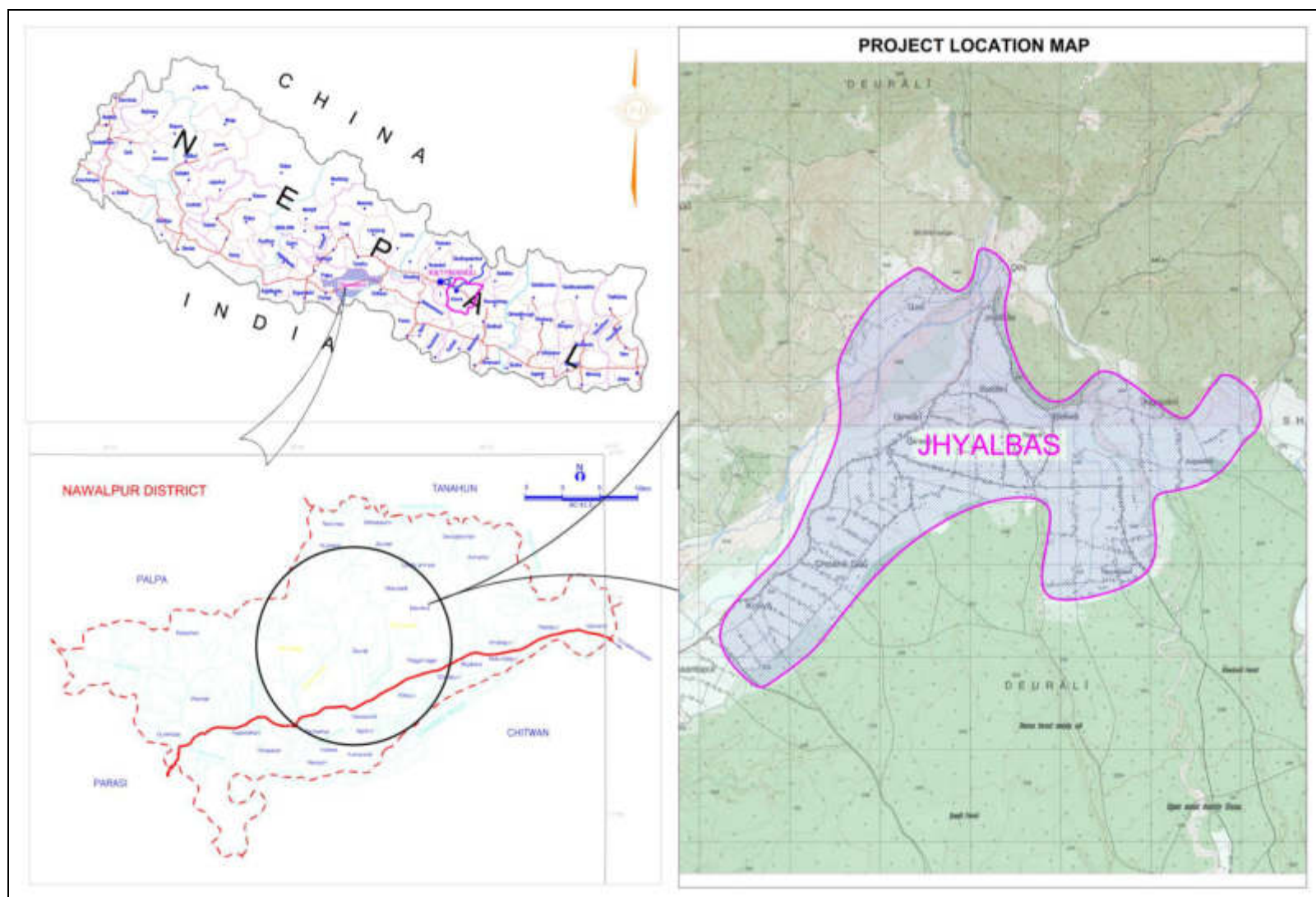


Figure I-1: Location Map of the Project Area

12. This figure given above shows that the project area belongs to Hupsekot Rural Municipality of Nawalpur District of Gandaki Province of Nepal. The project town is bounded by Bungdikali Rural Municipality & Palpa District (Nisdi Rural Municipality) in the north, Bulintar Rural Municipality in the north east, Kawasoti & Devchuli Municipality in the east, Kawasoti & Madhyabindu Municipality in the south and Madhyabindu Municipality & Palpa District (Nisdi Rural Municipality) in the west. Out of 6 wards of the project town, the proposed project area covers areas of wards 1,2,3 & 4.

13. The project town was declared as Rural Municipality by the Government of Nepal, Ministry of Federal Affairs and Local Development from Council of Ministers on September 20, 2015. The then VDC which were merged are Deurali, Dhaubadi & Hupsekot to form a Nawalpur Municipality with total of 6 wards covering area of 189.21 sq. km. The following table gives brief details on the ward profile of Hupsekot Rural Municipality:

Table I-2: Hupsekot Rural Municipality Ward Profile

Present Ward Municipality	Former VDC/Municipality	Former Ward No.
1	Deurali VDC	WN 5
	Dhaubadi VDC	WN 2
2	Deurali VDC	WN 1,2 & 9
3	Deurali VDC	WN 3 & 4
4	Deurali VDC	WN 6 & 7
	Dhaubadi VDC	WN 7
5	Deurali VDC	WN 8
6	Dhaubadi VDC	WN 1,3,6,8 & 9
	Hupsekot VDC	WN 1 to 9

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

14. The **Table I-2** shows that the reformed Hupsekot Rural Municipality has been divided into 6 wards. The current ward 1 of Hupsekot Rural Municipality belong to ward 5 of former Deurali VDC. Similarly, the current ward 2 belong to ward 2 of former Deurali VDC , ward 3 belong to wards 3 & 4 of the former Deurali VDC, ward no. 4 belong to wards 6 & 7 of Deurali VDC and ward 7 of former Dhaubadi VDC, the ward 5 belong to ward 8 of former Deurali VDC and ward 6 belong to wards 1,3,6,8 & 9 of former Dhaubadi VDC & ward 1 to 9 of former Hupsekot VDC.

E. Purpose of the IEE

15. 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.

16. 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

17. The existing water supply system supplies water for 24 hours from the reservoir, however the supply system to each household is intermittent and is limited to only 1-2 hour in a day. The supply system is such that the downstream household will be able to fetch water only after the upstream household closes the taps. This is mainly due to less discharge from sources, less capacity of storage reservoir and small sizes of pipes are used in the distribution system without any design consideration. Hence, the existing water supply system is not able to meet even the current demand of the proposed project town. There is also provision of water treatment plant in the existing water supply system. However, some of the components like Slow Sand Filter needs repair.

18. Considering the water demand and condition of the existing system, there is a need of the proposed project to upgrade the existing water supply situation within the proposed service area to make drinking water available to the people of service area throughout the year and to provide easy access to safe & reliable water supply service.

G. Rationale of the Project and IEE

Rationale of the Project

19. 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 commitments and various other aspects.

Rationale of the IEE

20. 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 wards 2 to 4 and 6 to 12. The project is expected to benefit a base year population of about 31,415 populations (2021) & a design year population of 45,768

(2040) 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.

21. 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 (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.

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

22. The IEE study has followed the necessary policy, legal and administrative 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

23. 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.

24. 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)

25. 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
- (v) 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)

26. 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.

27. 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-1***.

Table II-1: 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)	2050 B.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 (Draft)	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.

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
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.
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.

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
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 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.	These provisions are stated in EMP.

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
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.
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.
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 Community 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.

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
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 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	This has been followed for evaluation of the anticipated environmental impacts.
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, 2018/019

B. Environmental Agreements

International Environmental Agreements

28. 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

29. 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.

30. The Deurali Hupsekot Water Supply & Sanitation Project does not and will not break or go against Nepal’s commitment to these international agreements.

C. Environmental Standards

31. 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-2** and their details on the acceptable level criteria of these standards are featured in **Appendix 2A**.

Table II-2: 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

Particular	National Standard	International Standard
Drinking water quality	National Drinking Water Quality Standards, 2005	WHO Guidelines for Drinking-water Quality, Fourth Edition, 2011
Emission standard for diesel generator discharge to ambient Air	National Diesel Generator Emission Standard, 2012	

Source: IEE Study, 2018/019

32. 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, PM₁₀, Sulphur Dioxide(SO₂), Nitrogen Oxide(NO₂), 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 PM₁₀, PM_{2.5}, SO₂ and NO₂ 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-3: Standards for Ambient Air Quality

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	-	-

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.

33. Similarly, *National Noise Standard Guidelines, 2012* has set the standard noise levels measured in dBA for Industrial 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-4: 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.

34. *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, NO_x, and PM. This is given in detail below:

Table II-5: 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

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

i. Environmental Assessment Requirements of ADB

36. 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.²

37. ADB's Environmental Safeguards policy principles are defined in SPS (2009), Safeguard Requirements as per **Table II-6** given below and the IEE is intended to meet these requirements.

² 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/EnvironmentalGuidelines>

Table II-6: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 IEE is based on the Detailed Engineering Design Report. Copies of both SPS-compliant IEE and GoN-approved IEE will be 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

38. 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-7**. The key environmental quality standards applied in the GoN IEE (as well as in the ADB IEE) are included in **Appendix 2A**.

Table II-7: 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.	Subproject requires an IEE.
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 has not been prepared. This IEE is based on master plan only.
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 Subproject carried out the IEE and prepared the IEE Report accordingly.
Proponent submits 15 copies of the IEE Report along with the project proposal and recommendation of the concerned town or town to the CSA.	The subproject will submit documents accordingly for review and approval.
CSA conducts review and grants approval of IEE Report.	Subproject's IEE Report will be taken approval from the concerned ministry
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.	
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

39. 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:

B. Literature Review/Desk Study

40. 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.

C. Impact Area Delineation

41. 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 have 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.

42. 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.

43. 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.

D. Field Study

44. 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:

a) Physico-Chemical Environment

45. 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.

a) Biological Environment

46. 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 6**), 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.

47. 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.

48. 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 6** 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.

a) Socio-Economic & Cultural Environment

49. 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 6**.

50. 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.

E. Stakeholder & Public Consultation

51. 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.

F. Impact Identification, Prediction & Evaluation Methods

52. 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 6**) 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.

53. 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.

54. 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).

55. 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.

56. 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-1: 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 Specific (SS)	10
4.	Duration	Long Term (LT)	20
		Medium Term (MT)	10
		Short Term (ST)	5

Source: National EIA Guidelines 1993

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

Table III-2: 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

58. 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

59. 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. As the name of Deurali Hupsekot, it was envisaged that the majority of the settlement of Hupsekot Rural Municipality will be covered from this project. The name of the major settlements of the service area of Hupsekot Rural Municipality are as follows:

- Ward no. 1: Beluwa and Jukepani
- Ward no. 2: Koliya and Guheri (water to be supplied from RVT without pumping)
- Ward no. 3: Girubari and Belhani
- Ward no. 4: Jhyalbas and Tallo Dihi

60. As per the HH survey record, there are 3,652 households having present population 21,601 (permanent 19,347 and rental 2254).

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

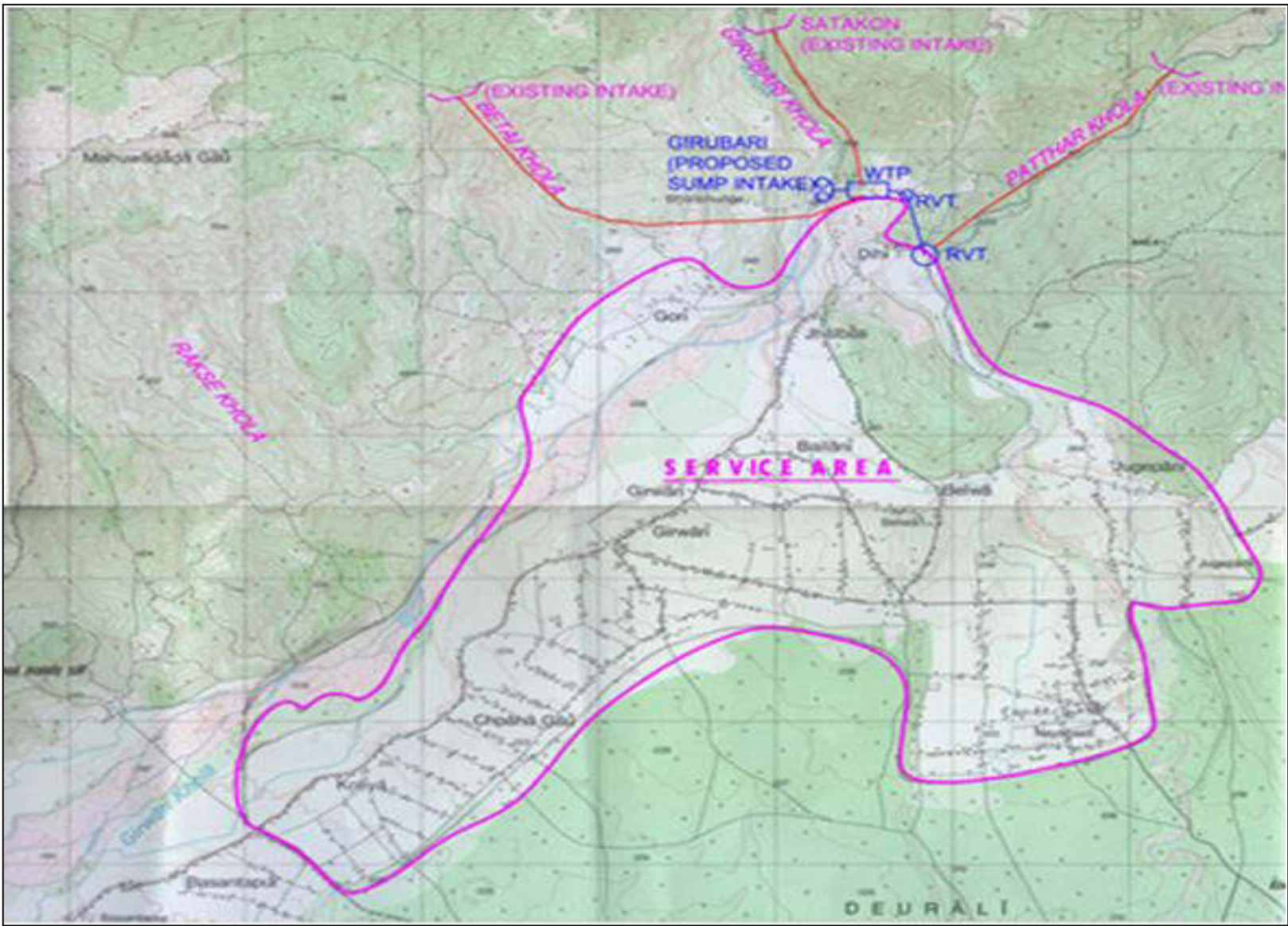


Figure IV-1: Proposed Service Area

B. Project Components

i. Water Supply Components

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

a) Source/Intakes

63. As per discussion with WUSC members, local bodies, the concerned beneficiaries and key personnel of the project area, four reliable sources have been proposed for the project.

64. The three gravity sources Girubari khola, Betai khola and Pathar khola with sufficient flow is proposed for the project. As per the design report, the sources were measured during dry season on April, 2019 and the discharge of 40 lps at Girubari Khola, 10 lps at Betai khola and 12 lps at Pathar Khola has been observed. The measured period was the driest month of the year. The water about (75-80) % of each source could be accumulated during the measurement. Hence, the discharge at source available is more than above mentioned figure, if all water could be accumulated.

65. Furthermore, the interaction has also been done with WUSC and local people regarding the source depletion. It was reported by the WUSC and local people that the water available at the source during flow measurement is least one in a year and they ensured that the water would not decrease than those above measured figures.

66. Based upon above, it has been considered during detailed design that the discharge figures available during measurement at each source are lean/ minimum discharge. Hence, the tapped water at Girubari khola (gravity) 26lps (65% of measured discharge 40lps), Betai khola 5lps (50% of measured discharge 10lps) and Pathar khola 8lps (66.7% of measured discharge of 12lps). Girubari khola (gravity), Betai khola and Pathar khola sources are the existing ones and the proposed intakes are located at the existing intake site. The tapped discharges are increased to cope the required demand of the proposed service area.

67. Girubari khola (pumping) sump well site is located at about 4km downstream of Girubari Khola (gravity) intake site. About 11 lps of the seepage water of this Girubari Khola will be pumped. The provision has been made to extract the water from the river, if seepage water is not adequate at sump well.

68. After withdrawal of water from each source, the significant discharge will flow downstream of each source. Hence, the sources are adequate and is concluded that there will not be an environmental issue regarding the source yield for this proposed project.

69. The tapped discharge from these sources is brought to the proposed WTP site – Dehidanda and the existing WTP site- Dehidanda and Shivalaya from which the treated water is conveyed to RVTs Dehidanda and Shivalaya and water from each RVT is supplied to the distribution system by gravity.

70. The Girubari khola intake is proposed to be rehabilitated with gabions works downstream and sides of existing cutoff wall, placing of course gravel and boulder on river bed at upstream of cutoff. The PE pipe 140mm dia is perforated on top half dia and 7-10mm dia hole will be made. There are 16 numbers of perforated pipe of each 20 m length. These pipes are placed in between gravel and connected to collection chambers. Also, the direct supply of

river water to each collection chamber have been provisioned. This is functioned, if perforated pipe cannot extract enough water at design volume or is used during maintenance of perforated pipes clogged.

71. The Betai khola intake is proposed to be newly constructed with RCC cutoff wall with gabions works downstream and sides of cutoff wall. The small chamber is designed to be constructed with intake cutoff wall. The strainer has been provisioned to extract the water from chamber and two pipes will run up to existing collection chamber. The existing collection chamber is also proposed to be rehabilitated.

72. The Pathar Khola intake is also proposed to be rehabilitated with gabions works downstream and sides of existing cutoff wall, placing of course gravel and boulder on river bed at upstream of cutoff. The PE pipe 140mm dia. is perforated on top half dia. and 7-10mm dia. hole will be made. There are 7 numbers of perforated pipe of each 7 m length. This pipe is connected at the existing collection chamber. The existing collection chamber is also proposed to be rehabilitated. These perforated pipes are placed in between gravel and connected to collection chambers. Also, the direct supply of river water to collection chamber has been provisioned. This is functioned, if perforated pipe cannot extract enough water at design volume or is used during maintenance of perforated pipes clogged.

73. The proposed location of the sump well is in between Badahare Kholsi and Chepari Gaira. The exact location of sump well at Girubari khola is finalized during implementation after test drilling at site. If the soil strata at proposed site has layer of rock, the location needs to be shifted or altered nearby proposed location. Based on drilling, the sump well site is finalized with minor modification in design, if necessary. There is only one sump well designed in the system. The perforated pipes are designed to flow the water from the filter media to sump well. The retaining wall at hill side and river side have been designed to protect the structures. The river side RCC retaining wall is proposed to be constructed to prevent the flood into the intake/ sump well site. It is envisaged that sump well collects water more than 11 lps. Accordingly, the perforated pipes 10 number of each 7 m length are arranged considering the possibility of clogging of perforation in pipes. The necessary treatment plant, service reservoir and other structures are designed as needed. The water treatment system is based on quality of water of the source. In total, the sources supply 50lps water for the project.

b) Electrical System

74. The system has only one stage pumping to pump 11lps water for 20hours daily during design year. All others three sources are gravity system and no need pumping. The sub meter is enough for electrical works for building and dosing house at each RVT locations.

75. The electrical system are designed as new together with overhead transmission line. It is envisaged that only one pump runs at a time and other is an additional. Accordingly, the transformer, generator and other components are designed. The capacity and number of pumps are provided in **Table IV-1**.

Table IV-1: Capacity and Number of Pump

Location	Number and capacity of pump	Remarks
Stage I (at sumpwell/	2 nos × 25 HP	Only one pump will run at a

Location	Number and capacity of pump	Remarks
source)		time.

Source: DEDR, 2019

76. In addition, spare pump is arranged at store for replacement, if any one pump does not function properly, can be replaced immediately. There is generator for backup to pump the water during NEA power failure. The transformer and diesel generator is designed as given in **Table IV-2:**

Table IV-2: Transformer and Diesel Generator

Pumpi ng stage	Description	Pump uses				Remarks
I stage	Pump 1 OR	25	HP	18.75	KW	Only one pump will run at a time
	Pump 2	25	HP		KW	
	Other load			4	KW	
	Total load			22.75		
	Safety factor			1.25		
	Net total load			28.43		
	Capacity of Transformer			35.55	KVA	
	Adopt: Capacity of transformer - 1no			50	KVA	
	Capacity of generator					
	1.25times the capacity of transformer					
	Size of Generator			44.43		
	Keep generator 1 no (rated power)			50	KVA	

Source: DEDR, 2019

77. **Distribution System:** The power cables from control panels to each load is calculated to satisfy the following criterions:

- Current carrying capacity of the cable is enough to carry the full load current continuously.
- Maximum voltage drop in the cable is less than 2% of the system voltage.

78. The control panels at pump house are provided with the Star-Delta starter to reduce the high starting current drawn by the pump-motors.

c) Transmission Main & Pumping

79. Transmission line is the pipe line length from various intakes to reservoirs. The transmission line passes via road, barren land and public land. The site for intakes and transmission route seems stable. But, as per WUSC, it is known that the transmission route of Girubari khola (gravity) may experience occasional landslide events at some locations. Hence, to overcome this problem, the Girubari sump well has been provisioned though the Girubari intake site has enough discharge. Single stage pumping is designed for Girubari sumpwell.

80. The total estimated transmission pipe line length from Girubarikhola, Betai khola, Patharkhola and Girubari sumpwell at Dehidanda and Shivalaya WTP/ RVT site is about 13,453.00m. Separate transmission line is provisioned for each source due to their location, elevation and topography. The transmission main of Betai has to cross Girubari Khola. Existing suspension bridge will be used for pipe crossing which is used now also.

d) Thrust Blocks, Saddle Blocks and Thrust Beam

81. Thrust blocks have been proposed for DI pipes (transmission and distribution mains for both alternatives) 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 24 kg/sq cm for both transmission lines and distribution line.

82. Similarly, there is also provision of Thrust Beam & Saddle Blocks for DI pipes that will be laid up in sloppy areas and un-buried portions. All saddle blocks are proposed to be anchored with concrete at the center of each pipe to prevent movement. Provision of RCC support for the stretches of buried & un-buried DI pipe line has also been made to prevent pipe movement which are laid-up in sloppy area.

e) Water Treatment Plant and Chlorination

83. The water quality of the streams/ river varies from time to time at every rain and carries suspended solid, other organic and inorganic impurities. The water quality of the sources has been tested during rainy and summer season. It is reported by the WUSC and community that the water becomes turbid during rain and flash flood frequently and requested to include the treatment plant for the worst condition of surface water. The treatment plant is generally provisioned for the worst water quality though the water quality is tested. This quality is not same throughout the year.

84. Based upon the water quality, secondary data available and discussion with community in the surrounding of the service area, the system is designed with provision of water treatment process comprising rapid mixture, flocculator, sedimentation tank, roughening filter, slow sand filter and disinfection.

85. There are existing treatment plants that have been constructed at two locations (Dihidanda & Shivalaya) for each Girubari, Betai and Pathar Khola sources. Each of these treatment plants are of 5 lps capacity. This is also proposed to be used for the proposed project with necessary rehabilitation works followed by washing and placing of filter media by adding deficit filter media. In addition, two other components that includes Rapid Mixture and Flocculator have been added in the existing treatment plant. For the remaining discharge 40 lps, new treatment plant has been designed.

86. New small rapid flash mixture one unit of size 2.0m x 2.0m x 2.0m at each Dihidanda and New Shivalaya Baffle wall flocculator 2 unit of each 8.50m x 3.00m x 1.20m at Dihidanda and one unit of 3.0m x 1.00m x 1.20m at Shivalaya are designed to be constructed for the proposed project.

87. Sedimentation tank with 4 units of each 13.75m x 4.75m x 3.00m is designed taking surface loading 600 ltr/hr/m². Roughening filter 4 units of each 7.10m x 1.60m x 1.5m is designed taking rate of filtration 2700 ltr/m²/hr. Slow sand filter 6 units of each 17.80m x 7.20m x 2.90m designed taking rate of filtration 190 ltr/m²/hr. This filter rate is taken as quite high due to limitation of the land provided by the WUSC and would be enough for the tested water quality. The scrapping/ replacement of sand from slow sand filter is increased, if the quality of water is worse than the treated quality. All new treatment plants are designed to be constructed at Dihidanda besides the existing treatment plant.

88. Accordingly, the inlet outlet arrangement of each filter units together with necessary valve arrangements are provided in the detailed drawings. The bypass arrangement from each filter inlet/ outlet are also provisioned for the repair and maintenance of the structures.

89. An emergency feeder line consisting of a solution tank connected with feeding tank having a constant level is proposed for the chlorination. As per design, bleaching powder 9.61kg / day and 13.56kg / day required during base and design year respectively. After disinfection, some part of the lime is settled at the bottom of the ground reservoir as residue. This residue is then removed through washout pipe which is connected to the drain.

f) Service Reservoir

90. The whole system is divided into seven DMAs. The system is designed by using multi reservoir concept. The capacities of reservoirs are RVT1 - 2 nos each 400cum at Dihidanda, RVT 2-400cum 1 no. at Shivalaya for Jhyalbas area. But the service area has been separated due to topography of the town. There are existing reservoirs at each location with capacity of 250cum and 150 cum respectively. These reservoirs are very old age and not considered in the new system. In RVT-1 location, the first RVT of 400cum is proposed to be constructed that supplies water to the existing system. Then, only another RVT of 400 cum is constructed. The total storage requirement for the system at the end of the design period is about 1200m³. This capacity is split and constructed at various locations.

g) Distribution Main and District Metering Area

91. The distribution system comprises a pipe network, which is designed in loop network system by using EPANET-2.4 software. EPANET software is used for the analysis of the water supply network. The base demand, elevation of each node, reservoir head and distance from node to node are the basic input data for the software. The socio-economic survey data is used to determine the nodal/ base demand considering the demand for rapid settlement growth. The engineering survey data is used for the length of the pipe and elevation of the nodes. The software works for unlimited nodes. The input data is given directly in the software after constructing the model. The software works for both loop and dead-end system.

92. There are three different methods for the determination of the head loss. But two methods can be used for the determination of head loss in pipe. The Hazen-Williams formula is the most commonly used to determine the head loss in pipe for water only. The Darcy-Weisbach formula is the most theoretically correct formula for all flow regimes and for all liquids. Hence, Hazen-Williams formula is used in pipeline design.

93. The roughness coefficient in Hazen-Williams formula for the use of GI, DI and PE pipes is taken 110, 120 and 130 respectively. The new distribution system has been designed by using PE-100 pipe and DI pipes.

94. The PE-100 pipes of outer dia. 50mm to 200mm and DI 150mm to 300mm dia have been used in the design. The minimum pipe size used in the design is PE100- 50mm, which governs the velocity. PE100 pipe above 4 kg/cm² pressure are proposed in the distribution network design as per technical requirement. But, PE100 PN 6 pipe of 50mm and 63mm pipes are not used in the design due to technical difficulties to join the pipe with electrofusion

technology. Instead of these, PN10 pipes are used. All PE pipes are joined using electrofusion technology. The washout and air valve have been arranged in the distribution system in control valve/ pipe valve chamber, wherever possible. In some nodes, the residual head is considered high to maintain the residual head in the downstream node.

95. The flow at each line has been calculated on the basis of the socioeconomic survey data and possibility of rapid increment of settlement in the near future. Pipe valve box/ valve chamber have been proposed at suitable junction to regulate the design flow in each pipe line and to stop the flow in the particular area without affecting the other area during repair and maintenance. All distribution line passes along the road network and public land. The distribution line on both sides has been proposed in core bazaar area, black topped road and the graveled road that will be black topped in the near future, DMA boundary while, pipeline along the single line has been designed in the remaining areas. Due to undulated/ irregular topography, two pipes are designed along one road, among which one pipe will supply water at the highest level without distributing water to the household and other pipe will distribute water to the households up to bottom from next pipe laid together. The distribution pipe for DMA-1 has to cross Girubari khola. The existing suspension is proposed to be used for pipe crossing.

96. The pipeline is designed by adding 10% extra length of actual one. The estimated distribution pipe is taken as 10% more than the actual one for PE pipe upto 90mm dia and 5% more than the actual one for remaining all pipes. The length of pipe is 149,964.00m.

97. The distribution system is designed in consideration with District Metering Area (DMA). Each DMA has one bulk meter to determine and control the flow into respective service area. There are 7 DMAs in total service area to supply water from each service reservoir. DMA boundary has been fixed depending upon the elevation difference, location and easy for operation and maintenance. It is presented in **Figure IV-2** given below:



Figure IV-2: District Metered Area (DMA) of the Proposed System

h) Household Connections

98. The household connect the taps to their respective households directly from the main distribution pipe. There is provision of average 15m length of 20mm dia. PE 100-PN16 pipe with ferrule, compression joint, joined with GI fittings and valves up to meter for each HH connection. There are 3,664 connections including individual and institutional connections during base year. The meter is kept near and adjoining the compound of the houses. After meter, each HH extend the pipe themselves as they desire. The necessary fittings have also been designed. Electrofusion saddle has been proposed to join the HH connection at main pipe to connect ferrule in the saddle. Likewise, GI and DI saddle clamp are proposed to join the HH connection at main pipe to connect the ferrule for GI or DI pipes.

99. Two types of tap stands have been designed for the project. At the end of the design period, it is anticipated that about 89.80% of the total households is fully plumbed and 10.20% of the total households is served through yard connection. The poor households connect tap at free of cost through OBA. There are total 5,071 fully plumbed connections and 576-yard tap connections. In total, there are 5,659 tap connections including institutional 12 connections during design year.

i) Appurtenances

100. **Bulk Water Meter:** The bulk water meter is designed at various locations in the transmission and distribution system to ascertain flow and leakage in the system. The bulk meter is designed at each intake outlets, at the outlet of service reservoirs, DMA outlets. Each bulk meter provide the quantity of water supplied in the particular area, water consumed by the consumers and leakage in that area can be determined calculating the difference of HH consumption water volume and bulk meter water supplied water volume. Accordingly, the repair and maintenance works can be carried out, if the leakages more than the permissible range in such areas.

101. **Types of Connections:** Consumers have been classified in three categories depending on their income level. The consumers having high level of income requiring more consumption of water are placed in fully plumbed category, consumers having medium income at medium consumption level and consumers of low-income group and who can't afford tariff of fully plumb connections and use less water through tap connection at their household are benefitted through yard connection. The poor household will get tap free of cost with OBA programme. However, WUSC has to reconfirm the status of poor household during implementation of the scheme.

102. The cost estimate of the taps for all households and institutions has been included in project cost estimate. During execution of the project, the poor households connect tap from OBA facilities under the recommendation of WUSC.

103. **Wash out Valve:** The washout valves have been arranged at transmission, distribution and every water retaining structures to remove the slush/ debris. Washout valves have been provided at depressions points in the pipeline and dead ends, where necessary. The purpose of the valve is to clean the debris collected in the pipeline. Sometimes the valve can also be used for the maintenance of the pipe line without closing the whole distribution system. There are 26 washout valves provided in the whole system.

104. **Air Valve:** The air valves are provided in intake outlet, transmission and distribution mains. Air valves have been designed to release the air accumulated in the pipes. The water flowing through pipes always contain some air. This air tries to accumulate at the highest points and may interfere in the flow by narrowing pipe opening area. Air relief valve is provided in the distribution pipe near the outlet of service reservoir to provide the exit for such accumulated air. Also, the automatic air release valve is provided in distribution system at several locations. There are 20 air valves provided in the whole system.

105. **Control Valve:** The valves are placed in required location of the structures, transmission main and distribution main. The purpose of the control valve is to regulate the required flow at each distribution main from the junction/ node. Sometimes, it can be used for the maintenance of distribution system in particular area without closing whole distribution system. A control valve is provided in the system where there are more than two branches from one junction or where it is necessary. Control valves have been designed in suitable distribution junctions having more than two mains and in required places to regulate the design flow in the main. The design flow in each pipe line is based on design population, non-domestic demand and system wastage and leakage. The future demand in the main may fluctuate and the control valve/ regulating valve is useful to deliver the required flow in pipe line. In total, there are 129 gate valves. 62 nos. pipe valve box and 45 nos. washout/ air release/ control valve chambers are designed in the distribution system.

106. **Pressure Relief Valve:** The pressure relief valve is a safety valve that keeps the pressure within safety limits to prevent equipment failure, mishaps or other undesirable outcomes. Pressure relief valves are designed with controls to increase or decrease the level of pressure in a pressure vessel. This type of valve is installed at each pumping stage.

107. **SCADA Valve:** This type of valve is operated by SCADA (Supervisory Control and Data Acquisition) system. This SCADA system is a control system that uses computers, networked data communications and graphical user interfaces for high-level process supervisory management, but uses other peripheral devices such as Programmable Logic Controller (PLC) and Discrete PID controllers to interface with the process planr or machinery.

108. A collection of equipment that provides an operator at remote location with enough information to determine the status of a particular piece of a equipment or entire substation and cause actions to take place regarding the equipment or network.

109. Supervisory Control and Data Acquisition (SCADA) achieves this requirement collecting reliable field data through remote terminal units (RTUs), Intelligent Electric Devices (IEDs) and presenting them to user requirement. The user interface or the man machine interface (MMI) provides various options of data presentation according to specific application and user needs. There are many parts of a working SCADA system. A SCADA system usually includes signal hardware (input and output), controllers, networks, user interface (HMI), communications equipment and software. All together, the term SCADA refers to the entire central system. The central system usually monitors data from various sensors that are either in close proximity or on-site.

110. Basic SCADA is proposed/ designed for Deurali Hupsekot town. The outlet management system (OMS) from sump well outlet and reservoirs outlets and each gravity intake outlets, Reservoir management system (RMS) at each inlet of reservoirs. SCADA

control valves are also provisioned at the outlet of each DMA to monitor and control the designed flow. The Outlet Management System(OMS) is to provide uniform distribution of water to the reservoirs irrespective of its location and distance from the source of supply, to avoid the overflow of Reservoirs, to measure, monitor and control the flow delivered to the RVT without any external Electric Energy and no high recovery cost for Energy/Communication Cost such as GSM/GPRS/RADIO etc.

111. The automation to link all the components through SCADA (Hydraulically Supervised Control and Data Acquisition) and all the mentioned components which is capable to control and monitor the parameters from SCADA room/ master control center for submersible pumps of all for main and one small stages, Water level sensors for all RVTs , Online Chlorine Monitors, AMS, RMS, WMD, and zonal PFCMDS etc. are provided. The Reservoir Management System (RMS) enable to avoid the overflow of reservoirs and pressure controlling system.

112. Likewise, one-year operation and maintenance for SCADA is also provisioned for water supply system operation and maintenance. The proposed system works under Wi-Fi coverage area, on the GPRS network or on a given radio frequency. The radio frequency is a free of cost communication media, but the limitations it has are, eye visibility of two connecting devices and the distance between them. Similarly, it is difficult to reach all equipment within Wi-Fi coverage also. The other way out is the GPRS which shall work with the 3g and above cell phone network area. The services of the network providers having a full network in the given area can be used.

113. **Valve Chambers:** Two 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 have been provided in non-vehicular areas and rural area. In other vehicular carriageway and city area, the chambers constructed with RCC has been provided.

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

115. In total, there are 62nos. pipe valve boxes and 45 washout/ air release/ control valve chambers designed in the distribution system.

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

j) Generator House

117. A Generator house is designed at Girubari sump well site. Th generator supplies power mainly for the pump installed at sump well, when there is no regular power from NEA. The generator of 50kVA (rated power) is used to pump the water during power failure at the town.

k) Laboratory Building cum WUSC Office Building, Guard House and Dosing House

118. A two storied laboratory building cum WUSC office building has been designed and proposed to be built in Jhyalbas Bazaar. WUSC provide the land required for the construction of office. The Guard house type -2 is to be constructed at WTP/ RVT-1 and 2 sites while Guard house type- 1 is constructed at sump well site. The preliminary water quality test kits are arranged for regular water quality monitoring. It is included in the project components of the system.

I) Boundary Wall & Retaining Wall

119. The retaining wall has been proposed at new WTP site at various location. In some cases, boundary wall is constructed above the retaining wall while in some cases, the boundary wall is built from the foundation. The metal post with chain-link fencing above brick masonry wall has been proposed to protect the structures such as sump well/ intake, office building, reservoir sites, generator house, WTPs etc. as necessary.

ii. Sanitation Components

120. The sanitation component is considered as an integral part of the water supply project so as to minimize the coverage gap between water supply and sanitation components. The main issues that need to be addressed in the sanitation components as they would have consequential impacts on all the activities are:

- Toilets/Septage/Sludge Management
- Drainage System
- Solid Waste Management
- Institution Building/Strengthening
- Raising Awareness

121. The sanitation practice is directly related with their hygiene consciousness. The socioeconomic survey shows that there is no separate sewerage system within the proposed service area. But almost, all the households in the urban areas as well as in rural areas have their own latrines with septic tanks. The survey revealed that out of 4024 households, about 95.90% (3858) households have water sealed latrines whereas, 2.10% (84) households have pit latrines. About 0.5% (22) HHs have ventilated pit latrines whereas 0.1% (3) of total households are using cistern flush type of pit latrine. Similarly, minimal percentage i.e.s 1.4% (57) of total households do not have latrines.

122. The survey also revealed that there are not any public toilets or institutional toilets within the project town. Hence, the basic sanitation requirement of the proposed project is the construction of public toilets for institution as well as general public for the betterment of facilities in this area. The thrust point is to avail basic sanitation facilities and declare the whole municipality as ODF. The aim of sanitation is universal coverage. ODF, based on multiple approaches like basic sanitation package, School sanitation and hygiene education program, Community-led total sanitation, School-led total sanitation, Local body-led total sanitation, is considered as the bottom line for program intervention.

123. There is provision of two public toilets under the sanitation components of this proposed project. The location for these proposed public toilets includes (i) Ward no. 1 at Jukepani (ii) Ward no. 4 -Jhyaalbaas Bazaar. Similarly, there is also provision of two institutional toilets viz., one at health post and location of other needs to be finalized during implementation.

124. There is also provision of tractor to collect and dispose the waste of the project town. It is envisaged that the waste of each household is collected nearby house and then the tractor collects this waste at regular interval and dump in safe place. The dumping site is proposed to be managed by WUSC by either buying the land or taking the land in lease at safe location. It is envisaged that the rural municipality supports WUSC for solid management of the town.

125. The establishment of four toilets and procurement of one tractor are included in BoQ of the bidding documents under Part no. J: Sanitation Component and in the contract documents too.

126. These sanitation components contribute towards the betterment of sanitation facilities in this area. These facilities also inculcate behavior of toilet use as well as of effective solid waste management among students and the general public. Hence, the proposed project address basic sanitation issues through the provision of toilets and solid waste management.

C. Salient Features of the Proposed Project

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

Table IV-3: Salient Features of the Project

SN.	Items	Description
1	Name of Project	Deurali Hupsekot Water Supply and Sanitation Project
2	Type	Both gravity and pumping system (use of 3 existing gravity sources and one new pumping source and gravity water supply in distribution system)
3	Study Level	Final Detailed Engineering Design
4	Location Area	
	Province	Gandaki (4)
	District	Nawalpur
	Rural Municipality/Municipality	Hupsekot Rural Municipality
	Service Area Ward and settlement	Hupsekot Rural Municipality: Ward no. 1: Beluwa and Jukepani Ward no. 2: Koliya and Guheri (water to be supplied from RVT without pumping) Ward no. 3: Girubari and Belhani Ward no. 4: Jhyalbas and Tallo Dihi
5	Available Facilities	
	Road	Kathmandu to Kawasoti is 178km, Kawasoti to Danda Bazaar (bifurcating junction called Sahid Chowk) is 3km and Sahid Chowk to WUSC office/ Jhyalbas is 8km.
	Water Supply System	Limited supply for few hours operated by WUSC
	Electricity	Available
	Communication	Available
	Health Services	Available
	Banking Facilities	Available
6	Social Status	
	Present HHs Numbers (2018)	3,652
	Present Population (2018)	21,601 (incl rental 2,254)
	Base Year Population (2021)	22,786 (rental population kept constant)
	Design Year Population (2040)	32,168 (rental population kept constant)
	Average HHS size	5.3

SN.	Items	Description
	Population Growth Rate % (PGR)	2.00
	Projected HHs in Design Year (based on GR)	5,647
7	Water Demand (MLD)	
	Base Year (2021)	2.88 (2,882,429 ltr per day)
	Design Year (2040)	4.07 (4,069,252 ltr per day)
8	Source Characteristics	
	Source Name	Girubari Khola at 2 locations (one gravity, other pumping), Pathar Khola and Betai Khola
	Source Type	Stream
	Source Location	Hupsekot (Ward 5 Girubari gravity atSatakon),Ward 4 Girubari pumping), Pathar Khola Ward 4, Betai Khola Ward 2
	Source Discharge (lps)	Plenty (more than required) Girubeni 40 lps, Betai 10 lps Pather khola 12 lps & Sumpwell (seepage of Girubeni khola, plenty)
	Tapped Discharge (lps)	50 lps (Girubari gravity 26lps, Girubari pumping- 20hr a day 11lps, Patharkhola 8lps, Betai khola 5lps)
8	Type of Structures	
a)	Water Supply Components	
	Proposed intakes	Stream Intake - 1 (Girubari existing rehab) Stream/ seepage water - 1 (Girubari khola; sumpwell well) Stream intake - 1 (Pathar khola, existing rehab.) Stream intake - 1 (Betai khola, existing rehab)
	Water treatment plant	Rapid mixture - Flocculator-Sedimentation-Roughening - Slow sand filter-Desinfection Rapid mixture - 2 location (Dihidanda & Shivalaya) Flocculator- 2 locations (Dihidanda & Shivalaya) Sedimentation tank - 1 location (Dihidanda) + existing 2 location (rehab) Roughening filter - 1 location (Dihidanda) + existing 2 location (rehab) Slow sand filter - 1 location (Dihidanda) + existing 2 location (rehab) Disinfection - 2 locations
	Pumping Details	Single stage 25HP submersible pump to pump 11 lps from Girubari Sumpwell/ intake. Transformer 50KVA and generator-50KVA
	Ground Reservoir (No and Capacity in CUM)	RVT1: 400cum – 2 nos. (Dihidanda) RVT 2: 400cum – 1 no. (Shivalaya) (Total capacity 1,200 cum)
	Pumping Chamber/Sump for pumping	
	Valve Chamber (Bricks/ RCC)	45 Nos
	Pipe valve box	62 Nos
	IC/BPT	
	Office Cum GH (O1) /Guard House (G 1) / Small Guard House (G2) /Dosing House (DS), Generator House, Boundary wall	WUSC office-1 no (bazaar area land to be provided by WUSC) Guard house (GH1) – 1 no (at sumpwell site) Guard house with store room (GH2) – 2 nos (RVT-1 Dihidanda and RVT-2 site Shivalaya) Dosing station- 2 nos (RVT-1 and RVT-2 site)

SN.	Items	Description
		Generator house - 1 no. (sumpwell site) Boundary wall – 4 locations
	Fire Hydrant (Nos)	5
	River crossing (Nos)	16
	Length of pipe in transmission main (from various intake to WTP/ RVT), (m)	13,453.00
	Length of Distribution Mains (m)	149,964.00
	Number of DMAs	7
	Number of HH connection	3,652
	Number of connections for institution	39
b)	Sanitation Components	
	Public Toilets	2 nos.
	Institutional Toilets	2 nos.
	Tractor	1
9	Total Cost of WS Component (Inclusive of all) NRs.	889,958,368.07
10	Cost Sharing Arrangement (NRs)	
	GON Component (70 %)	622,970,857.65
	TDF Loan (25 %)	222,489,592.02
11	WUSC's upfront (Cash contribution 5%)	44,497,918.40
12	Tariff	
	Up to 6 cum/monthly (NRs)	35
	7 to 10 cum/monthly (NRs)	45
	11 to 20 cum/monthly (NRs)	55
	21 to 30 cum/monthly (NRs)	65
	>30cum	75
	Institutional cum/month (NRs/ cum)	75
	Weighted av. Tariff (NRs./HH/month)	989 (NRs. 60.93/cum)
13	Financial Indicators	
	EIRR (Base case), %	23.50
	FIRR (Base case), %	21.50
	AIFC (Base case), NRs per cum	21.11
	AIEC (Base case), NRs per cum	28.25
14	Environment	
	ADB Category	B, Only IEE necessary
	IEE finding	No significant adverse impacts
15	Per Capita Cost for W/S component	
	Per Capita Cost (for base year pop.), NRs	39,057.24
	Per Capita Cost (for design year pop.),NRs	27,665.95

SN.	Items	Description
16	Total cost of Sanitation Component (including all), NRs	12,255,156.81
	GON Component (85 %)	10,416,883.29
	Local Authority (15 %)	1,838,273.52
17	Total cost of Water Supply and Sanitation Component, NRs	902,213,524.88

Source: DEDR, 2019

V. DESCRIPTION OF THE ENVIRONMENT

A. Physical Environment and Resources

i. Landforms and Topography

128. It falls under Inner Terai Valleys of Nepal which are part of the Terai-Duar-savanna and grasslands ecoregion. Moreover, it belongs to Inner Central Terai i.e., Chitwan valley. The project area lies between 27° 74' 0" N Latitude and 83° 98' 0" E Longitude. Hence, topographically, the project town Hupsekot lies in the inner Terai region and Gandaki Province (Province 4) of Nepal.

ii. Geology and Soils

129. The project area comprises mainly sandstone, feldspar and Lithic fragments (comprises (6 to 35) % of Siltstone, sandstone, shale and carbonate lithics). Basically, the subsurface lithology is composed of boulder, cobble, pebble, gravel and sand with intercalation of clays as well as detritus of quaternary age.

iii. Climate

130. The climate of the project area is mild and generally warm and temperate. In winter, there is much less rainfall in Nawalpur than in summer. This location is classified as Cwa by Köppen and Geiger. The average annual temperature at Nawalpur is 24.2 °C. In a year, the average rainfall is 1811 mm, which is higher than 1400 mm, the average precipitation of Nepal. The nearest climatological station no. 0704 is situated at Beluwa, Girubari.

iv. Water Resources

131. The project town is rich in water resources. This includes Rohini Khola, Soti Khola, Ramkot Kholsi, Badahare Kholsi, Chepari Gaira Kholsi, Girubari Khola, Betai Khola, Pathar Khola, Gaida Pakha Khola and Kuhi Khola. Among these available sources, Girubari Khola, Betai Khola and Pathar Khola shall be used for the proposed project. Similarly, people of the project town also rely on hand pumps, tube wells, kuwa & water harvesting available within their area.

v. Air Quality

132. Air pollution is caused by fugitive dust from vehicle movements, particularly over unpaved roads and other unpaved grounds, construction activities, and wind action on unpaved exposed surfaces. Gas emissions generally comes from household cooking, open burning, and moving vehicles. Emissions from these sources are scattered/spread apart, both in terms of locations and timing. Though there is a lack of secondary information on air quality for the project area, the ambient air quality is expected to be within the National Ambient Air Quality Standards of Nepal as there are no such big industries and the traffic volume is also very low.

vi. Acoustic Environment

133. The sources of noise in the project town are the construction activities and vehicle movement. The anthropogenic noise is confined in few clustered settlements and in market

places. Noise levels in the project area are expected to be within permissible standards prescribed by the Ministry of Environment of the GoN.

B. Ecological Resources

i. Flora

134. The major plant life forms species available in the project area are given in **Table V-1** below:

Table V-1: Plant Life Forms Found in the Project Area

Local name	English Name	Botanical Name	Life Forms
Aank	Giant Milkweed	<i>Calopttris gigantea</i>	Shrub
Amala	Indian Gooseberry	<i>Pbyllantus emblica</i>	Tree
Bakaino	China Berry	<i>Melia azedarach</i>	Medium Sized Shrub or Tree
Barro	Bedda Nut Tree	<i>Terminalia bellirica</i>	Tree
Bayer	Indian Plum	<i>Zizyphus mauritiana</i>	Tree
Bot Dhaiyanro	Small Flowered Grape Myrtle	<i>Lagerstroemia parviflora Roxb.</i>	Tree
Bhalayo	Charoli Nuts	<i>Busbanania latifolia</i>	Tree
Bhimsenpati Jhar	Three Leaf Isodon	<i>Isodon ternifolia</i>	Shrub
Chhatiwan	Blackboard Tree	<i>Alstonia scbolaris</i>	Tree
Dabdabe	Garuga	<i>Garuga pinnata</i>	Tree
Damaikath	Colicwood	<i>Myrsine sp.</i>	Tree
Dhatrung	Chamror	<i>Ebretia laevis</i>	Tree
Dhurseli	Indian Squirrel Tail	<i>Colebrookea oppositifolia</i>	Shrub
Dudhkhirro	Indrajao	<i>Holarrbena pubescus</i>	Tree
Harro	Chebolic Myrobalan	<i>Terminalia chebula</i>	Tree
Jamun	Black Plum	<i>Syzygium cumini</i>	Tree
Kadam	Burflower-Tree	<i>Anthocephalus cbinensis</i>	Tree
Khayer	Cutch Tree	<i>Acacia catechu</i>	Tree
Kumbhi	Slow Match Tree	<i>Careya arborea</i>	Tree
Kuro	Cristed Phillippine Violet	<i>Barleria crsitata</i>	Shrub
Kutmiro	Meda	<i>Litsea monopetala</i>	Tree
Kyamun	Rai Jamun	<i>Cleistocalyx operculatus (Syzygium nervosum)</i>	Tree
Lahare gayo	Spinous Kino Tree	<i>Bridelia retusa</i>	Tree
Latikath	Oblong-Petal Dogwood	<i>Swida oblonga</i>	Tree
Nim	Indian lilac	<i>Azadiracbta indica</i>	Tree
Palans	Bastard Teak	<i>Butea monosperma</i>	Tree

Local name	English Name	Botanical Name	Life Forms
Rajbrikshya	Golden Shower	<i>Cassia fistula</i>	Tree
Sal	Sal	<i>Shorea robusta</i>	Tree
Sandan	Chariot Tree	<i>Desmodium oojeinense</i>	Tree
Satisal	Indian Rosewood	<i>Dalbergia latifolia</i>	Tree
Saj	Indian Laurel	<i>Terminalia alata</i>	Tree
Sindure	Monkey Face Tree	<i>Mallotus philippensis</i>	Tree
Sisau	North Indian Rosewood	<i>Dalbergia sissoo</i>	Tree
Tantari	Karmal (Dog Teak)	<i>Dillenia pentagyna</i>	Tree

Source: IEE Field Study, 2018

ii. Fauna

135. 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-2: Mammals in the Project Area

S. No.	Scientific Name	English Name	Local Name	Status
1	<i>Herpetes auropunctatus</i>	Small Indian Mongoose	Nyauri Musa	LC
2	<i>Macaca mulatta</i>	Rhesus Monkey	Rato Badar	LC
3	<i>Felis Chaus/Prionailurus bengalensis</i>	Jungle Cat	Ban Dhade	LC
4	<i>Funambulus Pennantii</i>	Five Stripped Palm Squirrel	Paanch Dharke Lokharke	LC
5	<i>Canis lupus</i>	Gray Wolf	Bwanso	LC
6	<i>Panthera pardus</i>	Common Leopard	Chituwa	VU*
7	<i>Rattus Rattus</i>	House Rat	Musa	LC
8	<i>Vulpes Bengalensis</i>	Bengal Fox	Fyauro	LC
9	<i>Canis aureus</i>	Golden Jackal	Syaal	LC
10	<i>Cynopterus sphinx</i>	Greater Short Nosed Fruit Bat	Chamera	LC

Source: Field Survey, 2018

136. According to the local people, local and migratory birds are found within the project area. However, none of these are protected or endangered. Species The commonly found species of birds are given in the table given below:

Table V-3: List of Birds in the Project Area

S. No.	Scientific Name	English Name	Local Name	Status
1	<i>Aethopyga Siparaja</i>	Crimson Sun Bird	Sipraja Bungechara	LC
2	<i>Amaurornis Phoenicurus</i>	White Breasted Water Hen	Sim Kukhura	LC
3	<i>Anas penelope</i>	Eurasian Wigeon	Sindure Haans	LC

S. No.	Scientific Name	English Name	Local Name	Status
4	<i>Anas platyrhynchos</i>	Mallard	Hariyo Tauke	LC
5	<i>Anas strepera</i>	Gadwall	Khadkhade Haans	LC
6	<i>Anthracoceros albirostris</i>	Oriental Pied Hornbill	Kaalo Dhanesh	LC
7	<i>Athene Brama</i>	Spotted Owlet	Kochalgaade Latokoshero	LC
8	<i>Columba Livia</i>	Rock Dove (Blue Rock Pigeon)	Malewa	LC
9	<i>Corvus macrorhynchos</i>	Large Billed Crow	Kaalo Kaag	LC
10	<i>Corvus Splendens</i>	House Crow	Kaag	LC
11	<i>Lophura leucomelanos</i>	Kalij Pheasant	Kalij	LC
12	<i>Cuculus Canorus</i>	Common Cuckoo	Cuckoo Koili	LC
13	<i>Cuculus Micropterus</i>	Indian Cuckoo	Kafal Pakyo	LC
14	<i>Dendrocopus Macei</i>	Fulvous breasted Woodpecker	Kaasthakut	LC
15	<i>Dendrocygna javanica</i>	Lesser Whistling Duck	Silsile	LC
16	<i>Egretta Garzetta</i>	Little Egret	Sano Seto Bakulla	LC
17	<i>Eudynamys Scolopaceus</i>	Western (Asian) Koel	Koili	LC
18	<i>Francolinus Francolinus</i>	Black Francolin	Titra	LC
19	<i>Hirundo Rustica</i>	Barn Swallow	Ghar Gauthali	LC
20	<i>Megalaima haemacephala</i>	Coppersmith Barbet	Milchara	LC
21	<i>Megalaima lineate</i>	Lineated Barbet	Kuthurke	LC
22	<i>Merops Leschenaulti</i>	Chestnut Headed Bee Eater	Katus Tauke Murali Chara	LC
23	<i>Milvus Migrans</i>	Black Kite	Kalo Chil	LC
24	<i>Passer Domesticus</i>	House Sparrow	Ghar Bhangera	LC
25	<i>Passer Montanus</i>	Eurasian Tree Sparrow	Rukh Bhangera	LC
26	<i>Psittacula cyanocephala</i>	Plum headed Parakeet	Tuisi Suga	LC
27	<i>Streptopelia orientalis</i>	Oriental Turtle Dove	Dhukur	LC
28	<i>Upupa epops</i>	Common Hoopoe	Fapre Chara	LC

Source: IEE Field Study, 2018

137. 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.

138. The commonly found Herpito-fauna (reptiles & amphibians) observed in the project area are shown in **Table V-4** given below:

Table V-4: List of Herpito-Fauna Found in the Project Area

S. No.	Scientific Name	English Name	Local Name	Status
1	<i>Ptyas mucosus</i>	Rat snake	Dhaman	LC*
2	<i>Atretium Schistosum</i>	Olive Keelback Water Snake	Pani Sarpa	LC
3	<i>T. albolabris</i>	Green Pit Viper	Hariyo Sarpa	LC*
4	<i>Varanus Bengalensis</i>	Common Indian Monitor	Bhainse Gohoro	LC
5	<i>Calotes versicular</i>	Garden lizard	Chheparo	LC*

S. No.	Scientific Name	English Name	Local Name	Status
6	<i>Hemidactylus Flaviviridis</i>	House Lizard	Mausuli	LC*
7	<i>Bufo melanostictus/Duttaphrynus Himalayanus</i>	Common toad/Himalayan Toad	Khasre Bhyaguto	LC
8	<i>Rana cyanophylectis</i>	Stream Frog	Bhyaguto	LC*

Source: IEE Field Study, 2018

iii. Aquatic Life

139. Similarly, the list of common fishes found in the project area is given below in **Table V-5**. These species are found in the nearby water bodies of the project area that includes Girubari Khola, Betai Khola, Pathar Khola, Gaida Pakha Khola and Kuhi Khola.

Table V-5: List of Fishes Found in the Project Area

S. No.	Scientific Name	English Name	Local Name	Status
1	<i>Amblyceps mangois</i>	Indian Torrent Catfish	Bokshi Machho	LC
2	<i>Amphipnous cuchia</i>	Blind Fish	Andha Bam	LC
3	<i>Barilius barna</i>	Barna Baril	Titir Kani Phaketa	LC
4	<i>Chagunius chagunio</i>	Chaguni	Jarua	LC
5	<i>Channa Gachua</i>	Dwarf Sankehead	Hile	LC
6	<i>Clarias batrachus</i>	Walking Catfish	Mangur	LC
7	<i>Clupisoma garua</i>	Garua Bachcha	Jalkapoor	LC
8	<i>Garra Annandalei</i>	Stone Roller	Chuche Buduna	LC
9	<i>Heteropneustes fossilis</i>	Stinging Catfish	Singhi	LC

Source: IEE Field Study, 2018

140. 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

141. As per The Proximity Report on Hupsekot Town generated by ADB (**Refer Appendix 4**), 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

142. The field study shows that major project components does not encroach into any of the community forests of the project area. 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 the forest areas.

C. Socio-economic and Cultural Environment

i. Settlement pattern

143. The settlement pattern of project area is mixed type. The core bazaar area(Jhyalbas) which is located in ward no. 4 is quite dense and populated than other wards of the Hupsekot Rural Municipality. Similarly, settlement pattern of the other wards (1, 2 and 3) are semi urban type and is quite scattered. However, the settlement pattern is gradually changing and rural cluster are developing as market. The rate of migration into service area from surroundings villages and from other districts is increasing during few years.

ii. Caste & Ethnicity

144. The composition of community by caste/ethnic is heterogeneous in nature. So, diversity of culture, custom, tradition, norms and values exists in this project area. The household survey of the sub project area has also reflected the cross section of major ethnic groups of the country.

145. The survey revealed that out of total 3652 households, Janajati/ethnic (Tamang, Danuwar, Magar, Newar, etc.) are major group comprising of 64.20% (2346) households in the service area. Similarly, Brahmin/Chhetri are the second largest group comprising of only 19% (695) of total household whereas, Dalit comprises 16.30% (595). And, the minimal percentage i.e., 0.4% (16) belong to other castes groups (Muselman, Madhesi). Details of information are presented in the table given below:

Table V-6: Distribution of Households and Population by Ethnic Composition

S.N.	Caste/Ethnic composition	Ward #				Total	%
		1	2	3	4		
1	Brahmin/Chhetri	124	91	439	41	695	19
2	Janajati	902	206	932	306	2346	64.2
3	Dalit	185	131	259	20	595	16.3
4	Others (Muselman, Madhesi)	4	4	7	1	16	0.4
	Grand Total	1215	432	1637	368	3652	100

Source: Socio-economic Survey, 2018

iii. Population and Demographic Characteristics

146. The project area has been delineated in consultation with WUSC, the local community, Chairman of Rural Municipality. As per social survey, total HHs and population are 3,652 and 21,601 (permanent 19,347 and rental 2,254) respectively in 2018 with average family size of 5.3.

147. The service area comprises of merging Hupsekot VDC, Deurali VDC's ward and Dhaubadi VDCs wards. Based on the available record and census data, the growth rate of the service area is ranging from -1.2% to 1.93% based on the population between 2001 to 2011 of the VDCs. Whereas, the population growth of Nawalparasi district is 1.35% between 2001 and 2011 and is in decreasing order. Based upon these figures, the average growth rate of the service area is taken as 2.0%. The population and growth rate of Nawalparasi District and Hupsekot Rural Municipality are shown in **Table V-7** and **Table V-8**.

Table V-7: Population and Growth Rate

SN	District	2011		2001		Growth Rate
		POP	HHs	POP	HHs	
1	Nawalparasi	643508	128793	562870	98340	1.35

Table V-8: Population and Growth Rate of Hupsekot Rural Municipality

SN	NEW WARD	COMBINED VDC/MUNICIPALITY(NEW)	2011		2001		Growth Rate
			POP	HHs	POP	HHs	
1	1	Deurali (5)	2099	493	1734	323	1.93
2		Dhaubadi (2)	1944	374	1661	304	1.59
3	2	Deurali (1, 2, 9)	4392	828	3805	646	1.45
4	3	Deurali (3, 4)	4721	937	3903	675	1.92
5	4	Deurali (6, 7)	3092	542	2798	385	1
6		Dhaubadi (7)	2514	447	2177	323	1.45
7	5	Deurali (8)	1095	175	1113	138	-0.16
8	6	Dhaubadi (1, 3-6, 8, 9)	1527	240	1723	214	-1.2
9		Hupsekot (1-9)	3681	552	3464	505	0.61
TOTAL			25065	4588	22378	3513	1.14

Source: CBS, 2001 and 2011

148. As per socioeconomic survey (2018), the present population in the proposed service area is 21,601 in 3,652 HHs. Out of the total 19,347 permanent population, there are 9783 male and 9,564 females living in 3,652 HHs. The forecasted populations of the town are 22,786 and 32,168 in 2021 and 2040 respectively with growth rate of 2.00 % in permanent population. The rental population has been kept flat throughout the project period and is included in above figures

149. The population growth rate percentage of the project area is determined based upon population census 2001 AD, 2011AD of the Nawalparasi district, former Deurali VDC, Dhaubadi VDC and Hupsekot VDC and proposed service area. This has been consulted with WUSC.

iv. Education and Health

150. **Education:** There are various educational institutions in the project town. According to the institutional data obtained from the survey, 8 educational institutions including higher secondary schools , secondary schools as well as primary schools in service area with 2,858 people including students (Total: 2,698, Male: 1,292, Female:1,406) , staffs (Total:15, Male: 8,

Female:7) and teachers(Total:145, Male:58, Female:87). Almost of all educational institutions are relying on boring water, tap water and other sources. All of these educational institutions have water sealed latrines.

151. **Health:** General medical facilities are available in the service area. There is one health post named Deurali Health Post available within the service area. Similarly, small pharmaceutical stores are also available in Jhyalbaas Bazaar. For further medical services, most of the people prefer going to Kawasoti Municipality (15.9 km from Hupsekot) and Narayanghat, Chitwan (41.90 km from Hupsekot).

v. Waterborne and Communicable Diseases

152. The survey also collected cases of water born diseases such as diarrhea, dysentery, stomach ache and skin disease etc. within the service area. It was found that cases of mortality by water related diseases are nil. The information related to water borne and communicable disease was cross checked by visiting hospital and health posts within the service area. According to the obtained information, about 5.13% (1221) were observed to be suffered from diarrhea where as 4.74% (1128) were observed to be suffered from dysentery. Similarly, about 5.23%(1245) were found to be suffered from other diseases such as skin, stomach pain, fever etc. In total, about 15.10 %(3594) of populations are known to be suffered from the water related diseases.

vi. Economic Activities

153. The survey shows that there are various banks, cooperatives, hotels & lodges within the project area that have been boosting the economic activities of the project town. During the course of household survey of project area, the detailed information on the major occupation and economic activities of all household head has been collected. The survey shows that out of total 3652 households, the highest number of population i.e., 70.29% (2567) are engaged in agriculture, whereas 5.15% (188) population depend on business and 4.98% (182) of population in service. And, only 0.3% (11) are involved in industrial sector. Similarly, about 15.99% (584) and 2.71% (99) are dependent upon remittance and labour respectively. Then, only 0.58% (21) are found to be engaged in other sectors.

vii. Income Level and Poverty Conditions

154. The survey revealed that main sources of household income of the service area are agriculture, service, remittance and wage labour, respectively. Among the total 3652 households, 45.45% (1660) have monthly income of more than Rs. (20,001-50,000) and about 30.64% (1119) have monthly income of Rs. (10,876 - 20,000). Likewise, 8.21% (300) are earning ore than Rs. 50,000. The study shows that only 4.52%(165) falls under poor category that covers the households with income less than Rs 7,500 per month. The monthly income of HHs in the service area is given in table below:

Table V-9: Income Level of Households by Ward

S.N.	Income Level Range	Ward #				Total	%
		1	2	3	4		
1	< NRs. 7,500	64	5	70	26	165	4.52
2	NRs. 7,501-10,875	95	43	241	29	408	11.17
3	NRs. 10,876-20,000	267	200	545	107	1119	30.64
4	NRs. 20,001-50,000	665	177	630	188	1660	45.45

S.N.	Income Level Range	Ward #				Total	%
		1	2	3	4		
5	> Rs. 50,000	124	7	151	18	300	8.21
	Grand Total	1215	432	1637	368	3652	100.00

Source: Socio-economic Survey 2018

D. Existing Situation of the Utilities Associated with this project

i. Existing Water Supply Condition

a) Source to House Connections

155. Initially, two water supply systems were there, namely Deurali and Soti Khola. After joining together, the WUSC named as Deurali Soti Khola WUSC and later on it became Deurali Hupsekot Water Supply and Sanitation Project. There are several sources used in the service area. The system was implemented on 2040 BS and completed on 2047BS with 21 numbers of public tap stands. The system handed over to WUSC on 2055BS. The WUSC had received NRs 25,000.00 during receiving the project from GoN. The system has been expanded several times depending upon the budget available at each time from GoN / or other various agencies. The system is gravity water supply system from intake/ source to WTP/ RVT and distribution system.

156. Because of the fund availability, there are several pipes laid parallel from each source to reservoirs. The water treatment plants (sedimentation, 11.25m x 4.25m x 2.16m), roughening (12.60m x 7.0m x 1.32m) and slow sand filter (11.80m x 10.52 X 2.8m)) are constructed recently at two locations (one for Soti Khola system at Shivalaya and another for Deurali system, Dihidanda) which can be used in new system with some repair works has to be carried out. The one chamber of slow sand filter of Sotikhola system has leakage needs to be repaired. The valves have to be replaced and filter material to be washed and placed again. But the sizes are inadequate for the new system. The size for the new system has to be determined and deficit size has been included in the new system.

157. The private tap distribution has been started on 2060 BS. At present, there are 2,337 private taps in the service area. GI pipes and HH water meter are used in the house service connection. The system supplies water for 24hour from reservoir but each house will get water only 1-2 hour in a day. The upstream house hold closes the tap and downstream house will fetch water though system supplies 24 hours in a day through service reservoir. This is mainly due to less discharge from sources, less capacity of storage reservoir and small sizes of pipes are used in the distribution system without any design consideration.

158. The WUSC has 10 regular staffs to regulate the system. They are enjoying with provident fund, medical facilities, overtime payment, Dashain allowance, gratuity, payment against balance leave etc. The WUSC has implemented progress water tariff. Minimum water tariff for the consumption of first 10cum is NRs 150.00, then after 10-20 cum consumption apply NRs 17 per cum, 20-30cum consumption apply NRs 20 per cum and more than 30cum consumption apply NRs 28 per cum. They have implemented computer billing system for 5-6 years. Currently, WUSC has about NRs. 423 lakhs in their bank account. That amount is deposited in Muktinath Bank, NCC Bank, Prabhu Bank and Rastriya Banijya Bank. Currently, WUSC shall collect monthly about NRs 5-6 lakhs from water tariff bill.

Currently used source not used in new system:

159. **Rohini Khola/ Rohini Ghari Water Supply System:** It is located in ward no 4. The length of pipe is about 2.5 km from intake to WTP/ RVT. 90mm pipe has been used. It is reported that the water has lime content and source will drying up during summer. Hence, this source is not used for the new system.

160. **Soti Khola Water Supply System:** It is located in ward no 4. The length of pipe is about 3.0 km from intake to WTP/ RVT. 75mm and 32mm pipe have been used. The source is said to dry up during summer. Hence, this source is not used for the new system.

161. **Ramkot Kholsi Water Supply System:** It is located in ward no. 4. The length of pipe is about 3.0 km from intake to WTP/ RVT. 75mm dia. 2 nos parallel pipe have been laid. The water has lime content and the source is reported to dry up during summer. Hence, this source is not used for the new system.

162. **Badahare Kholsi Water Supply System:** It is located in ward no 4. The length of pipe is about 1.50 km from intake to WTP/ RVT. 40mm dia pipe have been laid. The water has lime content and the source is said to dry up during summer. Hence, this source is not used for the new system.

163. **Chepari Gaira Kholsi Water Supply System:** It is located in ward no 4. The length of pipe is about 1.50 km from intake to WTP/ RVT. 40mm dia pipe have been laid. The source is said to dry up during summer. Hence, this source is not used for the new system.

Currently used sources used in new system

164. **Girubari Khola Water Supply System:** It is located in ward no 5, Satakon. The length of pipe is about 8.0km from intake to WTP/ RVT (Dehidanda). The low height dam (about 2m height) having gabion and RCC cutoff wall constructed across the river to divert the water into collection chamber. 4 pipes of each 110mm dia HDPE perforated at upper half are laid to receive the water from filter/ gravel and allow into collection chamber. The collection chamber is provisioned with two number of HDPE pipes of 140mm diameter. One pipe is used and another pipe is kept spare. The transmission pipe has 90mm dia and has leakage at several locations and pipe is sliding at kholsa crossing. The pipes are very old and exposed on the ground. Currently, it is supplying about 4-5 lps water. This can be increased with proper construction of intake, addition of collection chamber and resizing the transmission pipe. The source has more than 40 lps discharge. About 26lps is withdrawn from the source in new system.

165. During inception visit, it was observed that the height of RCC wall is enough and existing gabion wall needs to repaired and added. The water is collected upstream of the low height dam. The additional collection chamber is constructed and the number of perforated pipes is increased to extract the water into new and existing collection chambers.

166. The transmission pipe is replaced by new to cater the designed discharge. The transmission pipe size has been chosen to supply water for rainy and summer season to decrease the pumping cost.

167. **Pathar Khola Water Supply System:** It is located in ward no. 4. The length of pipe is about 2.50 km from intake to WTP/ RVT (Shivalaya). The low height dam (about 2m height) having gabion and RCC wall constructed across the river to divert the water into collection

chamber. 3 pipes of each 140mm dia HDPE perforated at upper half are laid to receive the water from filter and allow into collection chamber.

168. The collection chamber has 140mm dia HDPE pipes and breakdown into 90mm 90mm 63mm dia pipes to reach water into WTP/ RVT. Currently, the perforated pipe is clogged and water is directly supplied into collection chamber. The transmission pipe has leakage at several locations. The pipes are very old and exposed on the ground. The source has more than 12 lps discharge. About 8 lps is withdrawn from the source in new system with proper rehabilitation of intake and replacement of pipe in the transmission main.

169. During field visit, it was observed that the height of RCC wall is enough. The existing collection chamber is rehabilitated and the number of perforated pipes is increased to extract the water into collection chamber. The transmission pipe is replaced by new to cater the design discharge. The transmission pipe size is chosen slightly higher to supply more water during rainy season and summer season to decrease the pumping cost.

170. **Betai Khola Water Supply System:** It is located in ward no. 2. The length of pipe is about 2.50 km from intake to WTP/ RVT (Dehidanda). The intake is safe and need RCC cutoff wall, some gabion works for side protection. 3 pipes of each 63mm, 63mm and 75mm pipes are laid parallel in transmission main. The pipes are exposed above ground and crossing from suspension bridge of Girubari Khola to reach water into WTP/ RVT. The transmission pipe has leakage at several locations. The pipes are very old and exposed on the ground. The source has more about 10 lps discharge. About 5lps is withdrawn from the source in new system with reconstruction of intake and replacement of pipe in the transmission main.

171. The survey revealed that largest numbers of household about 81.4% (3277) and 12.4% (500) are fetching water from private taps and public taps from the existing water supply system respectively. Whereas, minimum numbers of households rely on well/ spring/ stream/ rain water harvesting etc. All households reported that they use same source of water for all purposes as drinking, cooking, bathing, washing clothes, watering in kitchen garden etc. There is treatment plant in existing systems but it is not well functioning and size is not enough. Hence, the water is directly supplied into RVTs and distributed in the service area.

b) Consumption Level

172. The survey team has collected the information related to water consumption level during dry and wet season in the service area. Due to use of water from private/ public tap and well, spring, dhungedhara, consumption pattern and quantity do not vary between two seasons.

173. The survey revealed that the water consumption level of each household is found to be 199 liters per day and spent total time of about 42.4 minutes (per trip about 8.5 minutes) to fetching water. Similarly, the total trips for collections of water are about 7.1 trips daily. The per capita per day consumption is about 37 liters per day.

c) Operation costs and current Tariff

174. There is existing piped water supply system. In addition, the communities are dependent in hand pump, tube well, kuwa, pond etc. The communities are ready to pay handsome amount for piped water for the proposed water supply and sanitation project. They are aware of the quality of supplied water and economic in comparison to the water rate of

vender. Hence, the communities are ready to pay the water tariff reasonably fixed by the committee.

175. Now, they are fetching water through khola, hand pump, kuwa, where the tapped aquifer is easily susceptible to pollution and contamination. As there is hardship of water during dry season, quality of water is not good and found polluted, they are ready to pay whatever may be the tariff only they need water in sufficient quantity.

176. Currently, the WUSC is collecting minimum water tariff for the consumption of first 10cum is NRs 150.00, then after 10-20 cum consumption apply NRs 17 per cum, 20-30cum consumption apply NRs 20 per cum and more than 30cum consumption apply NRs 28 per cum. This shows that the community is familiar with water tariff and ready for that.

d) Problems of the Existing System

177. The problems of the existing water supply system in Hupsekot Rural Municipality are as follows:

- The existing water treatment components requires repair and maintenance.
- The intermittent supply system of the existing water supply system is not sufficient to meet the water demand of the increasing population;

ii. Existing Sanitation Situation

a) Sanitary Facilities

178. The survey shows that out of total 3652 households, about 95% (3469) have water sealed latrine where as 2.3% (25) of total households have pit latrines. About 0.7% (25) have ventilated pit latrines whereas, 0.1% (2) of total households are using cistern flush type of latrine. The table below gives the information regarding the availability of the latrine facility within the project area.

Table V-10: Coverage of sanitary facilities

S.N.	Type of Toilet	Ward #				Total	%
		1	2	3	4		
1	Pit Latrine	55	6	15	7	83	2.3
2	Ventilated Pit Latrine			17	8	25	0.7
3	Water Seal/Pour Flush	1149	422	1553	345	3469	95.0
4	Cistern Flush Latrines	1			1	2	0.1
5	Others	1				1	0.0
6	No Toilet	9	4	52	7	72	2.0
	Grand Total	1215	432	1637	368	3652	100.0

Source: Socio-economic Survey 2018

b) Drainage Facilities

179. There is provision of storm water drain along the main market area at both side of road. The service area is located in mild slope terrain, hence, there is no water logging problem foreseen. The WUSC has not prioritized to construct storm drainage at this stage.

c) Wastewater Management Practices

180. Almost all households in the urban areas have their own latrine with septic tanks. Similarly, private toilet with septic tank has been constructed in some households in rural area also. Such toilet with septic tank has been constructed in more than 61% HHs of service area. Hence, it is concluded that the people of the service area are much more aware in sanitation.

d) Solid Waste

181. The sampled survey among 210 households revealed that 63.80% (134) are disposing domestic solid waste in the pit near to the house while none of them are disposing their wastes by private collector. Similarly, it is also observed that 36.20% (76) are disposing waste in the waste bin managed by the local authority. It was observed that the respondent have sufficient knowledge about the solid waste management issues that may affect the public health and surrounding environment. The detailed information are given in the table below:

Table V-11: Existing solid waste management practices

S.N.	WASTE MANAGEMENT	Ward				Total	%
		1	2	3	4		
1	Pit Near to House	13	60	46	15	134	63.8
2	Private Collector	0	0	0	0	0	0
3	Waste Bin Managed by VDC/Municipality	9	3	45	19	76	36.2
4	Other	0	0	0	0	0	0
	Grand Total	22	63	91	34	210	100

Source: Socio-economic Survey 2018

iii. **Water Supply and Sanitation User's Association**

182. The project has been conceptualized on community based and participatory approach. Almost one third of the project cost has to be mobilized and shared by the community. The community is responsible for operation and management of the system after handover the project. So, their active involvement in the decision-making regarding project preparation/ design, implementation, operation and maintenance has to be ensured. In this regard, they are represented in project related activities. The WUSC takes necessary decision on behalf of the consumer community, mobilizes necessary fund for project implementation as up-front cash and assists PMO/WSSDO/ICG Engineer for the project implementation. The WUSC makes necessary arrangement after completion of operation and maintenance period of the project.

183. The existing Deurali Hupsekot Water Supply and Sanitation Committee consists of 11 members representing from various clusters within the service area. The executive committee consists of 9 male and 2 female members and none of female member are working in key executive post of WUSC.

184. Initially, the WUSC was formed and registered in 2054 BS in Water Resource Committee, Nawalparasi as per the Water Resource Act-2049 and Water Resource Rule 2050 and involved in management and improvement of the water supply system in Deurali Hupsekot. The existing committee, comprising of 11 members, were formed for the proposed water supply system. This WUSC is registered as per GoN rule and regulation. The Name list and position of the WUSCs are tabulated below:

Table V-12: Name List and Position of WUSC in Deurali Hupsekot WSSP

S.No.	Name	Position
1	Mr. Mek Bahadur Pulami	Chairman
2	Mr. Fagaraj Pandey	Senior Vice Chairman
3	Mr. Guru Prasad Subedi	Vice Chairman
4	Mr. Bhim Narayan Regmi	Secretary
5	Mr. Lal Bahadur Serpuja	Vice-Secretary
6	Mr. Mani Pandey	Treasurer
7	Mr. Nabal Singh Damai	Member
8	Ms. Durga Devi Khanal	Member
9	Ms. Bhagwati Pandey	Member
10	Mr. Shyam Prasad Lamsal	Member
11	Mr. Yam Bahadur Somai	Member

Source: DEDR, 2019

VI. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION/AUGMENTATION MEASURES

185. 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

186. 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

187. 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 minimal percentage 2.71% of total 3652 households have to rely on daily wages. Hence, this project is beneficial to this 2.71% 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.

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

189. 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

190. 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.

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

192. 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

193. 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 5.15% (188) and only 0.30% (11) of total 3652 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.

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

195. 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

196. 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.

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

198. 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.

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

200. 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

201. 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.

202. 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.

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

204. 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

205. 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.

206. The socioeconomic 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 2018, 58% of female are observed to be involved in water fetching & storage and 42% 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 60% of female are involved in taking care of family members especially children and senior citizens.

207. 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-12** given above, two female members are appointed as general members of Deurali Hupsekot Water Supply Users & Sanitation Committee. Though they are not appointed in key positions, their 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.

208. 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 emerging urban areas like Hupsekot Rural 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 society. The proposed project gives emphasis on various activities like stakeholder consultations, meetings etc. to persuade women to actively participate in project related activities.

209. 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.

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

211. 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

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

213. 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-1: 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)

Beneficial Impacts	Impact Rating				
	Nature	Magnitude	Extent	Duration	Rating
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

214. 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.

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

216. 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

217. 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.

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

219. **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

220. 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 agricultural lands as well as the anticipated properties.

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

222. **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

223. 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 (Jhyalbaas Area) and (viii) open burning of solid waste by workers.

224. 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.

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

226. **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

227. 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.

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

229. **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 vehicles
- 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

230. 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 surroundings of busy market areas like Jhyalbaas & Julkepani area. 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.

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

232. **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

233. 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.

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

235. **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

236. 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.

237. 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.

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

239. **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

240. 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.

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

242. 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

243. 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.

244. 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.

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

246. **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

247. The three gravity sources Girubari khola, Betai khola and Pathar 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..

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

249. **Mitigation Measures;** The study shows that as per the design report, the quantity of water to be tapped from the proposed sources will be 26 lps from Girubari Khola, 5 lps from Betai Khola and 8 lps from Pathar Khola. Hence, the combined tapped discharge of these three rivers is 39lps. Similarly, there is also provision of pumping system from Girubari Khola with 11lps tapped discharge, to be extracted for the proposed system. 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

250. Major project components does not interfere any of the forest areas. Hence, there will be no such effect on the existing flora & fauna. However, there may be requirement of clearing of some bushes and shrubs along the proposed pipeline alignment i.e, from sump well to WTP sites. The study shows that there is no requirement of cutting trees. Similarly, during pipe laying works, some of the top soil may be lost. As some portion of transmission mains pass through vegetated areas, during pipe laying works, the noise of construction activities may affect the faunas living nearby these areas.

251. Haphazard site clearing, parking, and movement of construction vehicles and equipment, stockpiling results in unnecessary loss of vegetation & fauna beyond Project footprints.

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

253. 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

254. 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.

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

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

257. **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

b) Operation Phase

1) Impact on Aquatic Life

258. 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.

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

260. **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

a) Construction Phase

1) Impacts on Water Quality of the nearby rivers

261. During construction phase, there is high possibility of water resources to be polluted due to the chance of disposal of solid wastes by the workers and poor sanitation behavior of the workers. This lowers the water quality of these water bodies. Polluted water bodies is 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.

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

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

264. **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

265. 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.

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

267. **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

268. 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.

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

270. 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

271. Hupsekot Rural Municipality belongs to hilly region as it falls under inner terai region, hence, it is prone to natural calamities like Soil Erosion, Landslides etc.. Though this impact is experienced during operation phase, this needs to 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.

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

273. ***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

274. 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.

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

276. 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

277. During construction phase, if the proposed pipelines interfere any of the existing utilities, there is greater possibility of those utilities 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.

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

279. 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

280. 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.

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

282. 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

283. 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. If the construction works are carried out during monsoons, if there is occurrence of flooding events, this may pose threats to the occupational (worker's) health & safety hazards.

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

285. **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

286. The project town may be susceptible to traffic congestion during transportation of construction materials, construction of public toilets & institutional toilets at proposed market areas as well as pipeline laying works that may provide discomfort to the passer-by & shopkeepers and may obstruct the daily activities of the people living in that area .

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

288. 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 especially Jhyaalbaas Area, the sample of which has been attached in **Appendix C**.

4) Public Protests

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

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

291. **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

292. 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.

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

294. **The mitigation measures for this impact include:**

- Adopt "zero soil" approach thorough prompt backfilling right after completion of drain construction. In general, execution of excavation works is such that excavation 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

295. 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.

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

297. **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

298. The terai region of Nepal suffers great loss from the flooding events yearly. Though various flash flood events were recorded in Parasi district in the past, the project district, Nawalpur, despite of being neighbourood district, there are no such events recorded so far. But, we cannot ignore the fact that there is possibility of occurrence of such events in the future within 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.

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

300. **The mitigation measures for this impact include:**

- After every flooding event if any, the contractor must conduct engineering investigation of built structures and implement the necessary corrective actions immediately as a mitigation measure for this impact.
- Avoid construction works during monsoons
- Prepare & Follow Emergency Preparedness and Response Plan

8) Damage to the existing utilities

301. 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.

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

303. **The mitigation measures for this impact include:**

304. 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.

305. 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

306. During construction works at Intake/Sump Well 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.

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

308. **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

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

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

311. The mitigation measures for this impact include;

- (i) installation of clear, visible signage in premises on safety measures; and (ii) setting up a mechanism for the quick response to spills of chemical and hazardous substances.

2) Delivery of Unsafe Water

312. 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.

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

314. The mitigation measures for this impact include;

(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 7** will be followed.

3) Impacts on Consumer's Health

315. 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.

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 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

318. 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.

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

320. **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 Girubari Khola, Betai Khola and Pathar Khola has more than 40lps, 12 lps and 10 lps flow. The design report also explains that the quantity of water to be tapped from the proposed sources are 26 lps from Girubari Khola, 5 lps from Betai Khola and 8 lps from Pathar Khola. Hence, the combined tapped discharge of these three rivers is 39lps. Similarly, there is also provision of pumping system from Girubari Khola with 11lps tapped discharge, to be extracted for the proposed system. This shows that the tapped discharge 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

321. 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) Lack of Sense of ownership & Affordability; (ii) Lack of Institutional Capacity & Policy Compliance and (iii) Ineffectiveness in O & M.

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

323. 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

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

Table VI-2: 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 (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)

Adverse Issues	Impact Rating				
	Nature	Magnitude	Extent	Duration	Rating
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)
ii) Operation Phase					
Impacts on the proposed source	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 Community & Workers	ID	M (20)	L (20)	LT (20)	Significant (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)

Adverse Issues	Impact Rating				
	Nature	Magnitude	Extent	Duration	Rating
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 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

325. 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-2** 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. Significance of Impact Rating

326. 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.

327. 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

328. 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

329. "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.

330. The study shows that there is provision of water treatment plant in the existing water supply system. However, it requires repair due to leakage problems. Similarly, apart of public & private taps, people of the project town are dependant on well/ spring/ stream/ rain water harvesting etc. where the tapped aquifer is easily susceptible to pollution and contamination. 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 continuous consumption of unreliable water. This results in the health hazards in the project area that will in turn expose the surroundings to environmental problems.

331. There are various but small existing water supply systems. The existing water supply systems within 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 compels 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, Dysentery etc. This may in turn result in various environmental problems.

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

333. 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.

334. Beside 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 is irrational to ignore the hardship that locals of this project town are facing for safe, reliable and potable water. Hence, 'Do-Nothing' alternative is the 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

335. With Project Alternative was also analyzed by envisaging the likely benefits of the proposed project. The analysis shows that the proposed sub project is the best alternative to overcome the aforementioned threats that is likely to occur in the absence of this subproject. With the Subproject alternative, 21,601 (including rental 2,254) populations (2018) is benefitted from adequate, safe, reliable and potable water supply & sanitation service. In overall, the 'with subproject alternative' brings about the improved public health and living environment that will contribute to improved quality of life in the project municipality.

336. Hence, the 'with project' alternative contributes 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.

337. Along with this, the limitation of "Without Project" Alternatives continuous water supply system, treatment system and susceptibility to water borne diseases leads to choose "With Project" Alternative. The proposed sub project is 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.

B. Alternatives Relative to Planning and Design

338. As per Feasibility Study Report by PPTA team, the system design for the town has been done under two scenarios. The optimization of a proposed water supply system can be done regarding system layout, alternative technology, alternative materials and alternative source. In case of Deurali Hupsekot WSSP, the development of system alternatives has been done using alternative source and additional service areas.

i. Alternative Sources

339. Various alternative sources are available in the nearby vicinity to meet the overall demand for this project. The alternative I uses (i) three gravity sources that includes Girubari khola, Betai khola and Pathar khola with combined discharge 39 lps and (ii) one pumping source i.e., Girubari Khola with 12 lps discharge. The alternative II uses (i) three gravity sources that includes Girubari khola, Betai khola and Pathar khola with combined discharge 39 lps; (ii) one pumping source i.e., Girubari Khola with 12 lps discharge and (iii) two sources that includes Chapaha 1lps (Gaida Pakha Khola) and Sankhadev 5lps (Kuhi Khola).

ii. Alternative Design

340. The environmental issues can be a deciding factor to choose the best alternative design among the list of alternatives. The design of both proposed alternatives is environmentally

sound. In both alternatives, the structures from Girubarikhola, Betai khola, Patharkhola and Girubari pumping to Girubari WTP/ RVT site remain the same. The total estimated transmission pipe line length from Girubarikhola, Betai khola, Patharkhola and Girubari pumping to Girubari WTP/ RVT site is about 14,077.00m in both alternatives. The main difference between the proposed alternatives is the use of sources and additional service areas. Both alternatives are briefly discussed below:

a) *Alternative I: Supply Water from Three Gravity Sources and One Pumping Source*

341. The three gravity sources Giruari khola, Betai khola and Pathar khola has combined discharge 39lps and Girubari khola pumping has 12lps discharge to be extracted for the new water supply system. The designed discharge is brought to the proposed WTP and RVT location and distribute the water to the distribution system by gravity. The necessary treatment plant, service reservoir and other structures are designed as needed. The water treatment system is based on quality of water of the source.

342. The total estimated transmission pipe line length from Girubarikhola, Betai khola, Patharkhola and Girubari pumping to Girubari WTP/ RVT site is about 14,077.00m. Separate transmission line is provisioned for each source. The transmission line alignment is stable. This alternative covers 3,652 HHs of the service area.

b) *Alternative II: Supply Water from Three Gravity Sources, One Pumping Source and Other Two Gravity Source in New Service Area*

343. The three gravity sources Giruari khola, Betai khola and Pathar khola has combined discharge 39lps and Girubari khola pumping has 12lps discharge to be extracted for the new water supply system. The designed discharge is brought to proposed WTP and RVT location and distribute the water to the distribution system by gravity. The necessary treatment plant, service reservoir and other structures are designed as needed. The water treatment system is based on quality of water of the source.

344. The total estimated transmission pipeline length from Girubarikhola, Betai khola, Patharkhola and Girubari pumping to Girubari WTP/ RVT site is about 14,077.00m. In addition, other two sources are added for Chapaha 1lps (Gaida Pakha Khola) and Sankhadev 5lps (Kuhi Khola) service area. The area is scattered and does not match the criteria of UWSSP. The transmission main for Sankhadev settlement is about 17,610.00m. Separate transmission line is provisioned for each source. The transmission line alignment is stable. This alternative cover 4,024 HHs of the service area.

iii. Selected Alternative Scheme

345. Environmentally, they are not much different and both of the alternatives have no such environmental issues too.

346. Depending upon the location, alternative I needs treatment plant at two location for total discharge i.e. 51lps. There is existing treatment plant for 10lps flow. New additional treatment plant is required for the remaining flow. In addition, in alternative I, one set treatment plant is constructed for Chapaha and other set will be constructed for Sankhadev. Both settlements are rural nature. Hence, based on the location, settlement pattern, sources to be used, alternative I is better than alternative II.

347. Major structures are provisioned at only two locations in alternative I, where in alternative II separate reservoirs and infrastructure are proposed at additional 9 locations. Hence, security threat is more in alternative II than in alternative I. Similarly, the transmission length in alternative II is more than alternative I and it requires additional precautions for its safety. Similarly, the additional service area of the alternative II is scattered and not match the criteria of UWSSP.

348. The financial indicator also indicates that the affordability percentage of the source alternative I and II is almost same. The affordability is in between 3%-5% in alternative I and II. Financially, in risk factor, both alternatives are similar despite of feasibility of both alternatives. Alternative I is recommended for the detailed design because of the reliability of source, transmission line route and safety precaution issues.

349. This indicates that the Alternative II is unfeasible option for the project town as per technical assessment. Hence, Alternative I has been selected as the best feasible alternative as this alternative is technically, environmentally and financially feasible.

350. The schematic diagram of the recommended alternative is given in the figure as follows:

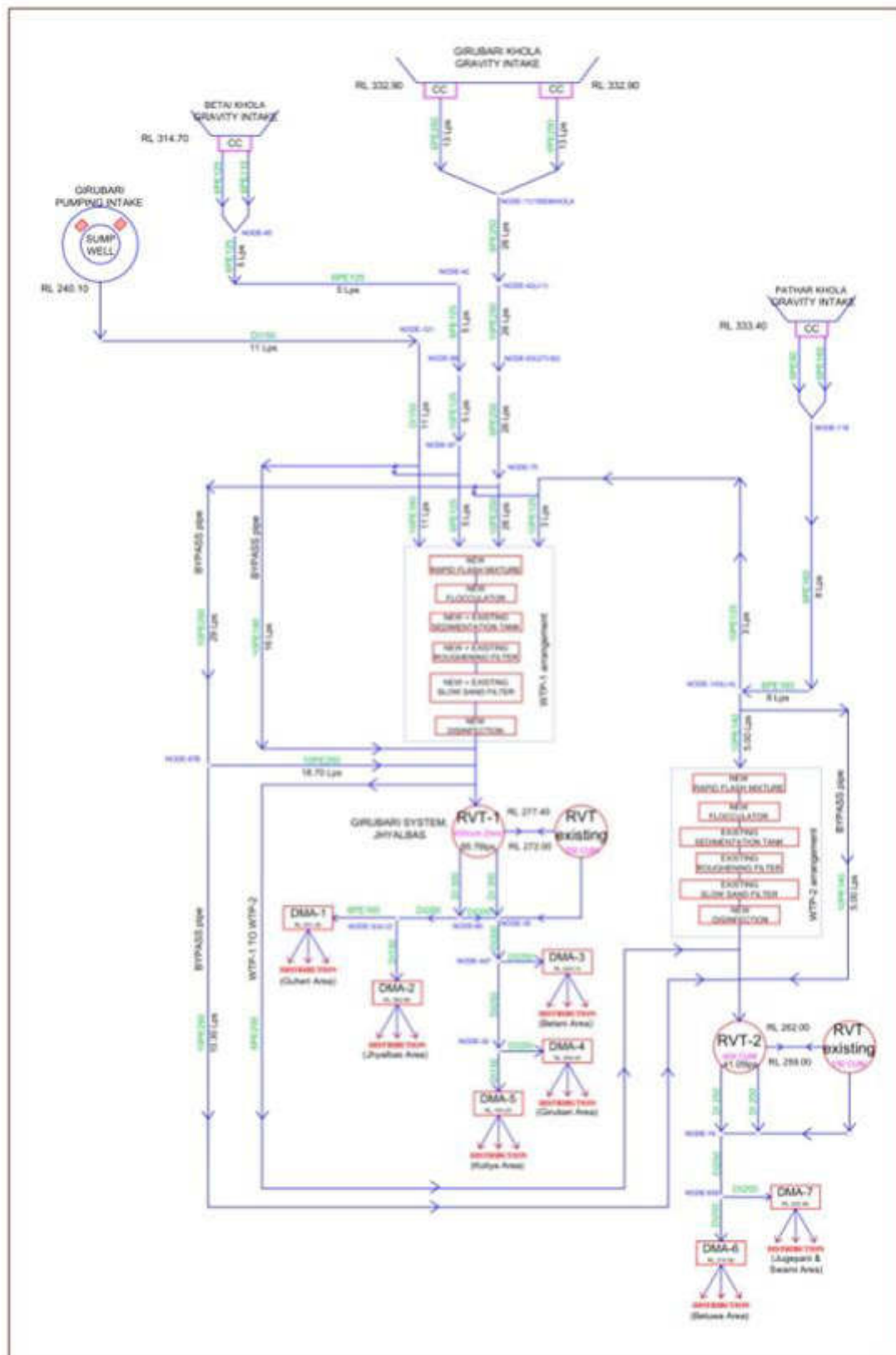


Figure VII-1: Schematic Layout of the Project

VIII. ENVIRONMENTAL MANAGEMENT PLAN

A. Introduction

351. 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.

352. 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

353. 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.

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

Prior to construction:

- MoWS will depute 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

355. **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.

356. 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.

357. **PMQAC:** The Project Management and Quality Assurance Consultants (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.

358. **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.

359. **Civil Works Contracts and Contractors:** The contractor will be required to designate an Environment, Health and Safety (EHS) supervisor to ensure implementation of EMP during civil works. It should be ensured that no works should be undertaken unless the contractor has appointed its EHS officer. The contractors are to carry out all environmental mitigation and monitoring measures outlined in their contract. The contractor will be 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.

360. 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.

361. 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.”

362. **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.

363. **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.

364. 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)

365. 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-1: 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 Construction Project
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 Construction Project
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 Construction Project
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 gulying 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	
		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 vehicles	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
		Regular inspection & maintenance of	Contractor	Contractor's/Consultant's log	Daily Basis

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		construction/transportation vehicles to ensure the use of Vehicles complying with NVMES,2069 B.S.		book of vehicle inspection & maintenance	
		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	a) 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 solid wastes	Contractor	- Number/size of burial pits for final disposal of bio-degradable solid waste - Location of burial sites - Frequency of burials	Daily basis
		Avoid over ordering of construction materials to the	Contractor	Contractor's log book of	Daily basis

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		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.		construction materials	
		Construct garland drains to reduce the runoff from the stockpiles.	Contractor	- Location of construction sites - Photographs	Daily basis
Solid Waste	Haphazard Disposal of Wastes	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.	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
		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	Daily basis during construction

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
				scrap vendors/dealers	
		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	Prior to the construction
		Supervise workers to handle fuel/chemicals properly	DSMC Supervisor Contractor & of	Records of any accidental spillage/leakage	Daily Basis During Construction
		Use of spill kit materials to block flow and prevent discharge to nearby water bodies	Contractor	Contractor's log book of materials procured for	Weekly Basis During Construction

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
				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
		Sale of Recyclable Wastes to Scrap Vendors/Dealers	Contractor	Quantity/Volume of such wastes sold to or given	Daily Basis

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
				away to scrap vendors • Frequency of sale to scrap vendors	
c) 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
		• Regular Monitoring	DSMC & RPMO	• Contractor's Log Book	Daily Basis During Construction

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
				Number of Monitoring Visits	
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 waste collected	Daily Basis During Construction

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
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					
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	Daily Basis

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
				waste collected	
		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
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					

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
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
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	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,	During Construction Phase, Monthly Basis

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	properties/economic activities/social services; service disruptions, etc. • Communicable and transmittable diseases may potentially be brought into the community by construction workers			temporary fence, reflecting barriers and signage	
		• 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
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

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		Make first aid kits readily available	Contractor	Contractor's Health & Safety Log Book	Weekly Basis during construction
Workers & Safety	Health	- 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	Contractor	- Location of Worker's Camp Site - Number of Monitoring Visits - Number of Complaints from the workers	Monthly Basis during construction
		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

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		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
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 especially Jhyalbaas Area.	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	Adopt "zero soil" approach thorough prompt backfilling right after completion of drain construction. In general, execution of excavation works is such that excavtion	Contractor	- Field Visits - Contractor's Work	Weekly Basis

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	hampering the daily business activities	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.		Schedule	
		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 Coordinate with them properly	Contractor	Written Notice or Miking (Verbal Notice)	Prior to the construction
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 - Avoid construction works during monsoons - Prepare & Follow Emergency Preparedness and Response Plan	Contractor	- Monthly Progress Report - Contractor's 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	During Construction Phase on Daily Basis

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
				Quantities • Photographs	
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
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	• Ensure the correct operation of water treatment plant to meet satisfactory water quality	PMO & RPMO	WUSC Monitoring Reports	Monthly Basis during operation
	• Delivery of unsafe water to the distribution system	• 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	During Construction

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	Inadequate protection of intake			drawings & Photographs of Dosing Unit Constructed	
	Health Hazards arising from inadequate design of facilities for receiving, storing and handling of Cl & other chemicals	Train operators for handling chlorine	RPMO, PMO & WUSC	Minutes & Photographs of Training	Prior to operation right after completion of construction
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

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		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 construction and During initial stage of operation phase
		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 2018

D. Environmental Monitoring Program

366. 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.

367. 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 VIII-2** 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-2: 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 2018/019

E. Institutional Capacity Development Program

368. 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.

369. 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 engaged in 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.

370. 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-3**. The Environmental Safeguard specialist & EMP Field Monitoring Staff are responsible for organizing different training programs for Environmental Management.

Table VIII-3: 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 2018

F. Staffing Requirement and Budget

371. 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.

372. 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.

373. 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.

374. 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 NPR 500,000.00 under provisional sum.

375. The indicative costs of EMP implementation is shown in **Table VIII-4** given below:

Table VIII-4: 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	50,000	200,000.00	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			100,000.00	100,000.00	
6.	Revegetating disturbed slopes & grounds	Construction			100,000.00	100,000.00	
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			100,000.00	100,000.00	
9.	Provision of Camp Site	Construction			200,000.00	200,000.00	
10.	Provision of Stockpiling Site	Construction			100,000.00	100,000.00	
11.	Provision of Hands on training to workers	Construction			100,000.00	100,000.00	
12.	Temporary Fencing, Use of Reflecting Barrier, Signage, Adequate Lighting	Construction			300,000.00	300,000.00	
13.	Provision of PPE to workers	Construction			250,000.00	250,000.00	
14.	Provision of Planks to provide access to shops & homes	Construction			50,000	50,000	
15.	Emergency Response Preparedness	Construction & Operation			200,000.00	200,000.00	
	Total Cost of Local Level Monitoring & Mitigation Measures					2,000,000.00	
C.	Capacity Building						

No.	Particulars	Stages	Unit	Total Number	Rate (NRs.)	Cost (NRs.)	Cost Covered by
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
	(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						

No.	Particulars	Stages	Unit	Total Number	Rate (NRs.)	Cost (NRs.)	Cost Covered by
	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						
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

No.	Particulars	Stages	Unit	Total Number	Rate (NRs.)	Cost (NRs.)	Cost Covered by
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					4,890,000.00	

Source: EARF, July 2018 and IEE Study 2018/019

376. The above given table shows that the total indicative cost for EMP implementation in NRs. 4,890,000.00. Out of this total amount, the total estimated cost for Local level Monitoring and Mitigation Measures is 2,000,000.00. 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

377. Environmental management is implemented from the detailed design phase through to procurement that will continue to construction, and operation phases. **Table VIII-5** presents the tentative timeframe of key EMP activities about the subproject implementation schedule. Similarly, **Table VIII-6** presents training for capacity building programs for the project.

378. 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-5: 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	- 8 th day after effective month
	- Semi-Annual EMR during construction for submission to ADB	- 8 th day after effective 6-mo. period
	- Annual EMR for submission to ADB	- 8 th 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	5 th day of the month following the effective month
	- Quarterly, by Contractor or by Licensed Laboratory	3 rd 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	5 th day of the month following the effective month
	- Quarterly, by Operator or (if applicable) by Licensed Laboratory	3 rd day of the month following the effective quarter

Source: IEE Study 2018/019

Table VIII-6: 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		

Topic			Target Participants	Timing
2.	By External Experts			
	2.1	Other relevant topics, such as:	MoWS, 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 2018/019

IX. INFORMATION DISCLOSURE, CONSULTATION & PARTICIPATION

A. Stakeholder Consultation & Participation

379. Stakeholder consultation and participation is an essential process in project preparation. It is also a part of information disclosure. 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 5**.

380. 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-1: Stakeholder Analysis & Mapping

S.N.	Stakeholders	Primary ³	Secondary ⁴	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

³ Primary Stakeholders: people, groups and institutions affected positively (beneficiaries) or negatively (involuntarily resettled) by the proposed program

⁴ Secondary Stakeholders: people, groups and institutions that are important intermediaries in the program delivery process

S.N.	Stakeholders	Primary ³	Secondary ⁴	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
10.	DSMC		✓	It will assist PMO & RPMO in the overall planning, implementation and monitoring of the project activities regarding environmental & social safeguards requirements.	High
11.	WUSC		✓	It is responsible for O & M of the proposed project. It will also facilitate the concerned authorities during planning as well as construction phase.	High
12.	Households (Families & Individuals)	✓		They are the main beneficiaries and are benefitted by the provision of adequate, safe, reliable & potable drinking water.	Low
13.	Contractors, Petty Contractors		✓	It is responsible for bidding for works and involved in the construction of the proposed project.	Low
14.	Local Technicians/Plumbers	✓		This group will be benefitted through the increased work opportunities related to construction works of the proposed project.	Low
15.	Unemployed Locals	✓		This group will be benefitted through the increased work opportunities related to construction works of the proposed project.	Low

S.N.	Stakeholders	Primary ³	Secondary ⁴	Stakeholders' Role or Interest	Level of Influence
16.	Local Vendors	✓		This group will be affected by the pipe laying works at core bazaar areas interfering the access to their shops.	Low
17.	Schools & Hospitals	✓		This group will be benefitted by the provision of enhanced and improved continuous water supply service.	Low
18.	Commercial Establishments (Private Enterprises)	✓		This group is benefitted by enhancing their business by supplying items to the construction employees regarding their basic needs.	Low
19.	Scrap Vendors	✓		This group will be benefitted by purchasing the recyclable wastes generated from the construction activities as well as from workers camp.	Low
20.	Local Leaders		✓	This group will facilitate to establish strong coordination between the local people and the project authority.	High

Source: IEE Field Study 2018 and DEDR & DDR, 2019

381. The consultations were carried out on various dates at various 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, 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, 5% Upfront cash collection and People's participation in project implementation were discussed. These consultations helped identify the needs/concerns of the communities related to the project and priorities of relevant stakeholders. The details of Major public consultation are tabulated below:

Table IX-2: Major Public Consultations

SN	Meeting Date	Facilitator	Venue & Participation	Topic of Dissemination/Discussion	Concerns/ Issues Raised	Recommended Measures
1.	December 11, 2019	WUSC	WUSC Office Male: 6 Female: 1	IEE Study in regard to Public Notice	Affirmative Improvements in the community life and environmental aspects	Positive response regarding the project and its environmental concerns
2.	June 21, 2019	Rural Municipality Chairman, ,Project Director and Deputy Director Design	Mayur Community forest meeting hall Male: Female:	Estimated budget for project, 5% Up front cash collection from local user and overall project modality .	Cost sharing from local and project implementation	All seems positive towards project implementation

SN	Meeting Date	Facilitator	Venue & Participation	Topic of Dissemination/Discussion	Concerns/ Issues Raised	Recommended Measures
		engineer and Safeguard specialist				
3.	October 18, 2018	Social safeguard Specialist	Ward no.11 office, Ward chairman of 9, 6 and 11 WUSC chairman, local and existing water supply staff. Male: 9 all male Female: 0	Discussion about the required land for project and its approval no objection letter from ward office, public land in busy places and its approval site verification government/ municipality land and no objection letter.	Does Municipality and ward office have right to grant permission for any project related activities & issues	Ward chairman of different ward and municipality has recommended that all responsibility/guarantee permission letter shall be provided by Municipality.

Source: DDR, 2019

B. Major Issues Raised by the Stakeholders

382. 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 intermittent water supply system. The downstream users have to wait for the upstream users to close their taps, to fetch water daily.
- iv. Coverage of the project i.e., Service Area
- v. Use of source water without affecting local environment and Consideration of environmental aspects for the successful implementation of the project
- vi. Priority to local people while hiring workers for the construction activities.
- vii. Upfront Cash Contribution
- viii. Existing Pipeline Condition

383. 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 people of the proposed town.
- ii. The proposed project has provision of continuous water supply system. This will end the irregular and intermittent water supply service.
- iii. The proposed project with water treatment facility and continuous water supply provision if effectively implemented will address the needs of Hupsekot Rural municipality residents regarding safe, reliable and potable water supply service.
- iv. The proposed service area of the project includes as follows;
 - Ward no. 1: Beluwa and Jukepani
 - Ward no. 2: Koliya and Guheri (water to be supplied from RVT without pumping)
 - Ward no. 3: Girubari and Belhani
 - Ward no. 4: Jhyalbas and Tallo Dihi
- v. Assurance on the use of sources without having any effect on the local environment during project implementation and to move the project forward keeping in view of the environmental aspects. In regard to this, it has been decided that the environmental

effects due to construction of required components/units, extraction of stream sources, pipeline works shall be assessed and an Initial Environmental Examination Report shall be prepared in consultation and discussion with all the stakeholders with adequate mitigation measures to minimize the negative impact.

- vi. Local workers of Hupsekot Rural Municipality will be given priority for employment to the extent possible however; it requires strong coordination with the concerned contractor.
- vii. The information on the requirement of 5% upfront cash collection from the beneficiaries has been delivered to the stakeholders.
- viii. It has been decided to replace the existing pipelines as the existing pipelines are old and worn out, are as per old design and cannot be brought into use.

384. 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.

385. 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

386. 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.

387. 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.

388. 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

389. 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 invitee⁵, 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.

⁵ 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.

390. 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.

391. 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.

392. 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.

393. 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.

394. 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 UWSSSP Information Datasheet (PID), to be published in web and distributed to the affected communities, as part of the project GRM.

395. This GRM procedure is briefly depicted in **Figure X-1** given below:

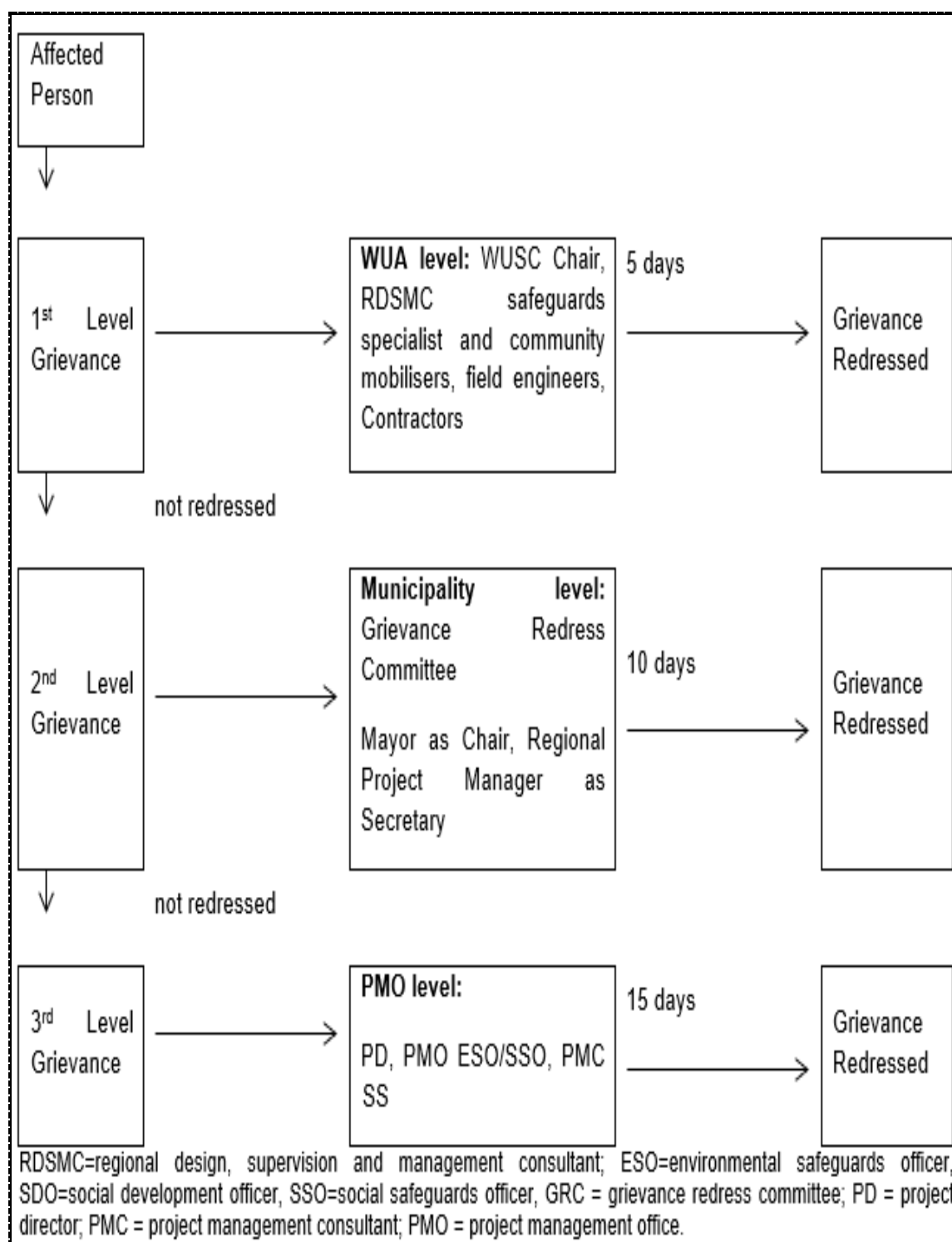


Figure X-1: Grievance Redress Mechanism (Formal Approach)

XI. MONITORING & REPORTING

396. 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.

397. 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.

398. 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.

399. 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

400. 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 easy access to reliable supply of safe and potable drinking 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 proposed 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 described 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 IX-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 damage of the constructed drains if any; will lessen the risks of the ineffective implementation of the proposed project and will sustain the system.
- Construction of public toilets within the project town will improve the public behaviour 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 Deurali Hupsekot 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.

401. Based on the above findings, the classification of the Deurali Hupsekot Water Supply & Sanitation Project as "Category B" is confirmed, no further special study or detailed EIA needs to be undertaken and people of Hupsekot Rural 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 Deurali Hupsekot Water Supply &
Sanitation Project

RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST FOR DEURALI HUPSEKOT 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: **Deurali Hupsekot Water Supply & Sanitation Project**

Screening Questions	Yes	No	Remarks
A. Project Siting : Is the project area			
Densely populated?		√	Hupsekot Rural Municipality has moderate population density.
Heavy with development activities?		√	.
Adjacent to or within any environmentally sensitive areas?			

Screening Questions	Yes	No	Remarks
Cultural heritage site		√	
Protected Area		√	
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 mineral constituents)?	√		Basic water treatment is proposed under the proposed project. 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 NDWQS Directives.
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. There is also provision of protection works for intakes/sump wells.

Screening Questions	Yes	No	Remarks
Over pumping of ground water, leading to salinization and ground subsidence?		√	
Excessive algal growth in storage reservoir?		√	EMP provides mitigation measures.
Increase in production of sewage beyond the capabilities of community facilities?		√	EMP provides mitigation measures.
Inadequate disposal of sludge from water treatment plants?		√	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 mitigation measures.
Health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.	√		EMP provides mitigation measures.
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 mitigation measures
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.

Screening Questions	Yes	No	Remarks
Continuing soil erosion/silt runoff from construction operations?	√		EMP provides mitigation measures.
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.
Accidental leakage of chlorine gas?		√	EMP provides mitigation measures.
Excessive abstraction of water affecting downstream water users?		√	EMP provides mitigation measures
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		√	This is not under the scope of the project.
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.

Screening Questions	Yes	No	Remarks
Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project	√		EMP provides mitigation measures.

Preliminary Climate Risk Screening Checklist

Country/Project Title: Deurali Hupsekot 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 proposed project will not likely be affected by climate change and extreme weather events due to the siting of project.
	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	
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-meteorological parameters) affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	0	
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	Regular operation and maintenance will not allow this effect to occur

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 DEURALI HUPSEKOT WSSP

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?	Yes	The proposed project components area will be covered by the proposed structures.	Not Significant
1.3	Creation of new land uses?	No		
1.4	Pre-construction investigations e.g. boreholes, soil testing?	No		
1.5	Construction works?	Yes	There is chance of occupying of land during construction of the proposed structures.	Not Significant.
1.6	Demolition works?	Yes	Will require demolition of road section for excavation works for pipelines.	Not Significant. It will be readily rehabilitated.
1.7	Temporary sites used for construction works or housing of construction workers?	Yes	There is a chance of disposal of the daily wastes to the nearby water bodies by the construction workers	Not Significant. EMP will provide mitigation measures.
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 roads, bazaar area.	Not significant. The spoils will be readily disposed as per spoil management plan 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?	Yes	The on-site concrete mixing activities shall be carried within the proposed component area and will occupy land that brings change in land use.	Not significant. The area covered to conduct such activities will be within the construction site.
1.15	Facilities for storage of goods or materials?	Yes	There is requirement of stockpiling site. Hence, certain portion land needs to be occupied for the installation of stockpiling site.	Not significant. The proposed location belongs to government area.

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?
1.16	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 leading to changes in traffic movements?	No		
1.21	New or diverted transmission lines or pipelines?	Yes	Excavation works for laying New transmission lines or distribution pipelines may bring change in land use.	Not significant. The proposed pipelines shall be laid within RoW of public road.
1.22	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?	No		
1.23	Stream crossings?	No		
1.24	Abstraction or transfers of water from ground or surface waters?	No		
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?	No		
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		

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?
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?	Yes	Barren Land will be used for the proposed project components.	Not significant. Use of either barren land or Government land will avoid any anticipated issues.
2.2	Water?	Yes	Surface water i.e., Sunkoshi River has been proposed as source of water.	Not significant. During design, safe yield of the proposed source has been considered.
2.3	Minerals?	No		
2.4	Aggregates?	Yes	These will be procured from the authorised vendors.	Not significant. This project will not use aggregates direct from the natural source.
2.5	Forests and timber?	No		
2.6	Energy including electricity and fuels?	Yes	Electricity and Fuel will be used for the project activities.	Not significant.
2.7	Any other resources?	No		
3. Will the Project involve use, storage, transport, handling or production of substances or materials 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 through inadequate supply of water and poor sanitation practice.	Not significant because it is limited to construction period only and it can also be managed 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?				

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?
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.	Not significant It can be avoided by provision of immediate disposal of the spoils at safe site. Spoil Management Plan shall be followed.
4.2	Municipal waste (household and or commercial wastes)?	Yes	There will be generation of solid wastes from the worker's camp site.	Not significant because it is short term. There is provision of waste management in EMP.
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?	Yes	There will be sludge formation within the proposed sedimentation tank.	Not significant. EMP provides mitigation measures.
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		
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?	Yes	Changes in Air Quality is expected due to use of diesel generators as well as use of vehicles.	Not significant because use of diesel generator and vehicles will comply the GoN standard.
5.2	Emissions from production processes?	No		
5.3	Emissions from materials handling including storage or transport?	Yes	Dust generation by the handling of materials like cement, aggregates etc.	Not significant --it is short term and there will be regular monitoring
5.4	Emissions from construction activities including plant and equipment?	Yes	Dust generation by construction works like earthworks	Not significant --it is short term and there will be regular monitoring

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?
5.5	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.	Not significant -it is short term and there will be regular monitoring
5.6	Emissions from incineration of waste?	No		
5.7	Emissions from burning of waste in open air (eg slash material, construction debris)?	No		
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?	Yes	The surrounding area may be disturbed by the noise and vibration of the engines & concrete mixers.	Not significant because it is short term and the preventive measure will be adopted.
6.2	From industrial or similar processes?	No		
6.3	From construction or demolition?	Yes	The demolition works of RoW for excavation works of pipe laying works may generate noise.	Not significant because it is short term (limited to construction phase). EMP provides mitigation measures.
6.4	From blasting or piling?	No		
6.5	From construction or operational traffic?	Yes	Use of transportation vehicles for carrying construction materials may affect core market areas and settlement areas.	Not significant - 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 effluents (whether treated or untreated) to water or the land?	Yes	The sludge from the sedimentation tank may be disposed haphazardly posing risk of land pollution.	Not significant, there will be provision of mitigation measures in EMP

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?
				and there will be also regular monitoring to resolve this issue.
7.3	By deposition of pollutants emitted to air, onto the land or into water?	Yes	The water bodies or land nearby the workers camp may be polluted by the daily activities of the workers residing there temporarily.	Not significant 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 build-up 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 eg 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 (eg 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 will be rural to urban migration that will affect the existing community, cultural identity, economic conditions etc.	Not significant because the proposed project area comprises mixed type of ethnicity.
9.2	By resettlement of people or demolition of homes or communities or community facilities eg 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 neighbouring remote areas to achieve improved living standards.	Not significant because this proposed project town is emerging town and is moderately populated.
9.4	By placing increased demands on local facilities or	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?
	services eg housing, 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 labour 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		
Question - 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?				
9.1	Will the project lead to pressure for consequential development which could have significant impact on the environment eg more housing, new roads, new supporting industries or utilities, etc?	No		
9.2	Will the project lead to development of supporting facilities, ancillary development or development stimulated by the project which could have impact on the environment eg: • supporting infrastructure (roads, power supply, waste or waste water treatment, etc) • housing development • extractive industries • supply industries - other?	No		
9.3	Will the project lead to after-use of the site which could have an impact on the environment?	No		
9.4	Will the project set a precedent for later developments?	Yes	The safe & easy 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 emerging town like Hupsekot.
9.5	Will the project have cumulative effects due to proximity to other existing or planned projects with similar effects?	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 ($\mu\text{g}/\text{m}^3$) *	WHO Air Quality Guidelines ($\mu\text{g}/\text{m}^3$) **	
			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 enable 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

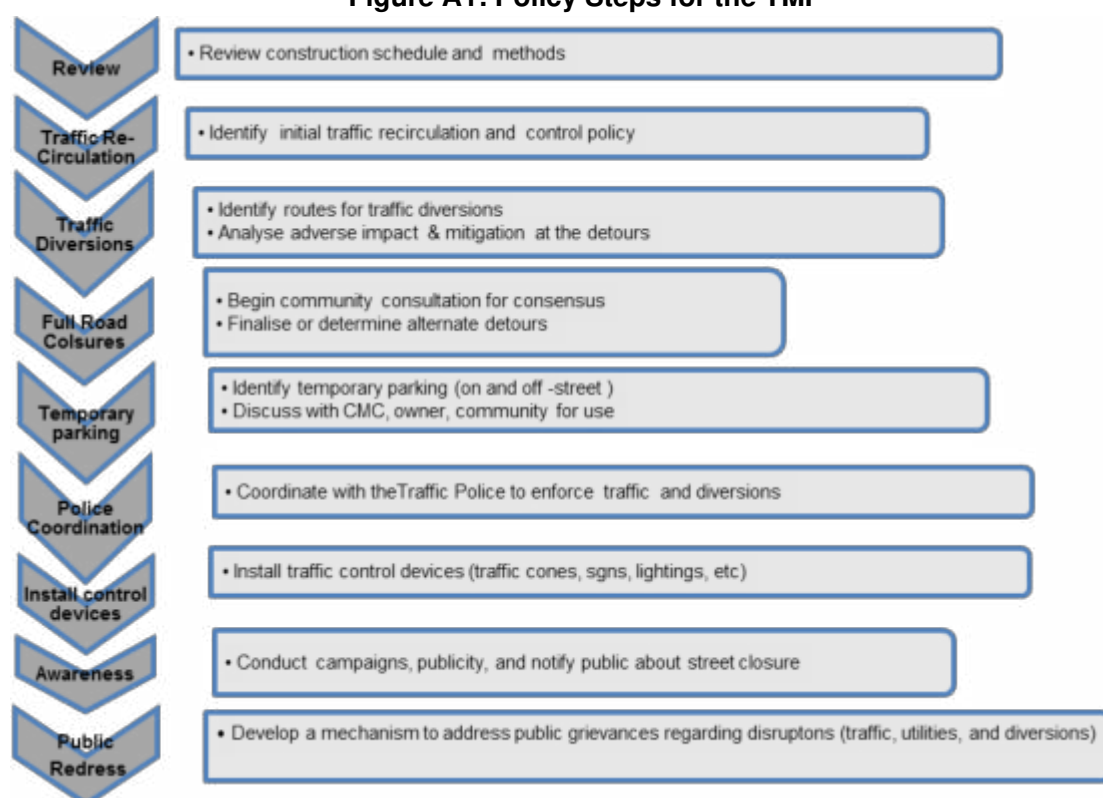
Apart from the capacity analysis, a final decision to close a particular street and divert the traffic should involve the following steps:

- (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** Manage 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 generation	Limitations on opportunities to minimize spoil
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)

- Brief discussion on the basis for monitoring
- Indicate type and location of environmental parameters to be monitored
- Indicate the method of monitoring and equipment to be used
- 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 _____

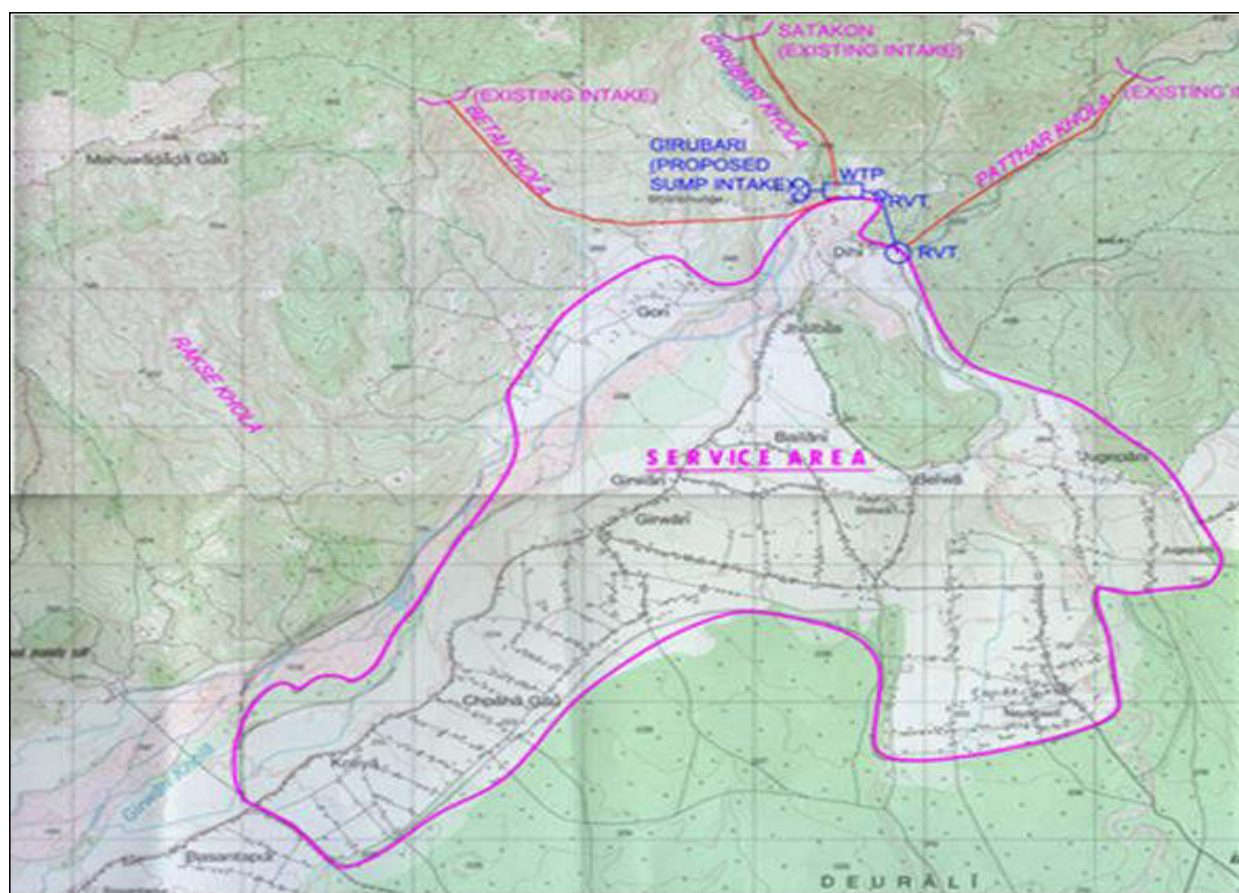
Sign off

Name
Position

Name
Position

Appendix 3

Project Service Area



Appendix 4
Proximity Report on Hupsekot Generated by
ADB and Report on IBAT Tool-World Bank
Group Biodiversity Risk Screen



Proximity Report NEP UWSSP - HUPSEKOT

Location: [28.2, 84.6]

Date of analysis: 05 November 2019

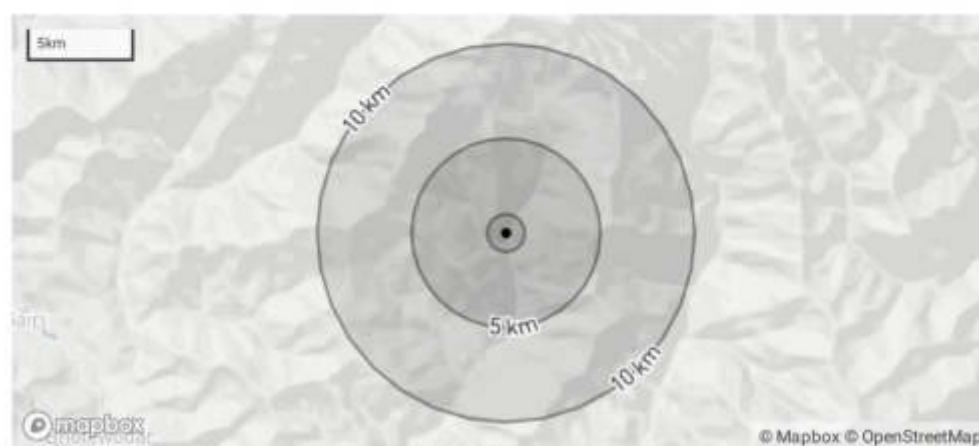
Buffers applied: 1.0 km | 5.0 km | 10.0 km

Generated by: Ninette Pajarillaga

Company/Subscriber: ADB

Overlaps with:

Protected Areas	0
Key Biodiversity Areas	0
IUCN Red List	37



Displaying project location and buffers: 1.0 km, 5.0 km, 10.0 km



About this report

This report presents the results of [954-5074] proximity analysis to identify the biodiversity features and species which are located within the following buffers: 1.0 km, 5.0 km, 10.0 km.

This report is one part of a package generated by IBAT on 05 November 2019 that includes full list of all species, protected areas, Key Biodiversity Areas in CSV format, maps showing the area of interest in relation to these features, and a 'How to read IBAT reports' document.

Data used to generate this report

UNEP-WCMC and IUCN 2018, Protected Planet: The World Database on Protected Areas (WDPA)[On-line], Cambridge, UK: UNEP-WCMC and IUCN. Available at: www.protectedplanet.net. August 2018

BirdLife International (on behalf of the KBA Partnership), 2018. Key Biodiversity Areas: June 2018 version.

IUCN, 2018. IUCN Red List of Threatened Species. Version 2017.3.



Protected Areas

The following protected areas are found within 1.0 km, 5.0 km, 10.0 km of the area of interest.
For further details please refer to the associated csv file in the report folder.

No protected areas within buffer distance

Key Biodiversity Areas

The following key biodiversity areas are found within 1.0 km, 5.0 km, 10.0 km of the area of interest.
For further details please refer to the associated csv file in the report folder.

No KBAs within buffer distance

IUCN Red List of Threatened Species

The following threatened species are potentially found within 50km of the area of interest.

For the full IUCN Red List please refer to the associated csv in the report folder.

Species name	Common name	IUCN Category	Taxonomic Class
<i>Ailurus fulgens</i>	Red panda	EN	Mammalia
<i>Amblyceps arunchalensis</i>		EN	Actinopterygii
<i>Anacyclus pyrethrum</i>	Atlas daisy	VU	Magnoliopsida
<i>Antigone antigone</i>	Sarus crane	VU	Aves
<i>Aonyx cinereus</i>	Asian small-clawed otter	VU	Mammalia
<i>Aquila heliaca</i>	Eastern imperial eagle	VU	Aves
<i>Aquila nipalensis</i>	Steppe eagle	EN	Aves
<i>Aythya ferina</i>	Common pochard	VU	Aves



Species name	Common name	IUCN Category	Taxonomic Class
Catreus wallichii	Cheer pheasant	VU	Aves
Chaetornis striata	Bristled grassbird	VU	Aves
Chloropetalia selysi		VU	Insecta
Clanga clanga	Greater spotted eagle	VU	Aves
Crocodylus palustris	Mugger	VU	Reptilia
Cuon alpinus	Dhole	EN	Mammalia
Falco cherrug	Saker falcon	EN	Aves
Gallinago nemoricola	Wood snipe	VU	Aves
Gyps bengalensis	White-rumped vulture	CR	Aves
Gyps tenuirostris	Slender-billed vulture	CR	Aves
Haliaeetus leucoryphus	Pallas's fish-eagle	EN	Aves
Indotestudo elongata	Elongated tortoise	CR	Reptilia
Leptoptilos javanicus	Lesser adjutant	VU	Aves
Manis pentadactyla	Chinese pangolin	CR	Mammalia
Moschus leucogaster	Himalayan muskdeer	EN	Mammalia
Myotis sicarius	Mandelli's mouse-eared myotis	VU	Mammalia
Neofelis nebulosa		VU	Mammalia



Species name	Common name	IUCN Category	Taxonomic Class
<i>Neophron percnopterus</i>	Egyptian vulture	EN	Aves
<i>Panthera pardus</i>	Leopard	VU	Mammalia
<i>Panthera uncia</i>	Snow leopard	VU	Mammalia
<i>Prinia cinereocapilla</i>	Grey-crowned prinia	VU	Aves
<i>Rusa unicolor</i>	Sambar	VU	Mammalia
<i>Sarcogyps calvus</i>	Red-headed vulture	CR	Aves
<i>Saxicola insignis</i>	White-throated bushchat	VU	Aves
<i>Sterna acuticauda</i>	Black-bellied tern	EN	Aves
<i>Sypheotides indicus</i>	Lesser florican	EN	Aves
<i>Tor putitora</i>		EN	Actinopterygii
<i>Tricula mahadevensis</i>		VU	Gastropoda
<i>Ursus thibetanus</i>	Asiatic black bear	VU	Mammalia



Recommended citation

IBAT Proximity Report, 2018. Generated under licence 954-5074 from the Integrated Biodiversity Assessment Tool on 05/11/2019, <http://www.ibat-alliance.org>

How to use this report

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.

Appendix 5

Minutes of Meeting & Other Important Documents

MINUTES OF MEETINGS-1

Name of parent

DATE

आज मिति २०७२/०१/०५। गतेका दिन जिल्ला नक्सपुर हुसेकोट गाउँपालिका कार्य क्षेत्र भित्र हुने नेपाली तथा शरणापन्न कार्य कम, शहरी शरणार्थी कार्य योजना को लागि यस र्थी हेतु राखी हुने नीतिगत शरणार्थी तथा सरसफाई उपकरण सेवा का आह्वान र्थी भैठ वहापुर पुलामो जुरको आह्वान नामा गाउँपालिकाका अध्यक्ष र्थी नङ्गी डेवी पाण्डे आह्वान र्थी र वल्लभ कोपिला मल्ल, जलपानि को कार्यकारी अधिकृत र्थी हृदि ऐरिनी जुर, एक इन्चल ट्रेन्ड प्राविण का मनजिड, डाइरेक्टर र्थी विरोड ठेकुरा जुर, सामाजिक सुरक्षा र्थी शिव प्रविडारी जुर भुक्तो समुदाय र्थी उपकरण सेवा का पदाधिकारी सुफल जुर र्थी उपस्थितीमा निम्न प्रस्ताव माफा हुन गल गरी निर्णय पारित गरिने।

- १- आह्वान र्थी- भैठ वहापुर पुलामो
 २- वरिष्ठ उपह्वान र्थी- पुजा नाथ पाण्डे
 ३- उपह्वान र्थी- गुरु प्रलड सुर्की (सु. र्थी)
 ४- सचिव र्थी- मिमना रायद २ र्थी
 ५- सह सचिव र्थी- लाल वहापुर र्थी र पुजा
 ६- उपह्वान र्थी- मति पाण्डे
 ७- सदस्य र्थी- नवल सि- र्थी
 ८- र्थी- र्थी- पुजा र्थी र वल्लभ
 ९- र्थी- र्थी- मजवती पाण्डे
 १०- र्थी- र्थी- र्थी प्रसाद लाल
 ११- र्थी- र्थी- र्थी

॥॥

0/0

DATE

११, सुरक्षा समिती ही समिती

१२, सुरक्षा समिती

१३, सुरक्षा समिती

१४, सुरक्षा समिती

१५, सुरक्षा समिती

१६, सुरक्षा समिती

१७, सुरक्षा समिती

१८, सुरक्षा समिती

१९, सुरक्षा समिती

२०, सुरक्षा समिती

२१, सुरक्षा समिती

२२, सुरक्षा समिती

२३, सुरक्षा समिती

२४, सुरक्षा समिती

२५, सुरक्षा समिती

२६, सुरक्षा समिती

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निर्णयनें आयोजना को पूर्ण डिजाइन का लागी -
 परामर्श काल को तर्जु वोट डिजाइन दे. निर्णयनें
 २१- विनोद चण्ड देव को हा जू. सामाजीक युक्ति
 किन २१- शिव काथिपुरी नू. नैसर्गिक विनोद जू.
 पालिका हाट से जोर गाँव पालिका को आइयडा,
 लोडगी पावडे उपाध्यडा स्वतन्त्र कोपिला कल
 से स्था स्था स्था प्रेम अवांर काडी से स्था कोपकाथ
 करी सुप्रात्य जू. हक स्वतन्त्र प्रत्यक्ष उपस्थितता
 हाल संचालनमा आइयेका भवत हक जिम्मेवारी
 खोला साकरी खोला, पत्रपर खोला जिम्मेवारी
 गाँवको संचालन भइयेका पानी रेकी प्रमाणन
 केन्द्र निर्देशक भयो आवश्यक जानकारी प्राप्त
 भयो।

निर्णयनें

प्रस्तावनें आवी वलपुत्राजी हाटका स्थान
 हक आयोजना को समेटने छन.

वडा नं० १ खैरली क्षेत्र, वलपुत्रा जू. जे पानी
 वडा नं० २ कोलिया, गुहरी तल्लो समथ भाग
 (वन्ने एकीले भवतने क्षेत्र).

वडा नं० ३ को खैरली क्षेत्र
 वडा नं० ४ को भगवतवास लल्लोडि की सेवा
 दिइयेको क्षेत्र.

निर्णयनें प्रस्तावनें आवी वलपुत्राजी हाट भइयेको
 डिडी वडा नं० १ को वलपुत्रा एकी निर्माण का लागी
 आवश्यक पत्र जू. का को आवश्यक डाटा जू. लल्लो
 पूरक का गाँव पालिका वोट डिजाइन सुनिई उपस्थित
 मा को लागी अवस्थापन हकमा, कामालय भवन.

સાંસ્કૃતિક ક્ષેત્રમાં નિર્માણ કાર્યો આયોજવાનું
જેમના સામાજિક સંસ્કૃતિની વ્યવસ્થા હેતુ
જોઈ શકે તેવા નિર્માણ કરી ઉપલબ્ધ થઈને
નિર્માણ થયો.

નિર્માણ નં ૫

પુસ્તક ને ૫ માંથી હાલમાં કરી આયોજનાને
કિલોમીટર સામાજિક તથા પ્રાવિધિક સમ
જમકા હાળી સ્થાપિત કરવાનો વ્યવસ્થિત
કેપિટલ સંચયની દરમિયાન કરી જોઈ
રેલુકા આયોજનાને નિર્માણ કરી
સાથે પ્રાવિધિક સમજાવી થઈ લાગે
મા કાર્ય રૂપ પ્રાવિધિક હેતુ સંગ્રહી
લેવામાં કરી સમગ્ર નિર્માણ કરી

નિર્માણ નં ૬

પુસ્તક ને ૬ માંથી હાલમાં કરી આયોજનાને
નિર્માણ કરી કરી રહ્યાં છે. આ મુદ્દાને આયોજનાને
લેવાની વાત વળેલાં કરી ને નિર્માણ કરી
તપ્ત કરી વાત વળેલી પદ્ધતિ લેવા
કરવામાં કરી આયોજનાને કરી કરી
વાત વળેલી કરી.

નિર્માણ નં ૭

પુસ્તક ને ૭ માંથી હાલમાં કરી હાલ
સંસ્કારના આયોજનાને સંસ્કારના હેતુ
પાઈસ લઈને આ પ્રયોજનાને પાઈસ
કરી જોઈ, કરના કિલોમીટર કરી પાઈસ
કરી પાઈસ પ્રયોજનાને તપ્ત કરી

निवेदन

English Translation for the Minutes of Meeting 1

Today dated October 15,2019, for the Urban Water Supply & Sanitation Project proposed within the proposed area of Hupsekot Rural Municipality of Nawalpur District, discussion has been made for the following mentioned proposals and accordingly, decisions were made, under the chairmanship of Mr. Bhek Bahadur Pulami (Chairman of Deurali Sotikhola WUSC) in the presence of Ms. Laxmi Devi Pandey (Chairperson of Hupsekot Rural Municipality), Mr. Swatantra Kopila Malla (Vice Chairperson of Hupsekot Rural Municipality), Mr. Hari Pangen (Executive Officer of Hupsekot Rural Municipality), Mr. Binod Chandra Devkot (MD of TAEC Consult P. Ltd.), Mr. Shiva Adhikari (Social Safeguard Specialist) and other members of Deurali Sotikhola WUSC.

S.No.	Name of Participants	Designation/Address
1.	Mr. Bhek Bahadur Pulami	Chairman, Deurali Sotikhola WUSC
2.	Mr. Phaganath Pandey	Senior Vice Chairman, Deurali Sotikhola WUSC
3.	Mr. Guru Prasad Subedi	Vice Chairman, Deurali Sotikhola WUSC
4.	Mr. Bhim Narayan Regmi	Secretary, Deurali Sotikhola WUSC
5.	Mr. Lal Bahadur Sherpuja	Assistant Secretary, Deurali Sotikhola WUSC
6.	Mr. Mani Pandey	Treasurer, Deurali Sotikhola WUSC
7.	Mr. Nawal Singh Damai	Member, Deurali Sotikhola WUSC
8.	Ms. Durga Devi Khanal	Member, Deurali Sotikhola WUSC
9.	Ms. Bhagwati Pandey	Member, Deurali Sotikhola WUSC
10.	Mr. Shyam Prasad Lamsal	Member, Deurali Sotikhola WUSC
11.	Mr. Yam Bahadur Somai	Member, Deurali Sotikhola WUSC
12.		Secretary, Safeguard Committee
13.	Mr. Srijan Pandey	Accountant, Deurali Sotikhola WUSC
14.	Mr. Khum Lal Pandey	Member, Safeguard Committee
15.	Mr. Krishna Raj Kandel	Member, Safeguard Committee
16.	Mr. Mahendra Basyal	Member, Safeguard Committee
	Special Invitees	
17.	Ms. Laxmi Devi Pandey	Chairperson, Hupsekot Rural Municipality
18.	Mr. Swatantra Kopila Malla	Vice Chairperson, Hupsekot Rural Municipality
19.	Mr. Hari Pangen	Executive Officer, Hupsekot Rural Municipality
20.	Mr. Prem Bahadur Karki	Patron & Former Chairman, Deurali Sotikhola WUSC
21.	Mr. Binod Chandra Devkota	Managing Director, TAEC Consult P. Ltd.
22.	Mr. Shiva Adhikari	Social Safeguard Specialist, TAEC Consult P. Ltd.
23.	Mr. Bhim Bahadur Aslami Magar	Safeguard Committee
24.	Mr. Chhabilal Midhuna	Chairman, Ward No. 3
25.	Mr. Purna Bahadur Lama	
26.	Mr. Ram Bahadur Rana	Deurali Sotikhola WUSC

Agendas:

1. Regarding the information on the proposed Deurali Hupsekot Water Supply & Sanitation project
2. Regarding the field visit for the proposed project
3. Regarding the delineation of service area
4. Regarding the management & availability of the required land and Social Safeguard
5. Regarding social and technical survey of the proposed project town

6. Regarding the environmental issues that may be encountered during project implementation
7. Regarding the pipeline of the existing water supply system

Decisions:

The following decisions were made concerning the above-mentioned agendas:

1. Regarding the agenda no. 1, the information on the requirement of 5% upfront cash collection, 25% TDF Loan and 70% from GoN Contribution for the project implementation, has been delivered by the consultant team.
2. Regarding agenda no. 2, it has been informed by the consultant team that the field visit was carried out at the existing source area i.e., Girubari Khola, Rakse Khola, Pathari Khola, and at the existing water treatment plant site, by the team that includes Mr. Binod Chandra Devkota (MD of TAEC Consult P. Ltd.), Mr. Shiva Adhikari (Social Safeguard Specialist), Ms. Laxmi Devi Pandey (Chairperson of Hupsekot Rural Municipality), Mr. Swatantra Kopila Malla (Vice Chairperson of Hupsekot Rural Municipality), Mr. Prem Bahadur Karki, Patron of WUSC and other members of WUSC.
3. As per agenda no. 3; the proposed service area of the project includes as follows;
 - Ward no. 1: Beluwa and Jukepani
 - Ward no. 2: Koliya and Guheri (water to be supplied from RVT without pumping)
 - Ward no. 3: Girubari and Belhani
 - Ward no. 4: Jhyalbas and Tallo Dihi
4. As per agenda no. 4; it has been informed that recommendation from the rural municipality office is required along with the required documents & land ownership certificates of the required land for the proposed reservoir tank at ward no. 4. It has also been decided to provide land at other locations for office building and public toilets as per Social Safeguard Policy without affecting others.
5. As per agenda no. 5, it has been decided to manage the local human resources by the local bodies to carry out the detailed social and technical survey. Along with this, it has also been decided to seek help from the technicians employed at the WUSC, during technical survey.
6. As per agenda no. 6, it has been decided to use the proposed sources without having any effect on the local environment during project implementation and to move the project forward keeping in view of the environmental aspects.
7. As per agenda no. 7, it has been decided to replace the existing pipelines as the existing pipelines are old and worn out, are as per old design and cannot be brought into use. Along with this, it has also been decided to assimilate the sources i.e., Girubari Khola, Sump Well Pumping, Pathar Khola and Betai Khola.

MINUTES OF MEETINGS-2

DATE:

आज मिति २०६८ साल अर्थात् ०९ चैतेका दिन
मस - ऐउराली (साँतीखोला) दुधकोट बजार पानी
उपभोग्यता समितिको अध्यक्ष श्री गौरव वहादुर
पुलामी ज्यूको अध्यक्षतामा - भड्जाईको कुम्हारेले
ले तथा उपारीपको सुन्दर डिजाइन् गर्नुदा प्रातः
भापर सायुपाईको वन उपभोग्यता समितिको सभाहल
मिलेर लिखित माहानुभाव हुने उपस्थिता प्रमुख
कारिणी :-
उपस्थिता :-

(१) श्री लोक वहादुर पुलामी अध्यक्ष
(२) श्री रामनाथ पाण्डे स. उपाध्यक्ष
(३) श्री गुरु सुवेदी - उपाध्यक्ष
(४) श्री मनमिका बागलगा रेग्मी - सदस्य
(५) श्री मनी पाण्डे - सचिव
(६) श्री लाल वहादुर रोरेपुजा - सहसचिव
(७) श्री भगवती पाण्डे - सदस्य
(८) श्री दुर्री देवी खनाल - सदस्य
(९) श्री नक्कलारिङ दर्जे - "
(१०) श्री इमान प्रकाश लामाला - "
(११) श्री धर्म वहादुर सोर्मे - "

विशेष उपस्थिति

१२) गा.पा. अध्यक्ष - लक्ष्मी देवी पाण्डे - निर्वाह
१३) " उपप्रधान - स्वतन्त्र कोषिला मल्ल
(१४) प्रमुख अभियंता - विद्यानाथ भट्टराई - आयोजना निर्देशक
(१५) डि. आर. डि कोडिनोर - हरि प्रकाश शर्मा
(१६) उप निर्देशक आयोजना - विश्व बहाल प्रधान शर्मा
(१७) विगत देवकेला प्रधानमन्त्री
(१८) मानव विकास, Engineer - नगर विकास अधिकारी
(१९) आबुतोष कुमार ठकुर, आ. ला. का. कलमडा निर्वाह
(२०) आमेल ईन्जि - Engineer, नगर विकास अधिकारी
(२१) शिव कलिबारी Safety and Experimentation Officer

STAG	DATE:
१०) कृष्ण राव भंडेल, खेडराली पो पां पुष्पमि	विश्वमि
११) डोलरात्र पाण्डे	" " "
१२) नारायण प्र. गोविंद	" " "
१३) नृपती पाण्डे - दे. सां. वि. पा - नारायण अमृत	अमृत
१४) नृपती पाण्डे - " - प्राविधि-अमृत	अमृत
१५) भिम लाल प्रसादी	" - प्राविधि-अमृत
१६) राम कापुर सांरी	" - " रामका
१७) राम क. राणा	" - "
१८) राम कि. राणा	" - " अ
१९) इम क. मराठी	" - मिटल मंडल
२०) मन उमारी राणा	" - सुरंग पाल मंड
२१) लाल क. राणा	" - "
२२) गोविंद व. ठकुरी, दुर्गेकोट गा. वि. लोपात्री शाळा	२३
२३) ईश्वरी प्रसाद पाण्डे उमो मंड	२४
२४) हरि प्रसाद कोइराला दुर्गेकोट ३ गिल्ली	२५
२५) गुरु प्रसाद विनायक	" " २६
२६) माल प्र. काळे	" " २७
२७) विष्णु काळे	दुर्गेकोट २ २८
२८) कापुराव काळे	" ३ २९
२९) प्रो. वि. काळे	३०
३०) श्रीमंत वि. राना	३१
३१) बाल कृष्ण तिवारी	३२
३२) चासिंवार घरे	३३
३३) लीला-मिश्र पाण्डे	३४
३४) नृपती प्रसाद भावा	३५
३५) सुप्रसन्न लुङ्गोला मंडार	३६
३६) लक्ष्मी बापा	३७
३७) लुङ्गोला वि. ३	३८
३८) लक्ष्मी पांडे	३९
३९) म-वाट दुर्गेकोट	४०
४०) लोम वा मल्ल वरुणी	४१

२१	पन गाराभा/गोदिमा	पन
२२	मिबन पाण्डे	Judean
२३	लिला माथ पाण्डे	लिला
२४	शिव का. पं. १०८	Hing
२५	का. का. आ. लामो	Bliss
२६	अनिल थापा	अनिल
२७	नराचन्द्र पाण्डे	नराचन्द्र
२८	पहल सि. रानी	पहल
२९	होम का. थापा	होम
३०	मोति का. ६ म. का. ८	मोति
३१	मुना पाण्डे	मुना
३२	मोटा केशव वि. ३, हु. लोको १	मोटा
३३	फागु प्रसाद चौधरी	फागु
३४	बुद्धिमान तामाङ	बुद्धिमान
३५	मित्र का. सुनुडो	मित्र
३६	रुन वि. रमा का. नं. १०९ सु. म. १०९	रुन
३७	यम का. आने गारा	यम
३८	मुना का. रानी	मुना
३९	मुना का. रानी	मुना
४०	जोकिट ठण्डा	जोकिट
४१	रुन प्रसाद वि. ३ हु. लोको ४	रुन
४२	रुन प्रसाद वि. ३ हु. लोको ४	रुन
४३	जोकिट ठण्डा	जोकिट
४४	अनिल फानेना मधुप	अनिल
४५	अनिल फानेना मधुप	अनिल
४६	चिममाथा थापा	चिममाथा
४७	गोमुना गुरुङ	गोमुना
४८	मिन का. परिफा	मिन
४९	रुन राना	रुन
५०	रुन राना	रुन
५१	तापा थापा	तापा
५२	दिना रानाभाट	दिना
५३	मुना का. राना	मुना

८३)	दल क० हुमाला	महाराष्ट्र
८४)	गनेन आले	महाराष्ट्र
८५)	श्याम प्रसाद सेवास	महाराष्ट्र
८६)	विष्णु नारायण	महाराष्ट्र
८७)	विठाराम कुमारे	महाराष्ट्र
८८)	नेहाचरण पांडे	महाराष्ट्र
८९)	प्रवीर प्रसाद	महाराष्ट्र
९०)	चामुन सिंह	महाराष्ट्र
९१)	मनिराज सेवास	महाराष्ट्र
९२)	मोम नारायण	महाराष्ट्र
९३)	चिरिजोषे पांडे	महाराष्ट्र
९४)	महाल	महाराष्ट्र
९५)	हुमना प्रसाद पांडे	महाराष्ट्र
९६)	माधव प्रसाद पांडे	महाराष्ट्र
९७)	महाराष्ट्र	महाराष्ट्र
९८)	महाराष्ट्र	महाराष्ट्र
९९)	महाराष्ट्र	महाराष्ट्र
१००)	महाराष्ट्र	महाराष्ट्र
१०१)	महाराष्ट्र	महाराष्ट्र
१०२)	महाराष्ट्र	महाराष्ट्र
१०३)	महाराष्ट्र	महाराष्ट्र
१०४)	महाराष्ट्र	महाराष्ट्र
१०५)	महाराष्ट्र	महाराष्ट्र
१०६)	महाराष्ट्र	महाराष्ट्र
१०७)	महाराष्ट्र	महाराष्ट्र
१०८)	महाराष्ट्र	महाराष्ट्र
१०९)	महाराष्ट्र	महाराष्ट्र
११०)	महाराष्ट्र	महाराष्ट्र
१११)	महाराष्ट्र	महाराष्ट्र
११२)	महाराष्ट्र	महाराष्ट्र
११३)	महाराष्ट्र	महाराष्ट्र
११४)	महाराष्ट्र	महाराष्ट्र
११५)	महाराष्ट्र	महाराष्ट्र

PAGE	DATE
998.	Sheela पदम वां. ज्ञानी चौडेल - कोने. 2
118	उराली रेडोरे का राम जदिवार. <u>पुस्तक</u>
997	हेमचंद्र दु. खानखुरी मिश्र. <u>पुस्तक</u>
995	मिथुन माया वि. का. <u>पुस्तक</u> 9. विमा
920	उर्मिला महे. 12 नं. 7. <u>पुस्तक</u>
919	लेज माया जाडे. 11. 12. <u>पुस्तक</u>
922	मन वल्लभ हुकेल. <u>पुस्तक</u> 9.
923	पुनश्चात हुकेल. <u>पुस्तक</u> 2. <u>पुस्तक</u>
928	देवेन्द्र (मजुमदार) दु. <u>पुस्तक</u>
922	देविलाज मिश्र. <u>पुस्तक</u> को. <u>पुस्तक</u>
926	रोशन माया <u>पुस्तक</u> को. <u>पुस्तक</u>
926	हारा के बाबा. <u>पुस्तक</u> को. <u>पुस्तक</u>
925	लेज माया. <u>पुस्तक</u> को. <u>पुस्तक</u>
925	शोभिला. <u>पुस्तक</u> को. <u>पुस्तक</u>
920	विजय माया. <u>पुस्तक</u> को. <u>पुस्तक</u>
922	शोभन कमल लाडिको. <u>पुस्तक</u> को. <u>पुस्तक</u>
922	लीन नन्द लामोडान. <u>पुस्तक</u> को. <u>पुस्तक</u>

370

DATE:

प्रस्तावः

क) मस हेतुवाली सेलीकोला दुप्पलीकर रवानेपानीको केल्लत
 15 फाईट रिमारे प्रस्तुती संभव्यता

ख) आपाजना सार आवय्यक चने कला भजिन उपलब्ध गरावणे
 संभव्यता

ग) आपाजना को निर्माण कार्य हुने कालावरण नेत्राव म्हायुक्त
 संभव्यता

घ) आपाजना को हनोट बलागत संभव्यता

च) आपाजना प्रलियेयन घमाट संभव्यता ।

निर्णयः

क) प्रस्ताव हेतु प्रयुक्ती दलामल गर्या, बाहरी रवानेपानी तथा
 सरसफाई आपाजनाको तर्फ वार हनोट भेटको मस
 से. हेतुवाली सेलीकोला उपमान्ता संस्थाको आगामी निर्माण
 बाहरी रवानेपानी तथा सरसफाई निमित्तनुसार रवानेपानी
 तथा सरसफाईका संरचनाको निर्माण गरि जग्गाको मस
 उपमान्ता संस्थाको तर्फ वार उपलब्ध गरावुको साथ निर्माण
 लागत 30% मा 20% अग्रिम नगद र 80% नगरिका
 कोष वार कृणको रूपमा प्रत्येक घर बुरीले बनेको
 गरी, निजी वारी रवाला घर आवय्यक पानी संभ-
 ल्द वल निर्माण गरी ताली गरीहुने योजना बसाय
 म्हायुक्त केल्लत हुने पश्चा रवाला, वेतई रवाला
 नुदान लाई पनि समरी आपाजनाको अगाडी पठाउने
 गरी T.A.E.C - 2014 ले तयार पारने डिजाइन रिपोर्ट
 उपमान्ता संस्थाले, रवालीय सारकोल बलाहु,
 गरी पारकोल अदवाहु, ले उपसधीतीमा प्रस्तुत गरी
 आपाजना दलामल हुने आगामी वरुने निर्णय गरियो।
 अन्त प्रस्तुती गदा सरकोल वालाहुको तर्फ वार
 अगाडी सारील्ला जि. राला को पूरा रूपमा समर्थन गर्दै
 जि. राला सभा दलाम, गरी गरी अगाडी वरुने
 निर्णय गरियो।

English Translation for the Minutes of Meeting 2

Detailed Design Report Presentation and Public Mass Meeting was conducted under the chairmanship of Mr. Vekh Bhadur Pulami, Chairman of Deurali Hupsekot WUSC date on June 21, 2019. In the presence of the following mentioned participants, discussions on the following mentioned agenda and decisions were made under the consent of all.

S.No.	Name of Participants	Designation
27.	Mr. Mek Bahadur Pulami	Chairman, Deurali Hupsekot WUSC
28.	Mr. Phaganath Pandey	Senior Vice chairman WUSC
29.	Mr. Guru Subedi	Vice chairman
30.	Mr. Bhim Narayan Regmi	Secretary WUSC
31.	Ms. Mani Pandey	Treasurer
32.	Mr. Lalbahadur Serpuja	Deputy Secretary WUSC
33.	Mrs . Bhagawati Pandey	Member
34.	Mrs. Durga Devi Khanal	Member
35.	Mr. Nawal Singh Damai	Member
36.	Mr. Shyam Prasad Lamsal	Member
37.	Mr. Yam Bahadur Sarki	Member
	Special participants	
38.	Mrs. Iaxmi Devi Pandey	Chairman Rural Municipality
39.	Mrs . Sotantra Kopila Malla	Vice Chairman Rural Municipality
40.	Mr. Bidhya Nath Bhattra	Chief guest / project director
41.	Mr. Hari Prasad Sharma	DRTAC coordinator
42.	Mr. Bikesh Badanthasche	Deputy Director PMO
43.	Mr. Binod Devkota	MD / TAEC
44.	Mr. Man Bahadur Gurung	WSS Engineer TDF
45.	Mr. Asutosh Kumar Thakur	Engineer PMO
46.	Mr. Shiva Adhikari	Safeguard Expert
47.	Krishna Raj Kandel	Deurali
48.	Dol Raj Pandya	Deurali
49.	Narayan Prasad Gautam	Deurali
50.	Srijana Pandya	Deurali
51.	Khum Lal Pandya	Deurali
52.	Bhim Lal Parajuli	Deurali
53.	Ram Bahadur Soti	Deurali
54.	Yam Bahadur Rana	Deurali
55.	Dhan Sing Rana	Deurali
56.	Hum Bahadur Masangi	Deurali
57.	Man Kumari Rana	Deurali
58.	Lal Bahadur Rana	Deurali
59.	Ganesh Bdr. Thakuri	Hupsekot
60.	Ishwori Pd. Pandya	Hupsekot
61.	Hari Pd. Koirala	Hupsekot
62.	Guru Pd. Khanal	Hupsekot
63.	Bharat Pd. Wagle	Hupsekot
64.	Bishnu Karki	Hupsekot
65.	Baburam Kandel	Hupsekot
66.	Prem Bdr. Karki	
67.	Oman Sing Rajati	
68.	Balkrishna Tiwari	

S.No.	Name of Participants	Designation
69.	Dhan Sing Bdr Ghale	
70.	Lila Nath Pandya	
71.	Chandra Bdr. Thapa	
72.	Susmita Langeli Magar	
73.	Laxmi Thapa	
74.	Lek Bdr. B.K	
75.	Laxman Pandya	
76.	Man Bdr. Bhujel	
77.	Hom Bdr. Malla Thakuri	
78.	Chan narayan Mukhiya	
79.	Jivan Pandya	
80.	Lila Nath Pandya	
81.	Hira Bdr. Darai	
82.	Durga Bdr. Aslami	
83.	Anil Thapa	
84.	Nara chandra Oandya	
85.	Pahal Sing Gharti	
86.	Hom Bdr. Thapa	
87.	Moti Bdr. Kumal	
88.	Fagu Pdr. Chaudhary	
89.	Buddhi Man Tamang	
90.	Chitra Bdr. Kanung	
91.	Purna Sing RANA	
92.	Yam Bdr. Alemagar	
93.	Humaan Pandya	
94.	Tara Bdr. B.K.	
95.	Durga Bdr. Sorme	
96.	Krishna Bdr. Sorme	
97.	Govinda Bhandari	
98.	Purna Prakash B.K.	
99.	Harka Bir Tamang	
100.	Jagat Sing Thapa	
101.	Anita Mahato	
102.	Sabita Shrestha	
103.	Chin maya Thapa	
104.	Jamuna Thapa	
105.	Min Bdr. Pariyar	
106.	Kamal Rana	
107.	Bhumishwo Rana	
108.	Tara Thapa	
109.	Dina Rnabhat	
110.	Krishnamaya Ranamagar	
111.	Dal Bdr. Kumal	
112.	Nabin Ale	
113.	Shyam Pdr. Bhusal	
114.	Bishnu narayan Shrestha	
115.	Tika Ram Aryal	

S.No.	Name of Participants	Designation
116.	Rishiram Poudyal	
117.	Purnachandra Pokheral	
118.	Yaman Sing Jyoti	
119.	Shree Bdr. Nepali	
120.	Om Bdr. Pata	
121.	Chirinjivi Poudyal	
122.	Maka Poudyal	
123.	Krishna Pdr. Poudyal	
124.	Madhav Pdr. Poudyal	
125.	Chura Bdr. Bhusung	
126.	Keshav RAJ Bhandari	
127.	Padam Bdr. Kanung	
128.	Minu Gaha	
129.	Dhan Bdr. Malla Thakuri	
130.	Rup Bdr. Pulami	
131.	Dal Bdr. Chauhan	
132.	Hem Raj Wagle	
133.	Prem Narayan Pandya	
134.	Bhawanishankher Subedi	
135.	Jit Bdr. Raimajhi	
136.	Lila Ballav	
137.	Madhav Bastakoti	
138.	Alisha Gurung	
139.	Gun Bdr. B.K.	
140.	Ganga Nisthuri	
141.	Om Bdr. Ichai	
142.	Bhim Bdr. Danuwar	
143.	Tek Nath Sigdel	
144.	Padam Bdr. Chetri Poudyal	
145.	Balram Poudyal	Deurali
146.	Hem Bdr. Khan Thakuri	
147.	Bishnumaya B.K.	
148.	Urmila Mahato	
149.	Tejmaya Pandya	
150.	Man Bdr. Chantel	
151.	Ghanashyam Subedi	
152.	Dekeshwor Bhandari	
153.	Chabilal Mighun	
154.	Roshan Thapa	
155.	Tara Bdr. Karki	
156.	Tejmaya Pandya	
157.	Sharmila Ghale Pariyar	
158.	Bishow Nath Pandya	
159.	Shomkanta Lamichhane	
160.	Lalchandra Lamichhane	

Proposals: -

1. Presentation of Detailed Design Report of Deurali Setikhola Hupsekot Water Supply & Sanitation Project
2. Acquisition/Possession of the required land for the project
3. Environment effect due to construction works of the project
4. Selection of the project and its estimate
5. Preparation of final report

Decisions: -

1. The Deurali Setikhola Water Users Association of the Project, selected as per policy of the Urban Water Supply and Sanitation (sector) project, shall provide required land for construction of different components of water supply and Sanitation project and a contribution of 30% of the estimated cost inclusive of 5% upfront cash shall be collected from each household and 25% loan from TDF. The design report prepared and presented by TAEC-ICON JV based on pumping of water from Girbari Khola sump well as well as collection of water from existing water sources-Patthari khola, Betai Khola in presence of WUSC, local stakeholders and the Chairperson of the Rural Municipality. It was decided after thorough discussion on queries and solutions of the stakeholders to move further ahead.
2. After discussion on the proposal No. 2, the required land for the proposed components like Water treatment Plant (WTP), Water Tank (RVT), Intake works etc. of this project shall be made available as per ADB safeguard policy by the WUA or the rural municipality.
3. After discussion on the proposal No 3, it was decided that the environmental effect due to construction of required components/units, extraction of stream sources, pipeline works shall be assessed and an Initial Environmental Examination Report shall be prepared in consultation and discussion with all the stakeholders with adequate mitigation measures to minimize the negative impact.
4. After discussion on the proposal No. 4, it was decided to proceed further as 5 % of the cost of proposed project components to be constructed, considering existing 8 sources and an additional source (Sump well on the bank of Girbari khola at Chapari koura & Badrer Kholi), shall be borne by the users of each household. The WUSC has made commitments to collect the said amount within 2 months.
5. It was decided that the design consultant TAEC-ICON JV should go ahead after discussion on the queries raised during presentation of social profile survey, environmental impact survey, and social/environmental safe guard assessment survey.

Minutes of Public Consultation in regard to Public Notice

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आजमिती २०६६।०।२५ जतेका दिन यस र्थे कैटरानी लोक
खेल खानेपानी तथा सरसफाई उपगोला र्थेका द्वारा प्रस्ता
वित कैटरानी हटसेकोट शहरी खानेपानी आयोजना एग्रेसीव
सन्धिवालय कैठक र्थेकाका अध्यक्ष र्थे मेक महादुर पुजारी
उपकोषधमातामा वरि निम्न प्रस्ताव माफी छलफल जारी
निर्णय पारित गरियो ।

उपस्थिती

१- अध्यक्ष र्थे मेक महादुर पुजारी

२- व. के. उपाध्यक्ष र्थे छजना व पाछे

३- उपाध्यक्ष र्थे गुरु प्रसाद युम्केरी

४- सचिव र्थे भिम रामका रेग्मी

५- कोषाध्यक्ष र्थे मन्त्रि पाछे

६- सह सचिव र्थे लाल महादुर शिष्टपुजा

७- नायबपापु र्थे छजना पाछे

आजका प्रस्तावनिर्णय

प्रस्ताव नं १ आयोजनाको कतावरणीय प्रभाव मूल्यांकन
सम्बन्धमा ।

निर्णय

प्रस्ताव नं १ माफि छलफलमा की मिति २०६६।०।१८ मा यस
कैटरानी हटसेकोट शहरी खानेपानी आयोजनाको प्रारम्भिक
कतावरणीय अध्ययन सम्बन्धी आविडि आयोजना राखिद्वय
द्विदिमा सुचना प्रकाशित गरी आम उपगोला र जनमानस
लाई आयोजना निर्माण र त्यसबाट हुने कतावरणीय असर
को शय-सुझाव माग गरिएकोमा सम्बन्धित शरोकारवाल
छुवाट हुने प्रतिक्रिया नदिएका र छलफलमा मेलमिलापको
निर्णयले समुदायको जीवनमा सुकारात्मक सुझाव ल्याउने
र कतावरणीय सुधार समेत आउने सम्बन्धी विषयमा -
अमकपड कलफल भएकै कारण निर्णय गरिद्व ।

अध्यक्ष

व. के. उपाध्यक्ष

उपाध्यक्ष

सचिव

कोषाध्यक्ष

सह सचिव

English Translation of Minutes of Public Consultation in regard to Public Notice

Today dated December 11, 2019, discussion has been made for the following mentioned proposals and accordingly, decisions were made, under the chairmanship of Mr. Bhek Bahadur Pulami, Chairman of Secretariat Meeting Organization of Deurali Hupsekot Water Supply Project Committee proposed by Deurali Sotikhola Water Supply and Sanitation User's Committee.

Attendees:

1. Chairman- Mr. Bhek Bahadur Pulami
2. Senior Vice Chairman-Mr. Jagannath Pandey
3. Vice Chairman- Mr. Guru Prasad Subedi
4. Secretary- Mr. Bhim Narayan Regmi
5. Treasurer- Mr. Mani Pandey
6. Assistant Secretary- Mr. Lal Bahadur Sherpuja
7. Manager-Ms. Srijana Pandey

Today's Proposals & Decisions:

Proposal 1: Regarding Initial Environment Examination

Decision: As per the discussions on the Proposal 1, no response has been received from the stakeholders regarding the call for local users and stakeholders for their opinions & suggestions on the project construction and environmental impacts afterwards, through the public notice published in Arthik Abhiyan Rastriya Dainik on November 20, 2019 in regard to Initial Environment Examination of Deurali Hupsekot Water Supply & Sanitation Project and it has been decided that necessary discussions are done in regard to the issues related to the affirmative improvements in the community life and in the environmental aspects that will be brought by the project construction.

RECOMMENDATION LETTER FROM DEURALI SOTIKHOLA WUSC

जि.वि.स.क.दा.नं. ४३१/०५५

बि १८६४४१२९७६

देउराली सोतीखोला खानेपानी तथा सर-सफाई उपभोक्ता संस्था



Deurali Sotikhola Water Supply & Sanitation User Organization

हुप्सेकोट-४, भयालबास न.प. (बर्दघाट सुस्ता पूर्व) गण्डकी प्रदेश

Hupsekot-4, Jhyalbas, Nawalparasi (East of Bardaghat Susta) Gandaki Zone

स्था (Estd) २०५५ (2055)

प.सं.(L.No.) 076/77

मिति (Date): २०७६/०८/२५

च.नं.(Ref.No.) २३



जानकारी सम्बन्धमा

परामर्शदाता टेक-आइकन जे.भी. को डिजाइन टिमले यस देउराली हुप्सेकोट शहरी खानेपानी आयोजनाको प्रारम्भिक अध्ययन देखि सम्भाव्यता अध्ययन र तत्पश्चात् विस्तृत इन्जिनियरीङ्ग डिजाइनको दौरानमा आयोजनाका लागि सुख्खा याममा गिरुवारी ग्रेभिटि मुहानमा भएको ४० लिटर प्रति सेकेण्ड मध्येबाट २६ लिटर प्रति सेकेण्ड, गिरुवारी पम्पिङ्ग साइटमा प्रशस्त पानी रहेको मध्येबाट ११ लिटर प्रति सेकेण्ड, बेतही खोला मुहानमा रहेको १० लिटर प्रति सेकेण्ड मध्येबाट ५ लिटर प्रति सेकेण्ड, पत्थर खोला मुहानमा रहेको १२ लिटर प्रति सेकेण्ड मध्येबाट ८ लिटर प्रति सेकेण्ड पानी डिजाइन वर्ष सन् २०४० मा आवश्यक रहने जानकारी उपभोक्ता समितिको बैठकमा तथा परामर्श दाताले प्रतिवेदन प्रस्तुतिकरणको समयमा उपभोक्ता समिति र उपस्थित उपभोक्ताहरु माझ प्रस्तुत गरी विस्तृत छलफल भएको जानकारी गरिन्छ ।


(मि.बाराण रेग्मी)
सचिव


(मैक गहदर पलागी)
अध्यक्ष

English Translation of Recommendation Letter from Deurali Sotikhola WUSC

Deurali Sotikhola Water Supply and Sanitation User's Organization
Hupsekot-4, Jhyaalbaas, Nawalparasi, (East of Bardaghat Susta), Ganadaki Province
Estd. 2055 B.S.

Date: December 11, 2019

In Regard to the Information

This is to inform that throughout Preliminary Study, Feasibility Study and Detailed Engineering Design phases, the detailed discussions have been carried out by the design team of the consultant, TAEC-ICON JV at WUSC meetings and detailed engineering design report presentation, regarding the information shared to the WUSC members and beneficiaries, on the requirement of 26 lps water out of 40lps available at Giribari Gravity source, 11 lps from Girubari Pumping site, 5 lps out of 10 lps available at Betahi Khola and 8 lps out of 12 lps from Pathare Khola for the design year 2040 A.D.

Bhim Narayan Regmi
Secretary

Bhek Bahadur Pulami
Chairman

GRC Notification at PMO Level (3rd Level)

Government of Nepal
Ministry of Water Supply
Department of Water Supply and Sewerage Management
Urban Water Supply & Sanitation Sector Project
PROJECT MANAGEMENT OFFICE
Panipokhari, Kathmandu



Ref No: 689/078/76



06 February 2020

To Whom it May Concern

Subject: Regarding formation of Grievance Redress Committee (Project Level)

As per the Project Administration Manual of Urban Water Supply and Sanitation (sector) Project, the project level, Grievance Redress Committee (GRC) at Project Management Office (3rd Level) has been formed with the following members.

- | | |
|--|-------------|
| 1. Project Director | Coordinator |
| 2. Deputy Project Director (Concerned) | Member |
| 3. Social Safeguard Officer : Ajita Regmi (Mob.9841739993) | Member |
| 4. Environment Safeguard Officer : Manish Kumar Raj | Member |
| 5. Social Safeguard Specialist (PMQAC) | Member |
| 6. Environment Safeguard Specialist (PMQAC) | Member |

Invitee: Representative of Nepal Federation of Indigenous Nationalities (NEFIN)

It is also notified that all the decision made from 3rd Level GRC will be shared by the Social Safeguard Officer to the related person and levels.

Regards

Yours Sincerely

Bidya Nath Bhattarai

Project Director
Bidya Nath Bhattarai
(Project Director)

GRC Notification Document at Municipality (2nd Level)

जि.वि.स.क.बा.नं. ४३१/०५५

१८६४४१२९७६



देउराली सोतीखोला खानेपानी तथा सर-सफाई उपभोक्ता संस्था

Deurali Sotikhola Water Supply & Sanitation User Organization

हुप्सेकोट-४, भ्यालबास न.प. (बर्दघाट सुस्ता पूर्व) गण्डकी प्रदेश

Hupsekot-4, Jhyalbas, Nawalparasi (East of Bardaghat Susta)

स्था। Estd। २०५५ (2055)

प.सं. (L.No.) 076/77

च.नं. (Ref.No.) 25

मिति (Date): २०७७/०९/२६



धीमान आयोजना प्रमुख ज्यू

शहरी खानेपानी तथा सरसफाई आयोजना

आयोजनाको कार्यालय, पानीपोखरी काठमाण्डौ

विषय - समिति गठन गरिएको सम्बन्धमा।

उपरोक्त सम्बन्धमा यस संस्थाको मिति २०७७ वैशाख २६ गते बसेको बैठक बाट निर्णय भए अनुसार आयोजना सम्वन्धी गुनासो निवारण समिति तर्पयित अनुसार गठन गरि पठाईएको व्यहोरा अनुरोध गरिन्छ।

तर्पयित

श्री हुप्सेकोट गाउँपालिका का अध्यक्ष

श्री लक्ष्मी देवी पाण्डे

सयोजक

श्री जिल्ला प्रशासन कार्यालय नवलपरासी प्रमुख

श्री पिताम्बर छिमेरे

सदस्य

श्री विराट सामुदायिक वन उपभोक्ता समूह अध्यक्ष

श्री प्रेम बहादुर काजी

सदस्य

श्री दे.सो. खा.पा. तथा स.स.उ.सं अध्यक्ष (दे.हु.न.खा.पा.आ.)

श्री मेक बहादुर पुलासी

सदस्य

श्री दे.सो. खा.पा. तथा स.स.उ.सं सचिव (दे.हु.न.खा.पा.आ.)

श्री भिमनारायण रेग्मी

सदस्य

भिमनारायण रेग्मी

सचिव

मेक बहादुर पुलासी

अध्यक्ष

(मेक बहादुर पुलासी)

English Translation of GRC Notification Document at Municipality Level (2nd Level)

Deurali Sotikhola Water Supply & Sanitation User's Committee
Hupsekot-4, Jhyalbaas Municipality (East of Bardaghat Susta) Gandaki Province
Estd. 2055 B.S.

Date: May 08, 2020

To,
The Project Director,
Urban Water Supply & Sanitation Project,
PMO, Panipokhari, Kathmandu

Subject: In regard to the formation of Committee

In relation to the aforementioned subject, it is informed that as per the meeting held dated May 08, 2020, Grievance Redress Committee regarding the project has been formed as mentioned below:

1. Chairman of Hupsekot Rural Municipality	Ms. Laxmi Devi Pandey	Coordinator
2. Chief of District Administration Office, Nawalpur	Mr. Pitamber Ghimire	Member
3. Chairman, Birat Community Forest User's Committee	Mr. Prem Bahadur Karki	Member
4. Chairman, Deurali Sotikhola WUSC	Mr. Mek Bahadur Pulami	Member
5. Secretary, Deurali Sotikhola WUSC	Mr. Bhim Narayan Regmi	Member

Bhim Narayan Regmi
Secretary

Mek Bahadur Pulami
Chairman

Appendix 6
Simple Checklists & Sample Survey
Questionnaire

OTHER CHECKLISTS**A. CHECKLIST FOR PHYSICO CHEMICAL ENVIRONMENT**

Parameters	Description
Topography	27°74'N Latitude and 83°98'E Longitude Inner Terai Region
Geology (Rock and Soil Types)	Boulder, cobble, pebble, gravel and sand with intercalation of clays as well as detritus of quaternary age
Erosion and Sedimentation	No such events recorded and observed
Climate	Mild; Generally warm & temperate Less rainfall in winter than in summer Average Rainfall: 1811mm
Quarry Sites (If any)	No
Land Use	Agricultural land is the dominant followed by forests and residential areas.
Air Quality	Medium
Noise Level	Medium
Drainage Network	Storm Water Drain Along Main Market Area, However, in other areas, drainage not required due to its topography.

B. Floras & Fauna**Floras (Plant Life Forms)**

SN	Local Name	Botanical Name	Location	Vegetation Type/Life Forms	Local Status	Local Uses	Protection Status			
							IUCN	CITES	GoN	IBAT
1	Aank	<i>Caloptris gigantean</i>	Pasture land	Shrub	Commonly Found	Medicinal Uses, and Agroforestry	LC	LC	LC	
2	Amala	<i>Pbyllantus emblica</i>	Dry Open Forest Areas	Tree	Commonly Found	Medicinal Uses, Agroforestry, Edible Fruit, Fuel wood and Source of charcoal.	LC	LC	LC	
3	Bakaino	<i>Melia azedarach</i>	Along road and forest edges	Medium Sized Shrub or Tree		Edible Fruits, Agroforestry	LC	LC	LC	
4	Barro	<i>Terminalia bellirica</i>	Scattered Forest Areas	Tree		Medicinal Uses, Edible Fruits, Agroforestry and Fuel wood and Source of charcoal.	LC	LC	LC	
5	Bayer	<i>Zizyphus mauritiana</i>	Sandy Soils along hills, slopes	Tree		Medicinal Uses, Edible Fruits, Agroforestry and Fuel wood and Source of charcoal.	LC	LC	LC	
6	Bot Dhaiyanro	<i>Lagerstroemia parviflora Roxb.</i>	Open grasslands	Tree		Edible Gum, Carpentry, Black Dye	LC	LC	LC	
7	Bhalayo	<i>Busbanania latifolia</i>	Open Areas of Forests	Tree		Edible Fruit, Edible Oil from seeds, Medicinal Uses, Agroforestry, Firewood and Charcoal	LC	LC	LC	
8	Bhimsenpati Jhar	<i>Isodon ternifolia</i>	Open Forests	Shrub		Medicinal Uses, Edible Leaves	LC	LC	LC	
9	Chhatiwan	<i>Alstonia scbolaris</i>	Nearby Forests	Tree		Medicinal Uses	LC	LC	LC	
10	Dabdabe	<i>Garuga pinnata</i>	Mixed Type Forests	Tree		Edible Fruits & Agroforestry	LC	LC	LC	
11	Damaikath	<i>Myrsine sp.</i>	Open areas favoring moist soils	Tree		Agroforestry and Fuel wood	LC	LC	LC	

SN	Local Name	Botanical Name	Location	Vegetation Type/Life Forms	Local Status	Local Uses	Protection Status			
							IUCN	CITES	GoN	IBAT
12	Dhatrung	<i>Ebretia laevis</i>	Forest Patches, Bushlands	Tree		Medicinal Uses	LC	LC	LC	
13	Dhurseli	<i>Colebrookea oppositifolia</i>	Lowhills	Shrub		Medicinal Uses	LC	LC	LC	
14	Dudhkhirro	<i>Holarrbena pubescus</i>	Forests near watercourses	Tree		Medicinal Uses and Agroforestry	LC	LC	LC	
15	Harro	<i>Terminalia chebula</i>	Mixed Type Forests	Tree		Medicinal Uses, Edible Fruits and Edible Oil from seeds	LC	LC	LC	
16	Jamun	<i>Syzygium cumini</i>	Evergreen to Deciduous Forests	Tree		Medicinal uses, Cultural & Religious Values	LC	LC	LC	
17	Kadam	<i>Anthocephalus chinensis</i>	Deep Moist Soils often in secondary forests along riverbanks	Tree		Medicinal Uses & Wood for Light Construction Works	LC	LC	LC	
18	Khayer	<i>Acacia catechu</i>	Tropical Moist Deciduous Forests	Tree		Medicinal Uses, Firewood, Charcoal	LC	LC	LC	
19	Kumbhi	<i>Careya arborea</i>	Along forest edges	Tree		Medicinal Uses, Wood for general construction works	LC	LC	LC	
20	Kuro	<i>Barleria crsitata</i>	Waste Places and Along the roadsides	Shrub		Medicinal Uses & Agroforestry	LC	LC	LC	
21	Kutmiro	<i>Litsea monopetala</i>	Lowlands	Tree		Medicinal Uses & Wood for furniture	LC	LC	LC	

Appendixes

SN	Local Name	Botanical Name	Location	Vegetation Type/Life Forms	Local Status	Local Uses	Protection Status			
							IUCN	CITES	GoN	IBAT
22	Kyamun	<i>Cleistocalyx operculatus</i> (<i>Syzvium</i>)	Grasslands	Tree		Agroforestry and Wood for furniture	LC	LC	LC	
23	Lahare gayo	<i>Bridelia retusa</i>	Open Land	Tree	LC	Medicinal Uses, Fuel wood and Construction Works	LC	LC	LC	
24	Latikath	<i>Swida oblonga</i>	Nearby Forests	Tree	LC	Medicinal Uses	LC	LC	LC	
25	Nim	<i>Azadirachta indica</i>	Lowland Forest Areas	Tree	LC	Edible Fruits, Edible Leaves, Medicinal Uses, Agroforestry, Firewood	LC	LC	LC	
26	Palans	<i>Butea monosperma</i>	Open Grasslands and Wastelands	Tree	LC	Medicinal Uses, Agroforestry, Firewood of Moderate quality	LC	LC	LC	
27	Rajbrikshya	<i>Cassia fistula</i>	Open Forests & Grasslands	Tree	LC	Medicinal Uses, Agroforestry, Making good quality charcoal	LC	LC	LC	
28	Sal	<i>Shorea robusta</i>	Nearby Forests	Trees	LC	Medicinal, Making plates, cups (Tapari), Fuelwood, Edible Seeds	LC	LC	LC	
29	Sandan	<i>Desmodium oojeinense</i>	Nearby Forests	Tree	LC	Medicinal uses and Fuel wood	LC	LC	LC	
30	Satisal	<i>Dalbergia latifolia</i>	Nearby Forests	Tree	LC	Medicinal Uses & Agroforestry	LC	LC	LC	

SN	Local Name	Botanical Name	Location	Vegetation Type/Life Forms	Local Status	Local Uses	Protection Status			
							IUCN	CITES	GoN	IBAT
31	Saj	<i>Terminalia alata</i>	Sal Forests	Tree	LC	Medicinal Uses, Fuel wood and Making of Excellent Charcoal	LC	LC	LC	
32	Sindure	<i>Mallotus philippensis</i>	Scrubby Vegetation and Open Rocky Grounds	Tree	LC	Edible Fruits, Edible Oil from seeds, Medicinal Uses, Agroforestry uses, Fuel Wood and various other uses.	LC	LC	LC	
33	Sisau	<i>Dalbergia sissoo</i>	Open Areas of Nearby Forests	Tree	LC	Medicinal Uses, Agroforestry Uses, Firewood and Charcoal Production	LC	LC	LC	
34	Tantari	<i>Dillenia pentagyna</i>	Open places in foothills	Tree	LC	Edible Fruits, Medicinal Uses, Wood For Furniture, Charcoal Production	LC	LC	LC	

Mammals in the project area

SN	Common Name	Scientific Name	Habitat	Local Status	Crop/Livestock Raider	Protection Status			
						IUCN	CITES	GoN	IBAT
1	Bengal Fox	<i>Vulpes Bengalensis</i>	Forests	Commonly found in forest areas	Livestock Raider	LC	LC	LC	LC
2	Common Leopard	<i>Panthera pardus</i>	Forests	Occasionally Spotted in Forest Areas	Livestock Raider	VU	VU	VU	VU
3	Five Stripped palm Squirrel	<i>Funambulus Pennantii</i>	Forests	Commonly Found	Crop Raider	LC	LC	LC	LC
4	Gray Wolf	<i>Canis lupus</i>	Forests	Commonly found in forest areas	Livestock Raider	LC	LC	LC	LC

SN	Common Name	Scientific Name	Habitat	Local Status	Crop/Livestock Raider	Protection Status			
						IUCN	CITES	GoN	IBAT
5	Golden Jackal	<i>Canis aureus</i>	Forests	Commonly found in forest areas	Livestock Raider	LC	LC	LC	LC
6	Greater Short Nosed Fruit Bat	<i>Cynopterus sphinx</i>	Forests	Commonly found in forest areas	Crop Raider	LC	LC	LC	LC
7	House Rat	<i>Rattus Rattus</i>	Human Habitations	Commonly Found	Crop Raider	LC	LC	LC	LC
8	Jungle Cat	<i>Felis Chaus</i>	Forests	Commonly found in forest areas	Livestock Raider	LC	LC	LC	LC
9	Jungle Rat	<i>Bandicota indica</i>	Forests & Agricultural Field	Commonly found in forest areas	Crop Raider	LC	LC	LC	LC
10	Rhesus Monkey	<i>Macaca mulatta</i>	Forests	Commonly found in forest areas and in human habitations also	Crop Raider	LC	LC	LC	LC
11	Small Indian Mongoose	<i>Herpetes auropunctatus</i>	Forests and Agricultural Field	Commonly Found	No	LC	LC	LC	LC

Birds Sighted in the project area

SN	Common Name	Scientific Name	Type	Habitat	Local Status	Protection Status			
						IUCN	CITES	GoN	IBAT
1	Barn Swallow	<i>Hirundo Rustica</i>	Swallow	Farmland & Settlement Areas	Commonly Found/LC	LC	LC	LC	LC
2	Black Francolin	<i>Francolinus Francolinus</i>	Game Bird	Thick vegetation near water	Commonly Found/LC	LC	LC	LC	LC
3	Black Kite	<i>Milvus Migrans</i>	Diurnal Raptors	Settlement Areas with high human population	Occasionally Spotted	LC	LC	LC	LC
4	Chestnut Headed Bee Eater	<i>Merops Leschenaulti</i>	Near Passerine Bird	Highland Areas	Commonly Found	LC	LC	LC	LC
5	Common	<i>Cuculus Canorus</i>	Cuckoo	Deciduous & Coniferous Forests,	Commonly Found	LC	LC	LC	LC

Appendixes

SN	Common Name	Scientific Name	Type	Habitat	Local Status	Protection Status			
						IUCN	CITES	GoN	IBAT
	Cuckoo			Woodland Areas, Meadows, Lowlands					
6	Common Hoopoe	<i>Upupa epops</i>	Coraciiform (Colorful Birds)	Farmlands	Commonly Found	LC	LC	LC	LC
7	Coppersmith Barbet	<i>Megalaima haemacephala</i>	Plump Bird	Open Areas, Urban Parks & gardens with fruiting trees	Commonly Found	LC	LC	LC	LC
8	Crimson Sun Bird	<i>Aethopyga Siparaja</i>	Sunbird	Forest & Cultivated Areas	Commonly Found	LC	LC	LC	LC
9	Eurasian Tree Sparrow	<i>Passer Montanus</i>	Passerine Bird	Human Habitations	Commonly Found	LC	LC	LC	LC
10	Eurasian Wigeon	<i>Anas penelope</i>	Wigeon (Dabbling Duck)	Open Wetlands	Commonly Found	LC	LC	LC	LC
11	Fulvous breasted Woodpecker	<i>Dendrocopus Macei</i>	Woodpeckers	Subtropical or Tropical Dry Forests and Lowland Forest	Occasionally Spotted	LC	LC	LC	LC
12	Gadwall	<i>Anas strepera</i>	Dabbling Duck	Open Wetlands	Commonly Found	LC	LC	LC	LC
13	House Crow	<i>Corvus Splendens</i>	Crow	Urban & Rural Habitats including towns, cities, farmlands	Commonly Found	LC	LC	LC	LC
14	House Sparrow	<i>Passer Domesticus</i>	Sparrow	Urban & Rural Habitats including towns, cities, farmlands	Commonly Found	LC	LC	LC	LC
15	Indian Cuckoo	<i>Cuculus micropterus</i>	Cuckoo	Deciduous & Evergreen Forests	Commonly Found	LC	LC	LC	LC
16	Kalij Pheasant	<i>Lophura leucomelanos</i>	Pheasant	Forests	Occasionally Spotted	LC	LC	LC	LC
17	Large Billed Crow	<i>Corvus macrorhynchos</i>	Crow	Human Habitations	Commonly Found	LC	LC	LC	LC
18	Lesser Whistling Duck	<i>Dendrocygna javanica</i>	Whistling Duck	Freshwater Wetlands, Wet paddy Fields	Commonly Found	LC	LC	LC	LC
19	Lineated Barbet	<i>Megalaima lineate</i>	Asian Barbet	Holes at Tree trunks	Occasionally Seen	LC	LC	LC	LC
20	Little Egret	<i>Egretta Garzetta</i>	Heron	Open Wetlands, Rice Fields	Commonly Found	LC	LC	LC	LC
21	Mallard	<i>Anas platyrhynchos</i>	Common Duck	Wetlands, Rivers & Streams	Commonly Found	LC	LC	LC	LC
22	Oriental Pied Hornbill	<i>Anthraceroceros albirostris</i>	Hornbill	Lowland Forests	Occasionally Seen	LC	LC	LC	LC

SN	Common Name	Scientific Name	Type	Habitat	Local Status	Protection Status			
						IUCN	CITES	GoN	IBAT
23	Oriental Turtle Dove	<i>Streptopelia orientalis</i>	Dove	Open habitats with good tree cover nearby human habitations	Commonly Found	LC	LC	LC	LC
24	Plum headed Parakeet	<i>Psittacula cyanocephala</i>	Parrot	Forest Areas, Open Woodlands, City Gardens also	Commonly Found	LC	LC	LC	LC
25	Rock Dove	<i>Columba Livia</i>	Dove/Common Pigeon	Open habitats with good tree cover nearby human habitations	Commonly Found and Abundant	LC	LC	LC	LC
26	Spotted Owlet	<i>Athene Brama</i>	Owl	Open habitats including farmlands and human habitations, City Areas	Commonly Found	LC	LC	LC	LC
27	Western (Asian)Koel	<i>Eudynamys Scolopaceus</i>	Cuckoo	Cultivated Lands, Forests	Commonly Found in forest areas	LC	LC	LC	LC
28	White Breasted Water Hen	<i>Amaurornis Phoenicurus</i>	Water Bird	Near Freshwater and Brackish Water	Commonly Found	LC	LC	LC	LC

Herpeto-fauna in the Project Area

S.N.	Local Name	Scientific Name	Habitat	Local Status	Protection Status			
					IUCN	CITES	GoN	IBAT
1	Common Indian Monitor	<i>Varanus Bengalensis</i>	Moist Forest Areas	Occasionally Spotted	LC	LC	LC	LC
2	Common toad/Himalayan Toad	<i>Bufo melanostictus/Duttaphrynus Himalayanus</i>	Shrubland near streams, Vicinity of seepage & fields	Commonly Found	LC	LC	LC	LC
3	Garden lizard	<i>Calotes versicular</i>	Gardens, Agricultural Fields	Commonly Found	LC	LC	LC	LC
4	Green Pit Viper	<i>T. albolabris</i>	Small Bush Vegetations, Trees, Urban Areas also	Occasionally Spotted	LC	LC	LC	LC
5	House Lizard	<i>Hemidactylus Flaviviridis</i>	Human Habitations	Commonly Found	LC	LC	LC	LC
6	Olive Keelback Water Snake	<i>Atretium Schistosum</i>	Water or Surrounding Vegetation	Occasionally Spotted	LC	LC	LC	LC

S.N.	Local Name	Scientific Name	Habitat	Local Status	Protection Status			
					IUCN	CITES	GoN	IBAT
7	Rat snake	<i>Ptyas mucosus</i>	Forest Areas and Vegetations near Human Habitations	Occasionally Spotted	LC	LC	LC	LC
8	Stream Frog	<i>Rana cyanophylectis</i>	Agricultural Fields, Roadsides, Freshwater, Vegetations near Human Habitations	Commonly Found	LC	LC	LC	LC

Fish in the Project Area

S.N.	Local Name	Scientific Name	Status of Occurrence	Migratory Status/Season	Observed Location
1	Andha Bam	<i>Amphipnous cuchia</i>	Common	June to November	
2	Bokshi Machho	<i>Amblyceps mangois</i>	Common	June to September and February to March	
3	Chuche Buduna	<i>Garra Annandalei</i>	Common	Resident	
4	Hile	<i>Channa Gachua</i>	Common	Available throughout year	
5	Jalkapoor	<i>Clupisoma garua</i>	Common	June to October	
6	Jarua	<i>Chagunius chagunio</i>	Common	Local Migrant-April to June	
7	Mangur	<i>Clarias batrachus</i>	Common	Available throughout year	
8	Singhi	<i>Heteropneustes fossilis</i>	Common	Available throughout year	

Note: All the above-mentioned floral & faunal species are found in various locations of the project town. Due to increasing urbanization, some of the species found within the settlement areas have now been increasingly shifted to the roadside bushes as well as nearby forests areas.

Sample Survey Questionnaire

लेखो साना शहरी खानेपानी तथा सरसफाई क्षेत्रगत आयोजना
घरघुरी सर्वेक्षण पुस्तकबन्दी

जिल्ला: _____ नगरपालिका/गा.वि.स. _____ वडा नं. _____
नगर आयोजना: _____ घर नं. _____
अन्तरवाता विनेको नाम: _____ अन्तरवाता मिति: _____
सुपरिबेक्षकको नाम: _____

१. सामाजिक-आर्थिक विवरण

(उपयुक्त कोठामा (✓) यो चिन्ह लगाउनु होस्)

१.१ अन्तरवाता विनेको नाम:

१.२ घरभूतिका नाम: _____ मिठु: ☐ पुरुष ☐ महिला ☐
 १.३ यस परिवारमा बचाइला भाएको कुनै सदस्य हुनु हुन्छ: छ ☐ छैन ☐
 १.४ जातजातिमध्ये कुन हो: क) आदिवासी जनजाति ☐ ख) दलित ☐ ग) अन्यसंरक्षक ☐ घ) अन्य ☐
 (अन्तर्वाता विनेको घरको आधारमा उपयुक्त वर्गमा चिन्ह लगाउने।)

१.५ अन्तरवाता विने व्यक्तिको नाता:

१.६ यस परिवारका सदस्यहरूको विवरण दिनुस्

क्र.सं.	घरभूतिलेखको नाता/नाम	उमेर	मिठु	शिक्षा स्तर	पेशा
१					
२					
३					
४					
५					
६					
७					
८					
९					

नोट: पेशा: १. कृषि २. व्यापार ३. लोकर्मी ४. उद्योगधन्दा

५. रेमिटेन्स (विदेशिक रोजगार) ६. जग्गाला ७. अन्य

शिक्षा: १. निरक्षर २. साक्षर ३. प्राथमिकसम्म ४. माध्यमिकसम्म ५. एस.एस.सी. उर्तिर्ग

६. आई.ए. ७. बि.ए. ८. एस.एस. ९. अन्य

१.७ यस परिवारमा बसोबास गर्ने अन्य सदस्यहरूको सहयोगी: डेरावाला कुल संख्या

१.८ यस नगर/शहरमा कहिले देखि बस्दै आउनु भएको छ: वर्षे

स्ववासी बसाइ सरेको बसाइ सरेर आएको भा. कुन जिल्लाबाट:

१.९ बसाइ सार्नुको कारण: प्राकृतिक/प्राकृतिक व्यापार/व्यवसाय शिक्षा हुन्छ विदेकोपासेन सामाजिक फलपन

१.१० कहिले देखि यस घरमा बस्दै आउनु भएको हो: सास/वर्ष

१.११ यो घर आफ्नै हो: हो होइन यदि हो भने हावाको मुख्य झलि होवा अनुमानित रु

ख: भाडामा बस्नेको हो होइन हो भने मासिक घर भाडा कति तिर्नुहुन्छ: रु

ग: सुकुम्भासी हो होइन

१.१२ यस घरमा भान्सा कोठा बाहेक अन्य कोठा कति वटा कोठाहरू छन्:

१ कोठा २ कोठा ३ कोठा ४ कोठा वा सो भन्दा बढि

१.१३ घरको अवलोकन गर्ने घरको किसिम लेख्ने: पक्की अर्ध पक्की कच्ची

(पक्की: छत हावा, अर्ध पक्की: दुहा, दुहाको गाढो, टिनको छाया, दुहा, स्लेट/किमरी, टावल आदि, कच्ची: माटो गाढो र घर, टावलले छाएको)

१.१४ यस परिवारसँग जग्गा जमीन छ: छ छैन

यदि छ भने रु रोपनी ०.२५ हेक्टर: भन्दा बढि वा रु रोपनी भन्दा कम

१.१५ पहाडी जग्गाको किसिम: क) खेत वा बारी/अर्धोपेत जग्गा: बिघा/रोपनी:

ख) खेत वा बारी/सिंचित जग्गा: बिघा/रोपनी:

१.१६ गह्राँने माई/भैसी पाल्नु भएकोछ: छ छैन, छ भने कतिवटा: एउटा दुईवटा वा बढि

१.१७ लगाईएको परिवारमा तल उल्लेखित कुल कुल सामान छन्: (मागको सामानको संख्या लेख्ने)

क्र.सं.	सम्पत्ती	संख्या	कौफयत
१	साइकल/रिक्सा		
२	मोटारसाइकल		
३	फिटरगाडी		
४	कार/जिप		
५	मिनीबस/बस		
६	ट्याक्टर/ट्रक		
७	गेबुको/काकोट		
८	टेलिभिजन/रेडियो/रेकर्ड		

९	स्टोम/म्यास चुली		
१०	रेफ्रिजरेटर		
११	वासिक मेशिन		
१२	वाटर फिल्टर		
१३	कम्प्युटर		
१४	इमेल/इन्टरनेटको पहुँच		
१५	अन्य भाग उल्लेख गर्ने।		

१.१८ यदि मूल पेशा कृषि भए कति महिना खान पुग्छ? ३ महिना ☐ ६ महिना ☐ १२ महिना ☐ यदि तपस्य भएमा कसरी खान्नु हुन्छ? घरमा/घरमाझा तम्बाखुरा ☐ घरेलु ☐ अन्य ☐ अन्य ☐ गर्नेछु।

१.१९ तपाईंको परिवारको औसत मासिक खर्च कति छ? उल्लेख गर्नेछु।

खर्चको शिर्षक र किसिम	मासिक खर्च रु.	कैफियत
(क) कृषि तर्फ		
रसायनिक मल, पिउ, किटनाशक आदी खरिद गर्ने		
माटोको लैपारी, रोप्ने, गोड्ने, बाली काट्ने, भिडाउने, बुचानी र बिर्छी गर्दा हुने खर्च		
अन्य भाग उल्लेख गर्नेछु।		
(क) को जम्मा		
(ख) गैर कृषि तर्फ		
खाद्यान्न (अन्न र दैनिक उपभोग्य वस्तु)		
कपडा		
शिक्षा		
घर भाडा/घर सम्मत		
यातायात/संचार		
विद्युत		
पानी पीत/सम्मत सम्भार		
बीबीध/उपचार (पानीबाट हुने रोग)		बाह्यिक खर्च
बीबीध/उपचार (अन्य रोग)		बाह्यिक खर्च
अन्य स्वास्थ्य सम्बन्धी खर्च आदि उल्लेख गर्ने		बाह्यिक खर्च
(ख) को जम्मा		
क+ख को कुल जम्मा		

१.२० तपाईंको परिवारको औसत मासिक आय कति छ? उल्लेख गर्नेछु।

आयश्रोत	समान परिवार		प्राप्त हुने आय (रु. मासिक)	कैफियत
	पुरुष	महिला		
(क) कृषि तर्फ				
कृषि उत्पादनको विक्रीबाट आय				
(मकै, गहुँ, धान, तरकारी, फलफूल)				
पशुजन्य उत्पादन (दुध, दही, घृ, बाख्रा, कुखुरा आदि)				
(क) को जम्मा				
(ख) गैर कृषि तर्फ				
लोकरी/जोगिर				
स्थानीय मजदुरी				
विमान/उपहार आदी				
वित्तीय सेवाहरू (रेन्टलेन्ड)				
पसल/उपचार				
उद्योग				
पसल/घर भाडा				
गाडी/बुचानी व्यवसाय				
अन्य भाग उल्लेख गर्ने				
(ख) को जम्मा				
क+ख को कुल जम्मा				

१.२१ घरको परिवारले कुनै ठुलो खराब होक्नु परेको छ ? ☐ छ ☐ छैन

२. खानेपानी तथा सरसफाई व्यवस्थापन

२.१ लपाईको परिवारको लागी खान्, खान्ना पकाउनु, नुहाउनु, भाँडाबर्तन तथा नुहा धुनुका लागी प्रयोग गरिने पानीको स्रोत एउटा हो ? ☐ हो ☐ होइन

२.२ लपाईको ☐ नपाईको ☐ स्रोत कहाँ छ : घर सम्भाव्यतः भित्र ☐ सार्वजनिक स्थलमा ☐

२.३ लपाईको परिवारले पिउन, खान्ना पकाउनुको लागी प्रयोग गर्ने पानीको स्रोत कुन हो : दैनिक कति लिटर पानी खर्चेनु हुन्छ : कुपचा तलको कोठामा ☒ थिक्न लगाउनुहोस् ।

क्र.सं.	वर्षा/सामना	✓	मिटर/ दैनिक	सुख्खा/सामना	✓	मिटर/ दैनिक
१.	इनार/कुचा/खुल्ना	✓		इनार/कुचा/खुल्ना	✓	
२.	इनार/कुचा/इक्कल भएको	✓		इनार/कुचा/इक्कल भएको	✓	
३.	टयुबेल/इयापइयम्भ	✓		टयुबेल/इयापइयम्भ	✓	
४.	खिप टयुबेल	✓		खिप टयुबेल	✓	
५.	इनार/कुचा/मेसीनले लाग्ने	✓		इनार/कुचा/मेसीनले लाग्ने	✓	
६.	सार्वजनिक द्वारा	✓		सार्वजनिक द्वारा	✓	
७.	निजी द्वारा	✓		निजी द्वारा	✓	
८.	मूल, खोला, नदी, पोखरी	✓		मूल, खोला, नदी, पोखरी	✓	
९.	विकृत/सँग पानी फिनेर	✓		विकृत/सँग पानी फिनेर	✓	
१०.	घरबाटको पानी सिकलन गरेर	✓		घरबाटको पानी सिकलन गरेर	✓	
११.	अन्य	✓		अन्य	✓	
१२.	बाह्य छेत	✓		बाह्य छेत	✓	

२.४ दैनिक खानेपानी आवश्यक पूर्ति पानी सिकलनबारे निम्न विवरण विनुरोस् ।

क्र.सं.	विवरण	वर्षा/सामना				सुख्खा/सामना			
		पुरुष	महिला	बालिका	बालक	पुरुष	महिला	बालिका	बालक
१.	कति खेप/पटक								
२.	मिटर/खेप								
३.	कुल परिमाण								
४.	पानी प्याउनु लाग्ने समय : मिनेट/खेप								
	पानीको मुहान समय								
	मुहानमा पर्खनु पर्ने समय								
	काँडा लाग्ने समय								
५.	प्रति खेप लाग्ने समय								

नोट : जस्तैजस्तै निचे व्यक्तिले पानीको भाँडा ठेरी साँघो लमाता यकिन गरि उल्लेख गर्ने ।

२.५ भाँडा सामान, नुहाउनु र नुहा धुनु तथा अन्य कामको लागी कुन स्रोतको पानी प्रयोग गर्नुहुन्छ : कति पानी खपत गर्नुहुन्छ : कुपचा

☒ थिक्न लगाउनुहोस् ।

क्र.सं.	वर्षा/सामना	✓	मिटर/ दैनिक	सुख्खा/सामना	✓	मिटर/ दैनिक
१.	इनार/कुचा/खुल्ना	✓		इनार/कुचा/खुल्ना	✓	
२.	इनार/कुचा/इक्कल सँगित	✓		इनार/कुचा/इक्कल सँगित	✓	
३.	टयुबेल/इयापइयम्भ सँगित	✓		टयुबेल/इयापइयम्भ सँगित	✓	
४.	खिप टयुबेल	✓		खिप टयुबेल	✓	
५.	इनार/कुचा/मेसीनबाट लाग्ने	✓		इनार/कुचा/मेसीनबाट लाग्ने	✓	
६.	सार्वजनिक द्वारा	✓		सार्वजनिक द्वारा	✓	

७.	धरको निजी धारा	A	धरको निजी धारा	A
८.	मूल खोला, नदी, पोखरी	A	मूल खोला, नदी, पोखरी	A
९.	पानी विक्रीतासँग किनेर	A	पानी विक्रीतासँग किनेर	A
१०.	आकासे पानी संकलन गरेर	A	आकासे पानी संकलन गरेर	A
११.	अन्य	A	अन्य	A
१२.	बहा छैन	A	बहा छैन	A

२.६. लुगा धुन र नुहाउन धरबाट पानीको मुहान सम्म जान कति समय लाग्दछ। (यदि श्रोत/मुहान छुट्याछुट्टै भएमा समय (मिनटमा) उल्लेख गर्ने)

क। लुगा धुन जाने नुहाउन भौडा माथान

ख। वर्षाधाममा लाग्ने समय मिनट सुख्खा धाममा लाग्ने समय ट

२.७. यदि धाराको पानी बहाको आवश्यकता परिपूरित गर्ने पर्याप्त छैन भने कसरी आपूर्ति गर्ने हुन्छ?

पानीको श्रोत	परिमाण मिटर	खर्चनु पर्ने समय/घण्टा/दिनिक	थप खर्च मासिक
क्या डनार			
आकासे पानी संकलन			
निजी टाँकरबाट पानी किनेर			
हण्ड पम्प ट्याङ्कलेन			
मिनटर वाटर जोर			
अन्य			

२.८. गाईबस्नुको लागि चाहिने पानी कुन श्रोतबाट कति मात्रामा उपभोग गर्नुहुन्छ।

क। प्रयोग भएको श्रोत

ख। परिमाण (लिट्र/दिनिक)

ग। श्रोतसम्म जान आउन लाग्ने समय (मिनट)

३. निजी धारा जडान

३.१. के लपाइले घरमा पाइप धारा जडान गर्नु भएको छ? छ ☐ छैन ☐ यदि छ भने कति खर्च लाग्यो? रु.

३.२. के लपाई आफ्नो घरमा धारा जोड्न चाहनु हुन्छ? चाहन्छ ☐ चाहिन्न ☐ चाहनु हुन्छ भने कसरी प्रब जडान गर्ने इच्छा राख्नु हुन्छ।

क। धरभित्र निजी धारा ☐

ख। कम्पाउण्डभित्र निजी धारा ☐

ग। सामुदायिक धारा ☐

३.३. यदि लपाइको 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 खर्चने भएकोले

घ। पानीको मात्रा पर्याप्त नभएकोले

ङ। पानीको आपूर्ति नियमित नभएकोले

च। घर क्षेत्रमा पाइपलाइन जडान गर्ने आवश्यक उपलब्ध नभएकोले

छ। पानीको गुणस्तर राम्रो नभएकोले

ज। अन्य कारण उल्लेख गर्ने

झ। बहा छैन

३.४. जल लपाइले पानीको धारा बापत राख्ने महिनामा पानीको महशुस कति लिनु भयो? रु.

३.५. राख्ने महिनामा तिरेको बिल देखाउन सक्नु हुन्छ? (बिल उपलब्ध भए सोको विवरण गर्ने)

क। तिरेको रकम रु. ख. खर्च भएको पानीको मात्रा मिटर

३.६. पानीको बिल रु. लिनुहुन्छ? ☒ चिन्ह लगाउनुहोस्।

क। मासिक निश्चित तोकिएको रकम

ख। मिटर सिङ्गु बमोजिम

ग। ब्यानेपानी कार्यालयले भने जति

घ। लिनु पर्दैन

ङ। अन्य

च। बहा छैन

३.७. लपाइलाई पानीको बिल तिर्ने कुन तरिका मत पछि?

क। निश्चित तोकिएको मासिक शुल्क

ख। मिटर सिङ्गु बिल अनुसार

३.८. धरको धारामा पानी नलाइँदा पनि पानी महशुस लिनु पर्छ? पछि ☐

३.९. निजी धाराको पानी बाहिर लपाइले कहिले थप पानी किन्नु पर्ने भएको

- कार्यक्रममा निरुद्ध मुख्यालयमा निरुद्ध पर्वत
- ३.१० निजीस्तरको कलाबाट किन्दा कति पर्ने घरमा पानी किन्नु भएको छ ?
निरुद्ध - प्रति निरुद्धको घर रु
- ३.११ लगाइको घरको छाना कति भरपूर छ ?
क) पानी निरन्तर आउँछ
ख) पानी कहिले आउँछ र कहिले आउँदैन
ग) पानी एक दिन चिरागर आउँछ
घ) पानी दैनिक दिन केही घण्टा आउँछ
- ३.१२ खानेपानी चितरण प्रणाली अवरुद्ध हुदा भर्ना सम्भार गर्दा लाग्ने खर्च व्यहान जिम्मा कसको हो ?
क) नेपाल सरकार
ख) खानेपानी उपभोक्ता समूहकाइ समित
ग) समुदाय / छर जिमेकी
घ) अन्य उल्लेख गर्ने
- ३.१३ खानेपानीको पाइप/धारा भर्ना सुधारको लागि बाधक कति रकम खर्चे गर्नुहुन्छ ? राख्ने ☐ राखिने ☐
- ३.१४ सार्वजनिक धारा प्रयोग गरे बापत पानी पोल तिर्नु पर्छ ?
पर्वत भने कति ? रकम समूह/बाधक
- ३.१५ पानीको गुणस्तर तपाइने प्रयोग गर्ने पानीको गुण नष्ट हुनुहुन्छ ? छ ☐ छैन ☐
यदि छैन भने, पानीको गुणस्तर सम्बन्धि समस्या कस्तो छ ?
अ) पानी गन्दाउँछ
आ) स्वाद तरासो छ
इ) पानी प्रदूषित/धमिलो छ
ई) अन्य कसै समस्या भए उल्लेख गर्ने
- ३.१६ घरमै प्रयोग गर्ने पानीको गुणस्तर कायम गर्न के गर्ने हुन्छ
पानीको प्रशोधनको घरैले बिधि अप खर्च मासिक

प्रमान	
फिल्टर गर्ने	
छान्ने	
क्लोरीन (पिचुस), आलम, पोटास	
धुरी गाई	
सोडियम	

सह-सहानी अवधारणा सम्बन्धी प्राथमिकता

- ४.१ यदि लगाईको नगरपालिका/गा.वि.स. मा विभिन्न योजना सञ्चालन गर्ने रकम उपलब्ध छ भने निम्नलिखित मध्ये कुन कुन २ योजनालाई पहिलो प्राथमिकता दिनुहुन्छ ?
- क) सडक चाली
ख) कानोपरे सडक
ग) विद्युत
घ) अस्पताल
ङ) व्यवस्थित खानेपानी प्रणाली
च) विद्युतवाही सडक
छ) विद्युत
ज) संचार
झ) सरसफाई/सुपिछा
ञ) सिंचाइ
ट) पार्टीपीचा धर्मशाला
ड) अन्य
- ४.२ यदि लगाई व्यवस्थित खानेपानी चितरण प्रणालीलाई महत्वपूर्ण मान्नु हुन्छ भने, कसो किसिमको खानेपानी चितरण प्रणालीको योजना गर्नु भएको छ ?
- क) घर - कम्पाउण्डभित्रै व्यवस्थापन, निजी धारा जडान
ग) शुल्क सहितको सामुदायिक धारा जडान
घ) सुधारको कुवा, हवापछपम्प जडान
ङ) सुधारको कुवा, बिद्युतीय पम्प जडान
च) हात उपस्था सेवामा सुधार आवश्यक छैन
छ) अन्य उल्लेख गर्नुहोस्

- ४.३ यदि लगाईको घरमा धारा छैन र निजी धारा राख्न इच्छुक हुनुहुन्छ भने, कति रकम सह-सहानी गर्ने सक्नुहुन्छ ? कृपया तल बिंदुको मापकमा निजि धारा राख्न कति रकम सम्म सहानी गर्नुहुन्छ लगाईको रकमको सीमामा ☒ चिन्क लगाइनुहोस् ।

क.स.	सहानीको विवरण	☒ चिन्क लगाइने
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१.	१२००० मन्दा माषी	☐
२.	१००१ दिखि १२००० सम्म	☐
३.	६००१ दिखि १००० सम्म	☐
४.	३००१ दिखि ६००० सम्म	☐
५.	१५०१ दिखि ३००० सम्म	☐
६.	१२०० मन्दा कम	☐

4.4 मिजी द्वारा जहाँन साधन सामने शब्द व्यहोने परनेछ। मन्जर छ मन्जर छैन

4.3. लक्ष्य साधनेपानी योजना शुरू भएमा र सो योजनाबाट सीधैसि थपदा पयोग भएमाना गुणस्तरमूलक पानी उपलब्ध भएको खण्डमा के लक्ष्यले आफ्नो धरम द्वारा जहान गर्ने प्रयत्नक हुन हुन्छ? छैन

सर्वोदय प्रकल्पक भाग नव्या निधनानुसार मासिक पाणी मागवून निवृत्त वृत्तांतून इतर...

संकेत [] खेन [] यदि इच्छुक हूँ, हुन्छ भने तल दिइएको जानकारीमा आफ्नो सहभागीको सीमामा ☒ चिन्ह लगाएर आफ्नो ईच्छा व्यक्त गर्ने।

क्र.सं.	मासिक पानी महशुल	☒ चिन्ह लगाउने
१.	रु १०० भन्दा माथी	☐
२.	रु १५१ देखि १००	☐
३.	रु १०१ देखि १५०	☐
४.	रु ३५१ देखि १००	☐
५.	रु ३०१ देखि ३५०	☐
६.	रु २५१ देखि ३००	☐
७.	रु २०१ देखि २५०	☐
८.	रु १५१ देखि २००	☐

४.६. वर्षा खानिपानी वितरण प्रणालीको व्यवस्था हुन नपाइएको परिस्थितिमा पनि प्रविधिसहित स्वस्थ अरिचम रकम योगदान गर्नु पर्ने हुन्छ, यहाँको विचारमा कति प्रतिशत योगदान हुन सक्छ।

लागतको रू. १०९ १४९

४.७. मध्य सहस्रकांडी सुविधा : सामुदायिक शौचालय तथा सस्ती-दुल। निर्माणको लागि सह-लाभारी स्वयं पै०५. स्थानीय निवास र उपभोक्ताको सहलाभारी गर्ने हप्ताको हतहप्ता छैन छैन

પાંદિ આશનહાન્યુ બને, જાતિ સમ્યક?

४. = वर्तमान में नभइ रहले तथा भए रामी हने प्राथमिक आवश्यकता कने हो।

निजी द्वारा जमाना ☐ निजी चर्ची निमान ☐ इधे ☐

५. नैतिक दृष्टिकोणबाट महिला सहभागिता

अधोपरोक्त विभिन्न चरणमा महिला समभागिता सम्बन्धि जानकारी सफलता गत प्रत्यक्ष धर्देशीमा लक्षित समूह (इलकलबाट न छुट्टी महिला समभागिता माथ रीतिमा प्रस्तुतः।

क) महिलाओं की उपस्थिति व सहभागिता

४.१. आयोगनाकोदारिद्र्य छुलफुल गर्न कुनै वैयक्तिक सोलाहोको थियो ।

पिथी स्थान

५.२ के आयोजनाको सुनौट गर्ने बैठकमा महिला उपभाषाहरूको उपस्थिति थियो ।

पिछो खान

यदि विद्यो नमे माहता दुर्गमोत्साहसो भवितुं शक्यो तस्यै तस्यै

काली भाषा	अन्तर्गत विषय	लिखित
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2.3. आई.बी. क्रियाकलापहरूको रिकार्ड गर्ने खालेपानाली उपभोग गीवा सरसकट

समिति संस्था गठन भाषा ४ : ४८

२. व. को वा पु.स समितिके सदस्यहरु माथ कोन सहित सदस्यहरु हुन ? जसलेबाट जिनै व्यक्तिले को वा पु.स सभामा सहित समितिको पदवीधारी तथा सदस्यहरुको नामावली तथा तल्लि कमरेचारीको विवरण माथ तथी उपस्था गरनुहुने

स. सैचिकतलाका आचारमा कार्य दिभाजन

२.४. लक्षको लक्षिकामा विद्युत्को कामकाज अन्तरमा उम्मेद गर्ने गर्नुहुन्छ।

ग) पारिवारिक व्यवस्थापन, आय और अन्य विषयमा महिलाहरूको नियन्त्रण र पहुँच
 ४.६ लक्षको लागि जसमा उल्लेखित पारिवारिक विषय वा क्षेत्रहरूमा निर्णय गर्दा यहाँको घर परिवारमा महिला/पुरुषको भनाइको समुदाई हुन्छ ।
 उपर्युक्त कोटामा * १००/१०० लगाउनमा

५. यहाँको परिवारमा पारिवारिक सम्पत्तिका निम्न विषयमा महिलाले पहुँच र स्वामित्व रहेको छु छैन तलको तालिकामा उपयुक्त कोठामा '१' वा '०' चिह्न लगाउनुम

घ) स्ना.पा.उ.स.स. तथा समुदायमा महिलाको स्तर (हैसियत) (निम्न सुदाहक अन्तरालमा विनोद व्यवस्थान गरेको अवलोकनका आधार हुनेछ)

६. सम विकासमा पहुँचका आधारमा सामाजिक समावेशी सहभागिता

क) आशयोजना क्रियाकलापमा गैरसाभान्वित विपन्न वर्गहरू, जातजाति, दलित, अपाहिता भागको व्यक्तिको उपस्थिति

६.१ आयोजनाको बारेमा सुझावन राख्न कुनै श्रेणी/वैयक्तिक सम्भाव्यता तवरले जोडावुटाको ध्यान

सह। निर्णय प्रक्रियायां समावेशी प्रक्रिया अपनाएकी दिवसी ।

६.४. आयोग/अन्य सुप्रीम कोर्ट एवं जलसंधारित्रकारी कर्मस्थली में/मकान कर्मस्थली स्थिति

६.५. सामा. शाही कुलेचम, जरीचम, कावानेचम रती सामा. लोक समारोहि अन्तर्गत पुढीलप्रमाणे परिचालन रती करावे पुढील प्रमाणे दिवा.

	पुणव	साठसम	रिम	
६.५. राखी	साठसम	रिम		

७. स्यात्स्यत्वं च सारस्यत्वात्

क. स्थानस्थानी

पुलपाईको विचारमा पानीको तापक्रम लगभग ३५°C भन्दा कम भएमा के सम्भाव्यता देखिन सक्छ ।

एक भन्दा यही हुनर आउनु सक्छ।

१००	१००	१००	१००
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- १.२ बाँस बिचिने/रवाले
- १.३ बिरामी बनाउने
- १.४ अन्य (उल्लेख गर्ने)
२. के लपाईलाई पानी भने र राख्ने भाँडो पानी भर्ने र भण्डार गर्नु पुग्न सक्छ

थाहा छ : छ ☐ छैन ☐

यदि छ भने, पानी राख्ने भाँडो कसरी सफा गर्नु हुन्छ ?

खासी पानी भाउले खरानी पानीले भूस/पिठो र पानीले

साबुन पानीले अन्य (उल्लेख गर्नुस्)

३. लपाई घरमा पानी कसरी राख्नु हुन्छ ?

(एक भन्दा बढी उत्तर आउन सक्ने)

- ३.१ पानी भर्नु पहिले भाँडा सफा गर्ने
- ३.२ खासी पानी फ्याँके
- ३.३ पानी राख्ने भाँडो राम्रोसँग ढाकेर/छोपेर राख्ने
- ३.४ अन्य (उल्लेख गर्ने)
४. लपाई राख्ने वा बिटोबाट पानी कसरी निकाल्नुहुन्छ ?
- ४.१ पानी सार्ने अथि अम्बोरा, लौटा, कठुवा, मग धोएर
- ४.२ गिलास, मग, कप गाडीमा ढुवाएर
- ४.३ राखेबाट लौटा, अम्बोरा, कठुवा, गिलासमा पानी सारेर
- ४.४ अन्य (उल्लेख गर्ने)

ख. चर्पी

१. चर्पी प्रयोगका फाइदाहरू के के छन् ? (एकभन्दा बढी उत्तर आउन सक्ने)

- १.१ घुसा, सालक तथा बिरामीलाई सुविधा
- १.२ घर तथा बातावरण सफा हुने
- १.३ गोप्यता हुने
- १.४ रोगबाट बचाव हुने
- १.५ अन्य (उल्लेख गर्ने)

२. के लपाईलाई बिसाबाट रोग सार्छ भन्ने लाग्छ ? ☐ लाग्छ ☐ लाग्दैन

यदि लाग्छ भने, मातिसको बिसाबाट कुनै रोगहरूको नाम भन्नुहोस् ?

३. के लपाईको घरमा चर्पी छ ? छ ☐ छैन ☐

३.१ यदि छ भने, कस्तो प्रकारको चर्पी छ ?

१. खान्ने चर्पी

२. भेन्टिलेटेड खान्ने चर्पी

३. वाटर सिन/पोर फ्लस

४. सिस्टर्न फ्लस

५. अन्य

२. यदि छ भने, लपाईको घरमा चर्पी कसकसले प्रयोग गर्नुहुन्छ ?

१. सबैले, २. बापछा बाजेक सबैले ३. बढेक र छोहले मात्रै ४. बिरामी मात्रैले

३.३ यदि छैन भने, किन चर्पी लभनाउनु भएको हो ?

(क. बनाउने तरिका थाहा नभएर, ख. लाग्ने गर्ने नसकेर, ग. खुला मैदानमा बिसा गर्ने कानी भएर, घ. जग्गाको जमावले हु अन्य)

३.४ यदि छैन भने, बिसा गर्ने कहाँ जानुहुन्छ ?

(क. खोला/जङ्गल/किनार ख. खुला मैदान/डाँड ग. घर/सडक छेउ घ. जहाँ सजिलो हुन्छ)

३.५ यदि छैन भने, चर्पी बनाउन कति बरानी गर्ने सक्नु हुन्छ ?

ग. खानेकुराको सरसफाई

१. खाद्यपदार्थ दुधिल हुनबाट कसरी बचाउनुहुन्छ ? (एक भन्दा बढी उत्तर आउनसक्ने)

- १.१ पकाएको खाना छोपेर/ढाकेर राख्ने
- १.२ पानी सक्ने रग्नै छरेर लपकाएर
- १.३ काँचै खाइने खानेकुरा राम्रोसँग पछाँतेर धोएर मात्र खाने
- १.४ हात रीझा सफा गरेर मात्र भान्सा पछेरेर
- १.५ सफा हातले खाना पस्कने
- १.६ ढाडु पम्पु, चाल, भाँडाकुँडा सफा गरेर मात्र खाना पस्कने/खाने
- १.७ पानी चोकी पकाउने भाँडा, डकलहरू सफा राख्ने
- १.८ छरेर पानी वा सडे गलेका कालपुस लगाएर नखाने

२. के लपाई खानेकुरा छोपेर/ढाकेर राख्नुहुन्छ ? ☐ राख्छ ☐ राख्दैन

यदि राख्नुहुन्छ भने, त्यसबाट के के फाइदाहरू छन् ? (एक भन्दा बढी उत्तर आउन सक्ने)

- २.१ धुलो मैलो, भिँसा, माइला, किरा, तथा घरपान्छा पशुपन्छीबाट बचाव
- २.२ भुसा/खुचुन्डी माउमुँस/बिरालोबाट बच्ने
- २.३ खाद्य दुग्धपदार्थ हुने रोगबाट बच्ने

२.४ अन्य (उल्लेख गर्ने):

जीवनश्रम बनाउने तरिका थाहा छ छैन सोच्ने, यदि थाहा भएमा सोझै तरिकाले जीवनश्रम बनाउने । जीवनश्रम बनाउने सोझै तरिका निम्नानुसारको छ ।

१. पहिला साबुन पानीले हात सफा गर्ने, २. चिया गिलासको ६ गिलास (एक लिटर) पानी गुठला सफा भइँदोमा हाल्ने (यदि पानी उमालेको भएमा सेलाउन दिने), ३. जीवनश्रमको एक प्याकेटभित्र भएको धुपौ पुरै पानीमा हाली पानीलाई राम्ररी घुमोलाई घुम्न दिने ।

घ. व्यक्तिगत सरसफाइ

१. लगाई र परिवारका अन्य सदस्यले कहिले र के गरेपछि हात धुनुहुन्छ । धुने भए यस्तो (✓) चिन्ह लगाउनुहोस् र नधुने भए यस्तो (×) चिन्ह लगाउनुहोस् । (एक भन्दा बढी उत्तर आउन सक्ने)

क्र. स.	क्रियाकलाप	१ वर्ष मुनिका बालबालिका		महिला		पुरुष	
		धुने (✓)	नधुने (×)	धुने (✓)	नधुने (×)	धुने (✓)	नधुने (×)
१.	खाना खानु अघि						
२.	खाना खाएपछि						
३.	दिसा गएपछि						
४.	कोहोर मैला छुएपछि						
५.	कामबाट फर्केपछि						
६.	केटाकेटीलाई दिसा पिसाव गराइ सकेपछि						
७.	अन्य (उल्लेख गर्ने)						

२. लगाई र परिवारका अन्य सदस्यले के से हात धुनुहुन्छ । धुनेमा यस्तो (✓) चिन्ह लगाउनुहोस् र नधुनेमा यस्तो (×) चिन्ह लगाउनुहोस् ।

क्र. स.	क्रियाकलाप	१ वर्ष मुनिका बालबालिका		महिला		पुरुष	
		धुने (✓)	नधुने (×)	धुने (✓)	नधुने (×)	धुने (✓)	नधुने (×)
१.	पानी मार्ने						
२.	सुशानी पानी						
३.	भुस/पिछो पानी						
४.	साबुन पानी						
५.	अन्य (उल्लेख गर्ने)						
जम्मा							

३. लगाई र परिवारका अन्य सदस्यले कहिले कहिले मुहोमुहो हुन्छ ।

मुहोमुहो भए यस्तो (✓) चिन्ह लगाउनुहोस् र नमुहोमुहो भए यस्तो (×) चिन्ह लगाउनुहोस् ।

क्र.स.	व्यक्तिगतक्रियाकलाप	बालबालिका		महिला		पुरुष	
		(✓) (×)	(✓) (×)	(✓) (×)	(✓) (×)	(✓) (×)	(✓) (×)
१.	दैनिक पित्त						
२.	एक दिन किराणर						
३.	हप्तामा २ पटक						
४.	हप्तामा १ पटक						
५.	२ हप्तामा १ पटक						
६.	महिनामा एक पटक						
जम्मा							

ड. कोहोर मैला व्यवस्थापन

१. लगाईको घरबाट निस्कने छोस कोहोर मैला कहाँ विमर्जित गर्नुहुन्छ ।

१.१ घर नजिक खान्दोमा

१.२ निजी कोहोर संकलनकर्तालाई दिने

१.३ गा.वि.स. / नगरपालिकाले व्यवस्था गरेको खान्दो वा सरासमा

१.४ अन्य (उल्लेख गर्ने)

२. छोस तथा सरस कोहोर संकलनार्थ अध्ययनित तरिकाले विमर्जित गर्नाले हुने तराङ्ग प्रभावहरू के के हुन् । (एक भन्दा बढी उत्तर आउन सक्ने)

२.१ कोहोर सारासमा बढि

२.२ सामझुट्टो, निरोग, किराणरको बृद्धि

- २.३ रोग सन्तमा वृद्धि
 २.४ अन्य (उल्लेख गर्नु) _____
 ३. तपाईंको घरबाट निस्कने फोहोर पानी कहाँ बिसर्जन गर्नुहुन्छ ?
 ३.१ खान्नीमा एकदमै उपलब्ध
 ३.२ तरकारी बारीमा/करीसा बारीमा
 ३.३ सार्वजनिक हलमा
 ३.४ अन्य (उल्लेख गर्नु) _____

घ. वस्तुभाउको फोहोर व्यवस्थापन

१. के तपाईंले वस्तुभाउ पाल्नु भएको छ ? छ _____ छैन _____

यदि छैन भने पानी जन्म सुरुवा रोगमा जाने। _____

यदि छ भने कुन कुन प्रकारका छन् र तिनीहरूलाई कहाँ राख्नु हुन्छ ?

क्र. सं.	वस्तुभाउको प्रकार	घरभित्रै राख्ने	बाहिर छुट्टै गोठमा राख्ने
१	गाइ/भैँसी		
२	बंगुर/मंगुर		
३	वाघा		
४	कुखुरा/होम		
५	अन्य		

२. वस्तुभाउबाट निस्कने फोहोर कहाँ र कसरी बिसर्जन गर्नुहुन्छ ?

- २.१ मलछादमा
 २.२ आगो बाल्ने/गुँठो बनाउने
 २.३ गोबर ग्यास प्लान्टमा प्रयोग गर्ने
 २.४ अन्य (उल्लेख गर्नु) _____

३. वस्तुभाउको फोहोर मैलाको जथाभावी अव्यवस्थित लचरले बिसर्जन गर्दा हुने खराब असरहरू के के हुन् ? (एक भन्दा बढी उत्तर आउन सक्ने)

- ३.१ बालाबराबी फोहोरमा वृद्धि हुने
 ३.२ लामखुट्टे, भिरा, जिराङ्गको वृद्धि हुने
 ३.३ रोगवाध बढ्ने तथा सार्ने
 ३.४ गाँउ, वनछिमेक तथा नगर अशौभनिष्ठ देखिने
 ३.५ अन्य (उल्लेख गर्नु) _____

घ. पानीजन्म सुरुवा रोगहरू

१. पानीजन्म सुरुवा रोगको कारणहरू 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 फोहोर बह्नाले
 १.४ मानिसको मलमूत्र जथाभावी फ्याक्ने गर्दा
 १.५ फोहोर मैला जथाभावी फ्याक्ने 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 तम्बर लेख्ने)

- २.१ घरबाटै उपचार गर्ने
 २.२ डाँसी, भोकी, चुजारी कहाँ लाने
 २.३ औषधि पसलमा जाने
 २.४ स्वास्थ्य चौकी वा अस्पतालमा जाने
 २.५ अन्य (उल्लेख गर्नु) _____

३. यदि परिवारमा कोहीलाई आउछापसाला लागेमा के गर्नुहुन्छ ? (प्राथमिकता अनुसार तम्बर लेख्ने)

- ३.१ जीवनजल खुवाउने
 ३.२ घरबाटै उपचार गर्ने
 ३.३ डाँसी, भोकी वा चुजारी कहाँ लाने
 ३.४ औषधि पसलमा जाने

३.५ स्वास्थ्य चौकी वा अस्पतालमा जाने

३.६ अन्य (उल्लेख गर्नु) _____

४. गत एक वर्षभित्र परिवारका सदस्यहरू ललका रोगहरू मध्ये कुन कुन रोगबाट बिरामी भए ? (योकोहीँको को चिनिँदैन)

५. तपाईंको परिवारमा पानीजन्म निम्नलिखित सुरुवा रोगबाट कोही बिरामी परेको विषय ललको लालिकामा संख्या उल्लेख गर्नुस् ।

क्र. सं.	रोग	५ वर्ष मुनिका बालबालिका	महिला	पुरुष	वार्षिक खर्च रु.
१	भाङ्गापखाना				
२	भाङ्ग				
३	जुका				
४	टाईफाइड				
५	हेजा				
६	छाना सम्बन्धी रोग				
७	कोलीरा (मलरिया)				
८	कमलापरा (जपटीरा)				
९	अन्य				
	जम्मा				

६. यत एक वर्षभित्र तपाईंको परिवारमा कोही भाङ्गा पखाना तथा पानीजन्य अन्य सरुवा रोगहरुबाट मृत्यु भएको छ । (मृत्यु जबरन)

रोग	५ वर्ष मुनिका बालबालिका	महिला	पुरुष
भाङ्गा पखाना			
भाङ्ग			
पानीजन्य अन्य सरुवा रोगहरु			
जम्मा			

७. यत एक वर्षभित्र तपाईंको परिवारका सदस्यलाई भाङ्गापखाना 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
भाङ्गापखाना				
पानीजन्य अन्य सरुवा रोगहरु				
जम्मा				

सहयोगका लागि धन्यवाद ।

APPENDIX 7: 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)*
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*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 8

Water Quality Test Reports



Nepal Environmental & Scientific Services (P) Ltd.

G.P.O. Box: 7301, Thapathali, Kathmandu, Nepal
 Phone : +977-1-4244989, 4241801, Fax No.: +977-1-4226028, Email: ness@mos.com.np
<http://www.nesspltd.com>

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NESS/Lab, M-03/R1.1

QS Test Report / Certificate

NS Accreditation No. Pra. 01/053-54

Entry No. : NCL - 203 (W) (2) - 11 - 2018 Date Received : 04 - 11 - 2018
 Sample : Water (Hupsekot, Nawalparasi) Date Completed : 18 - 11 - 2018
 Client : TAEC/ICON JV Sampling Date : 02 - 11 - 2018
 Source : Giribari Khola Sampled By : Client

S. N.	Parameters	Test Methods	Observed Values	Generic Effluent Standards Discharged into Inland Surface Water, GoN 2001
1.	pH @ 21°C	Electrometric, 4500 - H ⁺ B, APHA	7.7	5.5 - 9
2.	Turbidity, (NTU)	Nephelometric, 2130 B, APHA	6	-
3.	Color, (Chromaticity Unit)	Spectrophotometric, 2120 C, APHA	0.07	-
4.	Total Hardness as CaCO ₃ , (mg/L)	EDTA Titrimetric, 2340 C, APHA	64	-
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	104	-
7.	Sulphate, (mg/L)	Gravimetric Method with Ignition of Residue, 4500 - SO ₄ ²⁻ C, APHA	<1	-
8.	*Residual Chlorine, (mg/L)	Iodometric Titration, 4500- Cl B, APHA	Nil	-
9.	Chloride, (mg/L)	Argentometric Titration, 4500 - Cl ⁻ B, APHA	0.99	-
10.	Ammonia, (mg/L)	Direct Nesslerization, 4500 - NH ₃ C, APHA	0.10	-
11.	Nitrate, (mg/L)	UV Spectrophotometric Screening, 4500 - NO ₃ ⁻ B, APHA	0.37	-
12.	Aluminum, (mg/L)	Enichrome Cyanine R, 3500 - Al A, APHA	0.01	-
13.	Fluoride, (mg/L)	SPANDS, 4500 - F D, APHA	<0.05	2, max
14.	Iron, (mg/L)	Direct Air - Acetylene AAS, 3111 B, APHA	1.36	-
15.	Manganese, (mg/L)		0.04	-
16.	Cadmium, (mg/L)		0.05	2, max
17.	Lead, (mg/L)		<0.01	0.1, max
18.	Copper, (mg/L)		<0.01	3, max
19.	Zinc, (mg/L)	SDDC, 3114 B, APHA	0.02	5, max
20.	Arsenic, (mg/L)		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: Ethylenediaminetetraacetic 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 Signatory)

- Note:
1. This report/certificate is in reference to Laboratory Quality Control Manual, QS (017), 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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NESS/Lab, M-03/R1.1

QS Test Report / Certificate

NS Accreditation No. Pra. 01/053-54

Entry No. : NCL - 203 (W) (2) - 11-2018
 Sample : Water (Hupsekot, Nawalparasi)
 Client : TAEC/ICON JV
 Source : Phathar Khola

Date Received : 04 - 11 - 2018
 Date Completed : 18 - 11 - 2018
 Sampling Date : 02 - 11 - 2018
 Sampled By : Client

S. N.	Parameters	Test Methods	Observed Values	Generic Effluent Standards Discharged into Inland Surface Water, GoN 2001
1.	pH @ 21°C	Electrometric, 4500 - H ⁺ B: APHA	7.9	5.5 - 9
2.	Turbidity, (NTU)	Nephelometric, 2130 B: APHA	4	-
3.	Color, (Chromaticity Unit)	Spectrophotometric, 2120 C: APHA	0.07	-
4.	Total Hardness as CaCO ₃ , (mg/L)	EDTA Titrimetric, 2340 C: APHA	134	-
5.	Calcium, (mg/L)	EDTA Titrimetric, 3500 - Ca B & 3500 - Mg B: APHA	44.89	-
6.	Total Dissolved Solids, (mg/L)	Oven Drying Method, 180°C, 2540 C: APHA	142	-
7.	Sulphate, (mg/L)	Gravimetric Method with Ignition of Residue, 4500 - SO ₄ ²⁻ C: APHA	27.15	-
8.	*Residual Chlorine, (mg/L)	Iodometric Titration, 4500 - Cl B: APHA	Nil	-
9.	Chloride, (mg/L)	Argentometric Titration, 4500 - Cl B: APHA	1.97	-
10.	Ammonia, (mg/L)	Direct Nesslerization, 4500 - NH ₃ C: APHA	0.05	-
11.	Nitrate, (mg/L)	UV Spectrophotometric Screening, 4500 - NO ₃ B: APHA	0.66	-
12.	Aluminum, (mg/L)	Erichrome Cyanine R, 3500 - Al A: APHA	0.01	-
13.	Fluoride, (mg/L)	SPANDS, 4500 - F D: APHA	<0.05	2, max
14.	Iron, (mg/L)	Direct Air - Acetylene AAS, 3111 B: APHA	0.41	-
15.	Manganese, (mg/L)		<0.02	-
16.	Cadmium, (mg/L)		0.01	2, max
17.	Lead, (mg/L)		0.03	0.1, max
18.	Copper, (mg/L)		<0.01	3, max
19.	Zinc, (mg/L)	SDDC, 3114 B: APHA	0.02	5, max
20.	Arsenic, (mg/L)		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: Ethylenediaminetetraacetic 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 Signatory)

- Note:
1. This report/certificate is in reference to Laboratory Quality Control Manual, QS (017), section OPT.
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NESS/Lab, M-03/R1.1

QS Test Report / Certificate

NS Accreditation No. Pra. 01/053-54

Entry No. : NCL - 722(W) (I) - 06 - 2019 Date Received : 23 - 06 - 2019
 Sample : River Water (Pathar Khola, Date Completed : 11 - 07 - 2019
 Betai Khola, Girubari Khola) RVT Water Sampling Date : 20 - 06 - 2019
 Client : TAEC/ICON JV
 Sampled By : Client Location : Nawalpur

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	7.8	5.5 - 9
2.	Turbidity, (NTU)	Nephelometric, 2130 B, APHA	6	-
3.	Color, (Chromaticity Unit)	Spectrophotometric, 2120 C, APHA	0.10	-
4.	Total Hardness as CaCO ₃ , (mg/L)	EDTA Titrimetric, 2340 C, APHA	152	-
5.	Calcium, (mg/L)	EDTA Titrimetric, 3500 - Ca B & 3500 - Mg B APHA	47.3	-
6.	Total Dissolved Solids, (mg/L)	Oven Drying Method, 180°C, 2540 C, APHA	130	-
7.	Sulphate, (mg/L)	Gravimetric Method with Ignition of Residue, 4500 - SO ₄ ²⁻ C, APHA	28.67	-
8.	*Residual Chlorine, (mg/L)	Iodometric Titration, 4500- Cl B, APHA	Nil	-
9.	Chloride, (mg/L)	Argentometric Titration, 4500 - Cl B, APHA	<0.5	-
10.	Ammonia, (mg/L)	Direct Nesslerization, 4500 - NH ₃ C APHA	N.D. (<0.05)	-
11.	Nitrate, (mg/L)	UV Spectrophotometric Screening, 4500 - NO ₃ B, APHA	1.03	-
12.	Aluminum, (mg/L)	Enochrome Cyanine R, 3500 - Al A, APHA	0.02	-
13.	Fluoride, (mg/L)	SPANDS, 4500 - F D, APHA	<0.05	2, max
14.	Iron, (mg/L)	Direct Air - Acetylene AAS, 3111 B, APHA	0.19	-
15.	Manganese, (mg/L)		N.D. (<0.02)	-
16.	Cadmium, (mg/L)		0.004	2, max
17.	Lead, (mg/L)		0.02	0.1, max
18.	Copper, (mg/L)		0.01	3, max
19.	Zinc, (mg/L)	SDDC, 3114 B, APHA	0.04	5, max
20.	Arsenic, (mg/L)		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: Ethylenediaminetetraacetic 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:
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Appendix 9

Photographs



1. Proposed/ Existing Intake, Betai Khola



2. Proposed/ Existing Intake, Pathar Khola



3. Proposed/ Existing Intake, Girubari Khola (Satakun)



4. Proposed Sumpwell Site, Girubari Khola in between Badahare kholsi and Chepari Gaira



5. Existing Collection Chamber, Betai Khola



6. Existing Water Treatment Plant, Pathar Khola (Shivalaya)



7. Existing RVT-2, Pathar Khola (Shivalaya)



8. Existing Water Treatment Plant, RVT-1 site(Dihi Danda)



9. A view of Community Settlement



10. Detailed Design Report Presentation



11. Detailed Design Report Presentation



12. Detailed Design Report Presentation

Comment and Response Matrix
Deurali Hupsekot Water Supply & Sanitation Project, Nawalpur

S No.	Comment/Suggestions	Response	Remarks	ADB Comments (ref: May 2020 revised version of IEE report)
1	Provide consistent confirmation in the IEE report that the detailed engineering design used is the final. Table II-6 mentions that the IEE is preliminary and based on master plan only. While in Table IV-3, it mentions final detailed engineering design	It's a typo. This has been incorporated.	Chapter II, Section D-i. Table II-6, Page 25	Noted.
2	Confirm that the establishment of four toilets and procurement of one tractor are included in the BOQ of the bidding and contract documents;	This has been incorporated.	Chapter IV, Section B-ii., Line 120, Page 43	Noted.
3	Confirm that the GRM and GRC is notified. Attach as appendix copy of notification;	The documents issued by the municipality (2 nd level GRM) and by PMO (3 rd level GRM) that officially designate the composition of the respective GRCs at these two levels has been attached in Appendix 5.	Appendix 5	Noted.
4	Confirm that the river flow rates given for Girubari, Betai, and Pathare sources correspond to lean/low season flow rates. If not, provide the lean/low season flow rates and use them as basis in the assessment;	This information has been added in the report.	Chapter IV, Section B i)- a) Line 64, Page 34	Noted.
5	Confirm that the planned withdrawal rates from the rivers do not exceed their corresponding safe yields (Note: Safe yield means the maximum sustainable withdrawal rate that can be made from a particular river, while maintaining its value for fishes and other wildlife dependent on the river system and downstream users.);	The confirmation regarding the planned withdrawal rates from the rivers not exceeding their corresponding safe yields has been explained briefly in the report on the basis of the design report.	Chapter IV, Section B-i-a), Line 64 to 68 Page 34	Noted.
6	Conduct consultations with all stakeholders around the project sites, including other stakeholders in the immediate downstream of water supply sources. Ensure to:			

S No.	Comment/Suggestions	Response	Remarks	ADB Comments (ref: May 2020 revised version of IEE report)
	- Inform the stakeholders of the final design of the project including the planned withdrawal of 26 lps (plus 11 lps sump well), 5 lps, and 8 lps from Girubeni, Betai and Pathar rivers/streams, respectively. Topics on the design and flow rates of the project is not included in the previous consultations done. - 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); - Document all concerns of stakeholders and include in the discussions in Section IX of the IEE report; - Include all minutes of meetings with corresponding translation in the English language in Appendix 5;	- This information has been shared during detailed engineering design report presentation held on June 21, 2019. (Refer Appendix 5) The recommendation letter from Deurali Sotikhola WUSC in regard to the information on the flow rate of the project has been provided in Appendix 5. - This information has been shared during Detailed Engineering Design Presentation. - This has been incorporated. - This has been incorporated.	- Refer Appendix 5 - Refer Appendix 5 - Refer Chapter IX - Refer <i>Appendix 5</i>	
7	Revise the IEE report to include information from the above requests and submit to ADB for final review	This has been incorporated.		Noted.
8	Ensure that no works should be undertaken unless contractor has appointed its EHS officer.	This has been incorporated.	Chapter VIII, Section B-ii., Line 354, Page 92	Noted.

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.

Project:	Nepal: Urban Water Supply and Sanitation Project (UWSSP): Deurali Hupsekot (Nawalpur District)		
Loan No.:	3711	Package No.:	W16
Components :	Proposed intakes	Stream Intake - 1 (Girubari existing rehab) Stream/ seepage water - 1 (Girubari khola; sumpwell well) Stream intake - 1 (Pathar khola, existing rehab.) Stream intake - 1 (Betai khola, existing rehab)	
	Water treatment plant	Rapid mixture - Flocculator-Sedimentation-Roughening - Slow sand filter-Disinfection Rapid mixture - 2 location (Dihidanda & Shivalaya) Flocculator- 2 locations (Dihidanda & Shivalaya) Sedimentation tank - 1 location (Dihidanda) + existing 2 location (rehab) Roughening filter - 1 location (Dihidanda) + existing 2 location (rehab) Slow sand filter - 1 location (Dihidanda) + existing 2 location (rehab) Disinfection - 2 locations	
	Pumping Details	Single stage 25HP submersible pump to pump 11 lps from Girubari Sumpwell/ intake. Transformer 50KVA and generator- 50KVA	
	Ground Reservoir (No and Capacity in CUM)	RVT1: 400cum – 2 nos. (Dihidanda) RVT 2: 400cum – 1 no. (Shivalaya) (Total capacity 1,200 cum)	
	Pumping Chamber/Sump for pumping		
	Valve Chamber (Bricks/ RCC)	45 Nos	
	Pipe valve box	62 Nos	
	IC/BPT		
	Office Cum GH (O1) /Guard House (G 1) / Small Guard House (G2) /Dosing House (DS), Generator House, Boundary wall	WUSC office-1 no (bazaar area land to be provided by WUSC) Guard house (GH1) – 1 no (at sumpwell site) Guard house with store room (GH2) – 2 nos (RVT-1 Dihi danda and RVT-2 site Shivalaya) Dosing station- 2 nos (RVT-1 and RVT-2 site) Generator house - 1 no. (sumpwell site) Boundary wall – 4 locations	
	Fire Hydrant (Nos)	5	
	River crossing (Nos)	16	
	Length of pipe in transmission main (from various intake to WTP/ RVT), (m)	13,453.00	
	Length of Distribution Mains (m)	149,964.00	
	Number of DMAs	7	
	Number of HH connection	3,652	
	Number of connections for institution	39	
	Public Toilets	4	
	Tractor	1	

Contract Type:	Civil Works		
Date of IEE:	October 2019		
Draft IEE?	Updated/Revised IEE?		Others
			Based on the report, it is the final IEE and components are based on final detailed engineering design. However, there is a need to confirm based on the required further assessments below.

	Activity	Status		Detailed Comments and Further Actions Required
		Yes	No	
1.	Environmental assessment has been satisfactorily conducted based on ADB REA Checklist and scoping checklist. ¹		X	1. Based on discussions in Section IV (Description of the Project), the subproject is a water supply system that will draw raw water from 3 river sources (Girubeni, Betai, and Panther) with combined flow 62 lps, and 1 sumpwell which claimed to be seepage from one of the 3 river sources (Girubeni). The design withdrawal rate of water by the subproject is 39 lps (excluding the 11 lps ground well), which is already average of 63% of the total river flow. Withdrawal rates at individual sources show 65% for Girubari, 42% for Betai, and 80% for Pathar. It is very important to show the safe yield of each source. Note: Safe yield means the maximum sustainable withdrawal rate that can be made from a particular river, while maintaining its value for fishes and other wildlife dependent on the river system and downstream users. For immediate action: 1. Please include additional discussion and assessment on the impact of the subproject on the three rivers and on users of the rivers. Check if all the figures mentioned in the IEE report are accurate. Withdrawal rates are high. To be more specific: - Confirm that the river flow rates given for Girubeni, Betai, and Pather sources correspond to lean/low season flow rates. If not, provide the lean/low season

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
				flow rates and use them as basis in the assessment; and - Confirm that the planned withdrawal rates are below the safe yields. 2. Confirm that the establishment of four public toilets and procurement of one tractor are included in the BOQ of bidding documents.
2.	Environmental assessment based on latest project components and design	Yes		See above comments.
			No X	
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 is currently in the process of obtaining MOWS-approved IEE. PMO to attach copy of approval document in the SEMR.
			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.	Policy, legal, and administrative framework	Adequate		Section II discusses the policy, legal and administrative framework of the subproject.
		X		
		Included discussions and requirements of the:		

² If applicable, include date accomplished or obtained.

	Activity	Status				Detailed Comments and Further Actions Required		
		Yes	National regulation/law on EIA					
		Yes	Environmental agency					
		Yes	Relevant international environmental agreements					
		Yes	Environmental standards (IFC's EHS Guidelines)					
6.	Anticipated environmental impacts and mitigation measures	assessed impacts and risks:		mitigation measures included:			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 one mammal (Common Leopard) that is considered Vulnerable. No endangered or critically endangered species was found in the project area. The IEE report mentions that that project will not encroach any forest area. The EMP provides measure that contractor/s will not encroach forest areas.	
				Yes	No	n/a		
			Biodiversity conservation	X				
			Pollution prevention and abatement	X				
			Health and safety	X				Community and occupational health and safety measures are included.
			Physical cultural resources	X				No PCRs identified at the subproject sites.
			Cumulative impacts			X		
			Transboundary impacts			X		
		7.	Impacts from Associated Facilities ³	Addressed		Not Addressed		Not applicable
				X				
8.	Analysis of Alternatives	Yes		No			An analysis of alternatives is provided, but this is not required.	
		X						
9.	EMP budget included	Yes		No			Section VIII (Table VIII-4)provides indicative budget of NPR 4,890,000 for EMP implementation.	
		X						
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	
		X						

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
				EMP in the bid and contract documents. PMO and the RPMO will have the responsibility to ensure compliance with this requirement.
11.	Consultation and Participation	Yes	No	Section IX discusses the conduct of consultations. The latest one on 21 June 2019. Annex I shows a minutes of meetings, with translation in the English language. For immediate action: 1. In view of the complaint received in a similar subproject, it is recommended that PMO/RPMO undertake consultations with all stakeholders and downstream users to present the following: (i) final detailed design; (ii) environmental impacts and mitigation measures; and (iii) source sustainability analysis including river flows during lean seasons, river water withdrawal rates, and safe yield. 2. Include in the IEE report discussion of results of the consultations and resolution of issues raised, including minutes, attendance sheets, photos.
		??		
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. However, there is no information yet if the GRM/GRC has been notified.
				For immediate action: PMO to confirm if the GRM/GRC has been notified. Attach copy of notification in the IEE report.
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	This is confirmed in the SEMR for January – June 2019.
		X		
15.		Yes	No	

	Activity	Status		Detailed Comments and Further Actions Required
	Mobilized RPMO Environment Specialist	X		This is confirmed in the SEMR for January – June 2019.
16.	Mobilized PMQAC / DRTAC Environment Specialists	Yes	No	This is confirmed in the SEMR for January – June 2019.
		X		
17.	Mobilized DSMC/RDMSC Environment Specialists	Yes	No	This is confirmed in the SEMR for January – June 2019.
		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	Section VIII explains this role and responsibility of the contractor.
		X		
19.	If contract awarded already, confirm contractor's appointment of EHS supervisor and/or nodal person for environmental safeguards	Yes	No	This package is not yet awarded. But Section VIII explains that contractor has the responsibility to appoint an environment supervisor.
		X		
20.	Awareness training on compliance to safeguard requirements	Yes	No	Section VIII discusses the institutional capacity development program, schedule, and topics for the subproject, which PMQAC will supervise.
		X		
21.	Monitoring and Reporting	Yes	No	Section XI clarifies the monitoring and reporting roles of stakeholders.
		X		
22.	Others/Remarks			
	Documents/References:	1. First revision of updated IEE report of Duerali Hupsekot Subproject 2. EARF of UWSSP.		