Initial Environmental Examination

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NEP: Urban Water Supply and Sanitation (Sector) Project – Charikot (Dolakha) Water Supply and Sanitation Subproject

Package No. W-01

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

CURRENCY EQUIVALENTS

(as of 2 July 2018)

Currency unit	-	Nepalese rupee (NRe)
$1.00	=	NRs109.821
NRe1.00	=	$0.009

ABBREVIATIONS

ADB	-	Asian Development Bank
DMA	-	district metered area
DSMC	-	design, supervision and management consultant
DRTAC	-	design review and technical audit consultant
DWSS	-	Department of Water Supply and Sewerage
EARF	-	environmental assessment and review framework
EIA	-	environmental impact assessment
EMP	-	environmental management plan
EMR	-	environmental monitoring report
EPA	-	Environment Protection Act
EPR	-	Environment Protection Rules
ESS	-	environmental safeguard specialist
ESA	-	environmental safeguard assistant
GRM	-	grievance redress mechanism
ICG	-	implementation core group
IEE	-	initial environmental examination
MOWS	-	Ministry of Water Supply
NDWQS	-	National Drinking Water Quality Standards
PMO	-	project management office
RPMO	-	regional project management office
RVT	-	reservoir tank
SPS	-	Safeguard Policy Statement
UWSSP	-	Urban Water Supply and Sanitation (Sector) Project
VDC	-	Village Development Committee
WTP	-	water treatment plant
WHO	-	World Health Organization
WSS	-	water supply and sanitation
WUA	-	water users' association
WUSC	-	water users' and sanitation committee

WEIGHTS AND MEASURES

amsl	-	above mean sea level
cum	-	cubic meter
dBA	-	decibel audible
ha	-	hectare
km	-	kilometer
kph	-	kilometer per hour
lps	-	liters per second
m	-	meter
$\mu g/m^3$	-	microgram per cubic meter
mg/l	-	milligram per liter
mm	-	millimeter

NOTE
In this report, "$" refers to United States Dollars.

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EXECUTIVE SUMMARY

The Urban Water Supply and Sanitation (Sector) Project (UWSSP) will support the Government of Nepal in expanding access to community managed water supply and sanitation (WSS) in 20 project municipalities by drawing on experiences and lessons from three earlier projects funded by the Asian Development Bank (ADB). The project will finance climate-resilient and inclusive WSS infrastructure in project municipalities and strengthen institutional and community capacity, sustainable service delivery, and project development. The project will be implemented over a five-year period (indicative implementation period is 2018 – 2023) and will be supported through ADB financing using a sector lending approach.

The project will have the following impact: quality of life for urban populations, including the poor and marginalized, improved through the provision of sustainable WSS services. The project will have the following outcome: inclusive and sustainable access to WSS services in project municipalities achieved. The project will have two outputs: (i) water supply and sanitation infrastructure in project municipalities improved; and (ii) institutional and community capacities strengthened.

The Ministry of Water Supply (MOWS) is the executing agency and Department of Water Supply and Sewerage (DWSS) the implementing agency. The project management office (PMO) will be responsible for the overall management, implementation and monitoring of the project. There will be regional PMOs (RPMOs) to manage day-to-day project implementation at the subproject/municipality level. After construction including a one-year operations and maintenance (O&M) period by the contractor, subprojects will be operated. by the WUSC or municipality.

Charikot subproject is one of the subprojects proposed under UWSSP. The municipality is served by surface water sources. However, the system does not sufficiently meet the needs of the people, in both quantity and quality. Water samples have been collected from the proposed water sources. Analysis of the samples collected reveals results that meet all parameters of the National Drinking Water Quality Guidelines (NDWQG), except for total hardness.

Subproject Scope. The subproject is demand-driven by municipality and water users' association (WUA), and selected based on transparent criteria, including population growth, poverty index, existing WSS infrastructure, formed WUA, community willingness for cost sharing and long-term O&M contract. The subproject is an extension of the existing Charikot water supply system and has been conceptualized as a gravity surface water system. Investments under this subproject include: (i) construction of a piped water supply system comprising various components like intake, water treatment plant, transmission mains, river and stream crossing, reservoir tanks, valve chambers, office buildings, bulk distribution mains, distribution main and household connections; (ii) rehabilitation of water treatment plant that includes clearing of all filter media from slow sand filter; (iii) demolition of masonry tanks and of old stone masonry boundary wall at Bisuna.

Environmental assessment has been conducted for the Charikot (Dolakha) water supply and sanitation subproject selected based on (i) preliminary detailed design, and (ii) most likely environmentally sensitive components. The environmental assessment used ADB's rapid environmental assessment (REA) checklist (Appendix 1) and a "no mitigation measures scenario" checklist developed for UWSSP (Appendix 2). The environmental assessment of the Charikot (Dolakha) water supply subproject shows it is not likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. Potential impacts are unlikely to affect areas larger than the sites or facilities subject to physical works. These impacts are site-specific,

few if any of them are irreversible, and in most cases mitigation measures can be designed with uncomplicated measures commonly used at construction sites and known to civil works contractors.

Therefore, Charikot (Dolakha) water supply subproject is classified as Category B for environment per ADB Safeguard Policy Statement (SPS), 2009. This initial environmental examination (IEE) report has been prepared based on preliminary detailed design and following requirements of ADB SPS and Government of Nepal laws, rules and regulations.

Description of the Environment. The subproject components are in Bhimeshwore Municipality. The subproject components will be in municipality-owned sites and right-of-way (ROW) of public roads. There are no protected areas, forests, wetlands, mangroves, or estuaries in or near the subproject locations.

Potential Environmental Impacts and Mitigation Measures. The subproject is unlikely to cause significant adverse impacts that are irreversible, diverse or unprecedented because: (i) the components will involve straightforward construction and operation, so impacts will be mainly site-specific and localized; and (ii) there are no significant sensitive environmental features in the subproject sites although careful attention needs to be paid to minimizing disruption to the community.

Some impacts and their significance have been reduced by modifying the designs and locations. The concepts in the design of the subproject are: (i) demand for new piped water supply; (ii) maximum population coverage mostly in residential areas and areas of high growth rate; (iii) avoidance of water-use conflicts; (iv) locating pipelines within ROWs to avoid acquisition of land; (v) locating pipelines at least 10 meters (m) away from latrines, septic tanks and any main drains to avoid contaminations; (vi) locating the intake at least 30 m upstream from sanitation facilities; and (vii) ensuring that all planning and design interventions and decisions are made in consultation with local communities and reflecting inputs from public consultations.

During construction, impacts will likely arise from the need to dispose of moderate quantities of soil; and the disturbance to residents, businesses, and traffic. These temporary impacts are common for construction activities in urban areas, and there exist well-developed methods for their effective mitigation. Traffic management will be necessary during pipe laying on busy roads. Earthworks will be conducted during the dry season to avoid difficult working conditions that prevail during the monsoon. The location of stockyards will be identified at least 300 m away from watercourses. Fuel and lubricant storage areas will be located away from drainage. Precautions will be taken to minimize construction wastes. Measures will be provided to prevent wastewater entering into streams, watercourses, or irrigation channels. Open burning of solid wastes generated from the workers camp will be strictly prohibited. Better solid waste management practices will be adopted such as collection, segregation, reuse and recycling activities within the construction site and workers camp.

An O&M Manual including a standard operating procedures for operation and maintenance will be developed, imparting necessary training; safety and personal protection equipment for workers, measures to maintain the water supply system efficiency. During operation, the delivery of unsafe water will be mitigated with prompt action on leaks, and frequent monitoring. The water users' and sanitation committee (WUSC), as operator, requires the development of its capacity in water quality monitoring. Monitoring kits and laboratory rooms will be provided to WUSC, the executive body of the WUA, and the enhanced capacity development will be met through a "learning-by-doing." An expert in the first year and periodic capacity strengthening after that will

be undertaken the successful operation.

Environment Management. This IEE included an environmental management plan (EMP) which describe and address the potential impacts and risks identified by the environmental assessment. The EMPs included proposed mitigation measures, environmental monitoring and reporting requirements, emergency response procedures, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators. The IEEs and EMPs will be included in bidding and contract documents with specific provisions requiring contractors to (i) comply with all other conditions required by ADB, and (ii) to submit a site-specific environmental management plan (SEMP), including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program as per SEMP; and (iv) budget for SEMP implementation. A copy of the EMP/approved SEMP will be kept on site during the construction period at all times.

The budget for EMP implementation is NRs20,410,000 that include air quality, noise level monitoring, capacity building, workforce, administrative and other costs, e.g. public consultation and information disclosure, GRM implementation and any unanticipated impacts. The implementation costs of mitigation measures are covered separately under civil work contract. The contractor will be responsible for implementing the mitigation measures given in EMP. PMO, RPMO, and design, supervision and management consultants (DSMCs) are responsible for monitoring the EMP implementation.

Consultation, Disclosure, and Grievance Redress Mechanism. The stakeholders were involved during the IEE through discussions on site and public consultations. The views expressed by stakeholders were incorporated in the IEE and project design. IEE will be made available to the public through the ADB and UWSSP websites. The consultation process will continue during project implementation to ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation. A grievance redress mechanism is described within IEE to ensure that public grievances are addressed quickly.

Monitoring and Reporting. The PMO, RPMO, and DSMC will be responsible for environmental monitoring. RPMO with support from DSMC will submit monthly monitoring reports to PMO. PMO will consolidate the monthly reports and will send semi-annual monitoring reports to ADB. ADB will post the environmental monitoring reports in its website.

Conclusions and Recommendations. Charikot (Dolakha) water supply and sanitation subproject will bring a series of benefits to the local people. Based on the IEE findings, there are no significant impacts, and the classification of the subproject as Category B per ADB SPS is confirmed. To conform to government regulations, permits and clearances will be obtained prior to award of works contract.

This draft IEE is based on preliminary detailed design and will be submitted to ADB for concurrence and disclosure. However, this draft IEE will be updated based on final detailed design. The updated IEE will be submitted to ADB for final review and disclosure.

I. INTRODUCTION

A. Background

1. The Urban Water Supply and Sanitation (Sector) Project (UWSSP) will support the Government of Nepal in expanding access to community-managed water supply and sanitation (WSS) in 20 project municipalities by drawing on experiences and lessons from three earlier projects funded by the Asian Development Bank (ADB).[1] The project will finance climate-resilient and inclusive WSS infrastructure in project municipalities and strengthen institutional and community capacity, sustainable service delivery, and project development. Subprojects will be demand driven by water users' associations (WUAs) and project municipalities and selected based on transparent criteria[2] including population growth, poverty index, existing WSS infrastructure, community willingness for cost sharing, and long-term operation and maintenance (O&M) contract.[3]

2. The project will build upon the on-going efforts of the Government of Nepal in providing water supply and sanitation (WSS) services in urban areas of Nepal. It will help the country to meet Sustainable Development Goal (SDG)-6 to ensure availability and sustainable management of water and sanitation for all by 2030 and it is aligned with sector objectives laid out by the government's Fourteenth Plan, National Urban Development Strategy, and updated 15-year Development Plan for WSS in Small Towns, which is to improve water supply and sanitation service delivery in urban areas across Nepal.

3. The project will have the following impact: quality of life for urban populations, including the poor and marginalized, improved through the provision of sustainable WSS services.[4] The project will have the following outcome: inclusive and sustainable access to WSS services in project municipalities achieved. The project will have two outputs: (i) water supply and sanitation infrastructure in project municipalities improved; and (ii) institutional and community capacities strengthened.

4. The Ministry of Water Supply (MOWS) is responsible for planning, implementation, regulation, and monitoring of WSS. The Department of Water Supply and Sewerage (DWSS) under the MOWS supports the provision of WSS facilities in municipalities where large utilities do not exist, and these are operated by water users' and sanitation committee (WUSCs)[5] or municipalities.[6] Shortage of investment funds, skilled personnel, and inadequate O&M budgets, hinders municipalities from providing adequate, cost-effective services. The Local Governance Operation Act, 2017, established municipalities as autonomous government institution with responsibility for WSS services. While municipalities' capacity is being built, the government and

[1] ADB. Nepal: Small Towns Water Supply and Sanitation Sector Project Nepal: Second Small Towns Water Supply and Sanitation Sector Project; and Nepal: Third Small Towns Water Supply and Sanitation Sector Project.

[2] Subproject selection criteria are detailed in the Project Administration Manual (PAM). Selection of future investments to be designed under the project will follow same criteria, with preference for investments located in Kathmandu Valley, provincial headquarters, and strategic border municipalities.

[3] Procurement can only commence after DWSS and municipality sign management agreement with WUSC for 20 years O&M service. The municipality will own the system and the WUSC will be the operator.

[4] Government of Nepal. 2009. *Urban Water Supply and Sanitation Policy*. Kathmandu.

[5] The WUSCs, formed under the Nepal Water Resource Act, 1992, are the elected executive bodies of the water users' association.

[6] The DWSS assists in preparation of investment plans, project design, and establishing sustainable service delivery.

residents have been receptive to the decentralized, participatory, and cost-sharing service provision model by water users' associations (WUAs). Development support for municipal WSS has been channeled through a combination of (i) government grants through DWSS, (ii) loans by the Town Development Fund (TDF),[7] and (iii) contributions from municipalities and beneficiaries.[8] The TDF also supports WUAs in institutional and financial management including the introduction of tariffs.

5. The project will be implemented over a five-year period (indicative implementation period is 2018 – 2023) and will be supported through ADB financing using a sector lending approach. The MOWS is the executing agency and DWSS the implementing agency. The project management office (PMO) established under ongoing Third Small Towns Water Supply and Sanitation Sector Project (footnote 1) will be responsible for the overall management, implementation and monitoring of the project. There will be regional PMOs (RPMOs) to manage day-to-day project implementation at the subproject/municipality level. After construction including a one-year O&M period by the contractor, subprojects will be operated. by the WUSC or municipality.

6. The municipality is served by surface water sources. However, the system does not sufficiently meet the needs of the people, regarding both quantity and quality. The water sample has been collected from the proposed water source and analyzed. The results of the test have shown that chemical and microbial quality of water meets National Drinking Water Quality Guidelines (NDWQG).

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

Name of Proponent
Project Management Office
Third Small Towns' Water Supply and Sanitation Sector Project
Department of Water Supply and Sewerage
Ministry of Water Supply
Government of Nepal

Address of the Proponent
Panipokhari, Kathmandu
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Consultant Preparing the Report
TAEC Consult P. Ltd. Joint Venture with **Integrated Consultants Nepal (P) Ltd.** is responsible in preparing this IEE report.

C. Purpose of the Initial Environmental Examination

7. All projects funded by ADB must comply with its Safeguard Policy Statement (SPS) to ensure that projects are environmentally sound, designed to operate in compliance with

[7] The TDF is a government-owned entity established under the Town Development Fund Act, 1997. Loans from the government to WUAs or municipalities are generally on-lent by TDF under a subproject financing agreement.

[8] WUAs contribute 30% of project costs for water supply subprojects (25% from TDF loan and 5% from users' upfront cash contribution) and 15% for sanitation subprojects (subsidy from municipalities).

applicable regulatory requirements, and are not likely to cause significant environmental, health, or safety hazards. Environmental assessment has been conducted for the Charikot (Dolakha) water supply and sanitation subproject[9] selected based on detailed engineering design, and (ii) most likely environmentally sensitive components. The environmental assessment used ADB's rapid environmental assessment (REA) checklist (Appendix 1) and a "no mitigation measures scenario" checklist developed for UWSSP (Appendix 2). The environmental assessment of the Charikot (Dolakha) water supply and sanitation subproject shows it is not likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. Potential impacts are unlikely to affect areas larger than the sites or facilities subject to physical works. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed with uncomplicated measures commonly used at construction sites and known to civil works contractors.

8. Therefore, Charikot (Dolakha) water supply and sanitation subproject is classified as Category B for environment per ADB SPS. This initial environmental examination (IEE) report has been prepared based on detailed design and following requirements of ADB SPS and Government of Nepal Environment Protection Act (EPA) and Environment Protection Rules (EPR) where the subproject is listed under Schedule-1 requiring an IEE.

9. The IEE report primarily:

(i) provides information on the project and its environmental requirements;
(ii) provides the baseline physical, ecological, cultural and socioeconomic environments and resources in and surrounding the project's area of influence;
(iii) identifies and assesses potential environmental impacts arising from the implementation of the project;
(iv) recommends measures to avoid, mitigate, and compensate the adverse impacts;
(v) presents information on stakeholder consultations and participation during project preparation;
(vi) recommends a mechanism to address grievances; and
(vii) includes an environmental management plan.

10. The IEE study team conducted a preliminary exercise to solicit information from planners, policy makers, project components, concerned authorities, the user community and affected population. The team reviewed the relevant documents on water supply and sanitation in the country and the feasibility report. Similarly, the team also reviewed the reports on hydrology, meteorology, geology, and others related to the environment.

11. The study team visited the site to identify the potential impacts, both positive and negative, of the project. During the visit, the team met local people and conducted meetings, brainstorming sessions, field examinations, and data gathering. The team also made walkthrough surveys of the project area to assess the baseline environment and potential environmental impacts of the project during the construction and operation phases.

II. DESCRIPTION OF THE SUBPROJECT

A. Need for the Subproject

12. The municipality is an attraction for internal migration from remote hilly regions. Because

[9] All the water supply and sanitation subprojects will include output-based aid (OBA) for sanitation (toilets), hence they are called water supply and sanitation.

of its strategic location, the municipality will tend to grow moderately in the future. The existing water supply system has not been able to meet the growing demand for water from the consumers. The present water supply is intermittent and is limited to only certain parts of the city area. The current systems serve only about 90% of the population. There is a demand from other parts of the municipality for the supply of regular potable water.

13. The water from the existing system is hardly treated. The people are mostly dependent on piped water supply directly from streams/springs, the quality of which is prone to bacteriological contamination specially during the Monsoon season.

14. Considering the water demand and condition of the existing system, there is a need for a project to upgrade the existing water supply situation in the service area to meet the growing demand for private connections and to make drinking water available to the people of the service area throughout the year.

B. Relevance of the Subproject

15. Charikot (Dolakha) water supply and sanitation subproject is intended to serve drinking water in all ward areas of Bhimeshwore Municipality. The subproject is expected to benefit a base year population of about 22,755 (2018) and design year populations of 34,610 (2038) by providing a reliable and adequate supply of safe and potable water.

16. **Subproject Selection.** Charikot (Dolakha) water supply and sanitation subproject is demand driven by WUA or municipalities, and selected based on transparent criteria, including population growth, poverty index, existing WSS infrastructure, formed WUA, community willingness for cost sharing and long-term O&M contract.[10]

C. Overview of the Subproject

17. The service area of the Charikot (Dolakha) water supply and sanitation subproject comprises coverage of wards 1, 7 and 10 and partial coverage of ward numbers 2, 3, 4, 5, 6, 8, 9, 11, 12, and 13 of Bhimeshwore Municipality. The implementation period will be two years, including operation and maintenance.

18. The subproject is located in Bhimeshwore Municipality, which is situated in Dolakha district in Janakpur Zone of the Eastern Development Region of Nepal. It lies between 27º37' 58" N to 27º44' 42" N latitude to 85º5' 12" E to 85º 59' 31" E longitude. The municipality is in a hilly region with an altitude ranging between 950 to 2,560 m above mean sea level with an average altitude of 1554 meters. The municipality has a subtropical to a temperate climate and is heavily influenced by the monsoon (June-September) with an average annual rainfall of about 1,710 mm.

D. Project Components

19. The salient features of the Charikot (Dolakha) water supply and sanitation subproject are presented in Table 1 and detailed description of the components are described in the sections below.

[10] Subproject selection criteria are defined in the PAM. Procurement of services can only commence after the DWSS and municipality sign a management agreement with the WUSC for O&M of services for 20 years. The municipality will own the system, while WUSC will be the operator.

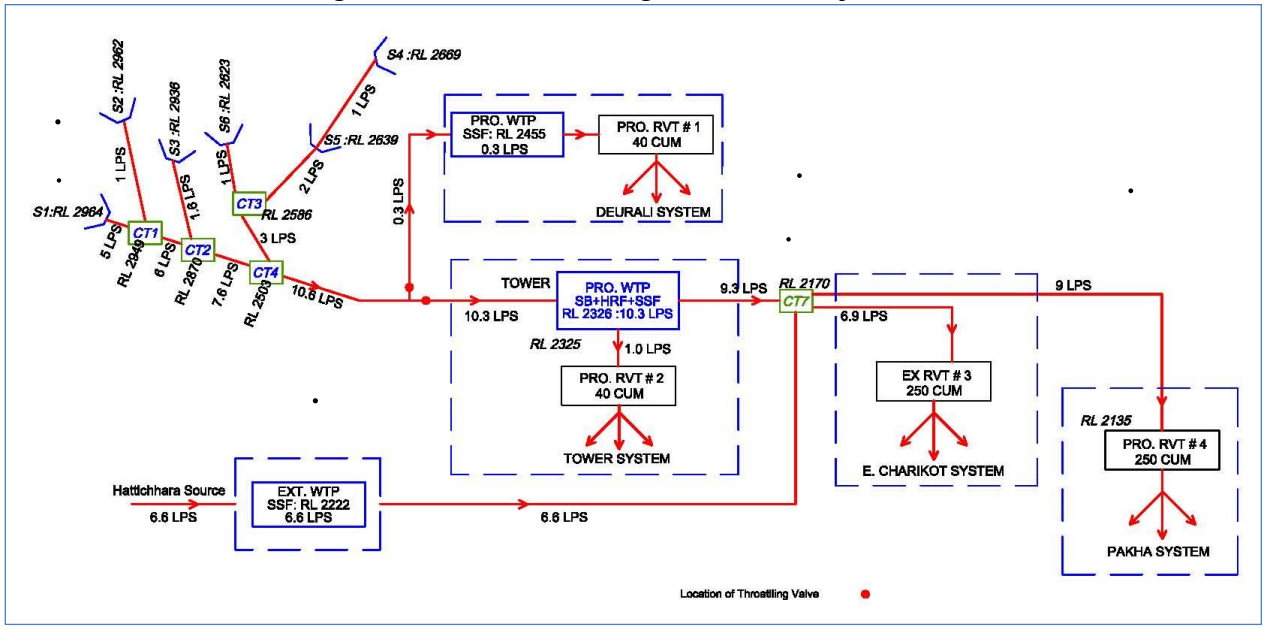
Table 1: Salient Feature of the Subproject

	Items	Description
1	Name of Project	Charikot Town Water Supply and Sanitation Project
2	Type	Gravity
3	Study Level	Detailed Engineering Design
4	Location Area	
	Region	Central Development Region
	Zone	Janakpur
	District	Dolkha
	VDC/Municipality	Bhimeshwore Municipality
	Ward	Complete area of Ward No. 1 to 10 and partial area of ward No. 12 and 13
5	Available Facilities	
	Road	On the Lamoshanghu- Jiri Highway
	Supply Water System	WUSCs
	Electricity	Available
	Communication	Available
	Health Services	Available
	Banking Facilities	Available
6	Social Status	
	Present households Numbers (2016)	3,842
	Present Population (2016)	21,909
	Base Year Population (2018)	22,755
	Design Year Population (2038)	34,610
	Average HHS size	5.7
	Weighted Growth Rate % (WGR)	2.1
	Projected households in Design Year (based on WGR)	~ 6,070
7	Water Demand (MLD)	
	Base Year (2018)	2.878
	Design Year (2038)	4.378
8	Source Characteristics	
	Source Name	Apart from existing small source, Charnawati River and its tributaries are main sources
	Source Type	Perennial river
	Source Location	Within the municipality
8	Type of Structures	
	Proposed intakes	10 Nos with rehabilitation of 5 nos intake
	Water treatment plant	Total Capacity for 51.3 lps, in 5 location including one set with 6.6 lps capacity.
	Ground Reservoir (No and Capacity in CUM)	2N-40 cum + 1E-250 cum + 3N-250 cum + 3N-150 cum
	Valve Chamber (Bricks/RCC)	70/25
	Office Cum GH (O1) /Guard House (G1) / Small Guard House (G2) /Dosing House (DS)	1-O1 / 3-G1 / 3-G2 / 9- DPH
	Household Connection	3,842
	Fire Hydrant	14
	Total Length of pipe in transmission and Bulk Distribution	44,674 m (with 1351 m of BDS)
	Total Length of pipe in Distribution	143,321 m
9	Total Cost of WS Component (Inclusive of all) NRs	893,892,356.20
10	Cost Sharing Arrangement	

	Items	Description
	Government of Nepal Component (75 %)	670,419,267.15
	TDF Loan (25 %)	223,473,089.05
11	WUSC's Commitment for O&M as upfront (Cash) (NRs)	17,877,847.12
12	Tariff	
	Up to 6 cum/monthly (NRs)	210
	7 to 10 cum/monthly (NRs)	53
	11 to 20 cum/monthly (NRs)	79
13	EIRR (Base case) %	31.05
14	Environment	
	ADB Category	B, Only IEE necessary
	IEE finding	No significant adverse impact.
15	Per Capita Cost for W/S component	
	Per Capita Cost (for base year pop.) (NRs)	39,283
	Per Capita Cost (for design year pop.) (NRs)	25,828

20. **Intake.** Altogether, there are ten intakes. The first sub-system, SS-1 or OLD system comprises of six intakes and the other two sub-systems, SS-2 and SS-3, each comprises of two-stream intakes.

Figure 1: Schematic Diagram of Sub-System 1



21. Out of these six intakes of the old system, two are spring intakes, and four are stream intakes. As they are drawing water from these sources since the past with a cumulative safe yield of 11 liters per second (lps), the safe yield of the transmission system of this sub-system has been adopted as 10.6 lps. The water collected from the two streams will be collected in a collection chamber. Intakes are located in an altitude ranging from 2,669 m to 2,964 m.

22. Two-stream intakes (TYP-4) have been proposed at Hattichahara for Sub-system 2 (SS-2). One intake is at the main Charnawati River, and another one is from its tributaries, which is about 300 m from the Charnawati intake. Each branch of the rivers has a safe yield of more than 20 lps. As the bed is of hard rock that acts as a stilling basin in this waterfall area, Bottom Rack

intake have been proposed in both of these rivers. A gravel trap at the end the bottom rack has been provided to trap the heavy sediment, which enters from the bottom rack and rolled gallery. The gravel trap shall occasionally be cleaned manually. A filter box (intake) with perforated pipes covered by filter material (clean graded gravel) is proposed after the gravel trap. The water collected from the two streams will be collected in a collection chamber. In totality a cumulative discharge of about 31 lps has been proposed. The Relative Levels (RL) of these intakes are around 2,318 above mean sea level (amsl).

23. As the main course of the Charnawati River flows with a very steep gradient at the intake area of SS-3 Sub-system, a temporary type of weir using Rip-Rap has been recommended. A single orifice type intake with a minimal sill height has been provided to divert the river water to the intake filter chamber in the main river. As a rigid concrete structure or masonry weir is not suitable for a river of the mid hills with a large river width. A temporary weir formed using Rip-Rap of 0.5 to 1 m height across the 20m wide river has been provided for the diversion structure of this system. Moreover, such a flexible structure is easy for operation and maintenance. A single orifice type of intake has been provided to capture the design flow even during the lean season. To make the design simple and simple to operate, no gates and scour sluice at the intake are provided. To control heavy discharge in the canal during floods, a control orifice is provided immediately after the gravel trap.

24. **Transmission Main.** There are three different transmissions mains for the different sub-systems. The total length of the transmission main of the Old System (SS-1) is about 12.665 kilometer (km). This transmission system transfers water to WTP-2 of SS-2 at the Tower area. As the pipe used in existing transmission line is sub-standard (regarding pressure rating), it is not recommended to be incorporated in the proposed transmission system.

25. The transmission length of the Hattichahara Transmission system (SS-2) is about 9.468 km. The transmission main passes through valley crossing and pipeline along the river gorge in steep terrains that is the reason ductile iron pipe has been used. Similarly, a transmission line of Ghatta Transmission system (SS-3) is about 13.305 km (Table 2).

Table 2: Details of Transmission Pipes Subsystem Wise

Subsystem	Length (m)	Pipes Details
Existing System	12665	PE (50-140mm)
Hattichahara System	9468	Dl (150-200mm) PE (125-200mm)
Ghatta System	13305	PE (110-180mm)

26. **Thrust Blocks, Saddle Blocks and Thrust Beams.** Thrust blocks have been proposed for ductile iron pipes (for both the transmission and distribution mains) from being moved by forces exerted within the pipe 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 for horizontal bends, vertical bends, and tees have been designed for a pressure of 30 kilogram per square centimeter (kg/cm^2) and 20 kg/cm^2 for the transmission and distribution line, respectively.

27. Similarly, thrust beams and saddle blocks are proposed for ductile iron Pipes laid up in the sloping areas and unburied portions. All saddle blocks are proposed to be anchored with concrete at the center of each pipe to prevent movement. This type of support will be used in the initial stretches of the Hattichahara Transmission system. RCC Supports for the stretches of buried and unburied ductile iron pipelines, which are laid in the sloping areas, will be provided to prevent pipe movement.

28. A special thrust block and beams for 25 PN rating have been designed and recommended in 1500 m long stretches of the valley crossing in the Hattichahara Transmission system (SS-2).

29. **River and Stream Crossing.** There are several river crossings in all the three-transmission systems. There are two major crossings, one is in SS- 1, and another is in SS-2. MS truss pipe crossing for a span of 25 m and span of 20 m have been proposed in the Transmission line of SS-2 and SS-3, respectively. These truss crossings are triangular in shape comprising of tuber mild steel sections and braced by welded tubular sections to form a composite light section which is economical than the traditional angle and channel section.

30. A simple crossing by providing SP-4 type concrete saddle block is recommended for small crossings for ductile iron pipes. This type of crossing is used only when the span of crossing is less than 6 m. There are about five crossings in the three-transmission systems. In the case of crossing near the existing bridge and culvert, provision has been made for pipe clamps.

31. **Water Treatment Plants.** The Charikot (Dolakha) water supply and sanitation subproject will have five small water treatment plants (WTPs) ranging with capacities ranging from 23.9 to 0.3 lps. As the DMA-1 (Deurali System) is drawing water from the existing sources, the small WTP-1 comprises of a slow sand filter (SSF) with a filtration rate of 0.25 m/hour. This service area is at a higher elevation than the proposed larger WTP at Tower (WTP-2). This Deurali area is presently served directly by the existing Charikot transmission system. Therefore, a separate WTP has been proposed for this SS-1. The capacity of the SSF is 0.3 lps. Two circular RCC units of 1.8 m diameter and height of 3.4 m of SSF have been proposed.

32. Excluding one separate slow sand filter in WTP-1 for DMA-1, the Charikot water supply system will have four major water treatment plants.

33. Out of four major water treatment plants, one water treatment plant is the existing treatment plant referred to as WTP-E, which will be rehabilitated to improve its performance. The design capacity of the existing WTP is 6.6 lps. As the elevation allows for the Hattichahara Transmission System (SS-2), a discharge of 6.6 lps has been diverted from this Transmission System. This WTP will be referred as WTP-E from now on. The elevation of this area is about 2,222 m. Results of the environmental audit of WTPs (Appendix 9) to be rehabilitated in Charikot (Dolakha) water supply and sanitation subproject show compliance with government regulations and requirements. Raw water taken from the concerned sources meets National Drinking Water Quality Standards (NDWQS). During rainy season, turbidity became high and chances of E. coli is increased. During the operation of treatment plan, the tap water meets both NDWQS and WHO guidelines. Turbidity and residual chlorine was within the limits of NDWQS. Monitoring is done by DWSS, water quality section. Sludge generated is very minimal which is managed by burying in low land within premises of WTP. Management of filter media washing done by the concerned WUSC as per specified methods. Corrective action on managing WTP sludge is included in the subproject design and EMP.

34. The proposed WTP near the Tower referred to as WTP-2 for the old transmission system (SS-1) has been proposed at an elevated area to treat 10.3 lps water. This location has been identified as a command location for the reservoir to serve elevated settlements along the old transmission line, which is presently getting water from the transmission mains. The elevation of this WTP area is about 2,325 m.

35. Similarly, the third WTP has been proposed for the discharge from Hattichahara

Transmission system ((SS-2). It is situated at 2220 m and referred as WTP-3.

36. WTP-4 has been proposed for the Ghatta Transmission system to treat 10.2 lps water. The settling basin has been proposed near the intake and the Horizontal Roughing filters and Slow sand filter in different areas.

37. Plain sedimentation has been provided as a pre-treatment unit in all the proposed WTPs. The retention period is more than 4 hours for each settling tank.

38. All settling basins are rectangular with longitudinal flows. A Settling basin with two identical chambers of 2.6 m x 9 m have been adopted for 10.3 lps with a design load of 0.8 cum/m^2/h. In case of 23.9 lps design discharge, two identical chambers of 4 m x 14 m have been adopted with the same design load.

39. Horizontal roughing filters have been proposed in every treatment plant. A filtration rate of 1.8 cum/m^2/h has been adopted for design. Inlet and outlet chambers each of 90 cm width has been provided in the unit. Each unit comprises of three chambers for the filter materials.

40. The roughing filter has been designed for a discharge capacity of 10.3 lps and 23. 9 lps. For 10.3 lps capacity, the number of units proposed is 4. The size of each unit is 5m x 7m. Similarly, eight units each of 5 m x 7 m have been provided for the design discharge of 23.9 lps.

41. The SSF as the main filtration unit has been proposed in every major WTP. The filtration rate of 0.2 cum/m^2/h has been adopted for the design. All SSFs will have a depth of 2.8 m including a free board of 50 centimeters. Three chambers each 6 m x 12 m have been proposed to filter the design discharge of 10.2 to 11 lps capacity as a unit. Similarly, the same size of two units have been proposed to filter the design discharge of 23.9 lps (Table 3).

Table 3: Water Treatment Plant in Various Sub-systems

Description	WTP-1 (Proposed)	WTP-E (Existing)	WTP-2 (Proposed)	WTP-3 (Proposed)	WTP-4 (Proposed)
T. Sub-system	SS-1 (Old)	SS-2 (Hattichahara)	SS-1 (Old)	SS-2 (Hattichahara)	SS-3 (Ghatta)
Design Discharge	0.3 lps	6.6 lps	10.3 lps	23.9 lps	10.2 lps
Units	SSF	I SB+HRF+SSF	SB+HRF+SSF	SB+HRF+SSF	SB+HRF+SSF

42. Bleaching powder has been proposed as the disinfection agent for the disinfection of the water. Chlorinators of appropriate capacity have been proposed for chlorination of the filtered water.

43. Each reservoir tank (RVT) sub-system has its dosing system before distributing water to the system. The dosing system comprises of an electronic dosing pump with a fibre reinforced plastic tank and stirring device. As the pump is automatic, an electronic dosing pump with closed housing is recommended.

44. **Service Reservoir.** The cumulative capacity of the nine-service reservoirs provided in the Charikot water supply project is about 1,530 cum. A minimum of 40 cum capacity has been provided for all reservoirs. An existing tank of 250 cum capacity has been incorporated from the existing system.

45. **Bulk Distribution Mains.** As the service area is very scattered and with high elevation difference (in the range of 1000 m), the proposed concept of Bulk Distribution has been proposed. This has been done to reduce inequality of pressure in households connections within the service area so that the household at a higher elevation and tail end of the service area will get equal services. All of the storage reservoirs of the Subsystem will get the required water from corresponding water treatment plants. The details of the pipes used in different Subsystem have been given in Table 4.

Table 4: Details of Pipe Used in Subsystem

Sub-System	Length (m)	Pipes Details
Existing System	1287	PE (75- 110mm)
Hattichahara System	5555	PE (125-140mm) GI (100mm)
Ghatta System	1540	PE (90mm)

46. **Distribution Mains.** The distribution system comprises of a pipe network, which is looped in certain cases and branched in others. The network has been analyzed using EPA net, a design analytical software tool. The entire system has been designed using Polyethylene (PE), Ductile Iron (DI) and Galvanized Iron (GI) pipes. The sizes of the ductile iron pipes are 200 mm and 150 mm. For proper saddle arrangements at the household connections in distribution pipe, the minimum diameter of the distribution pipe has been adopted as 50 mm.

47. Three types of pipes have been used in the distribution network: DI, GI pipe and PE pipes. However, the uses of galvanized iron pipes have been limited. The total pipe length of various diameters is given in the Table 5. The total pipe length of the proposed distribution system works out to 143.36 km.

Table 5: The total design length of pipes used in Distribution

S. No.	Description	Length (m)
A	PE PIPES of 10 kg/cm^2	
	50 mm OD	81,956
	63 mm OD	20,755
	75 mm OD	3,303
	90 mm OD	3,708
	110 mm OD	3,382
	125 mm OD	0
	140 mm OD	2,500
	160 mm OD	111
	Sub Total	115,715
B	PE PIPES of 6 kg/cm^2	
	75 mm OD	2,381
	90 mm OD	6,677
	110 mm OD	6,552
	125 mm OD	996
	140 mm OD	5,142
	160 mm OD	870
	Sub Total	22,618
C	GI Pipes	-
	50 ND	4,160
	65 ND	72
	80 ND	0
	100 ND	37
	Sub Total	4,269

S. No.	Description	Length (m)
D	DI Spigot-Socket Pipe	
	DI 150 ND	112
	DI 200 ND	647
	Sub Total	759
	Total	143,361

48. **House Connections.** Three types of house connections have been envisaged in the project. There are about 192 house connections from ductile iron pipes, about 2,882 house connections from PE pipes and about 768 house connections from galvanized iron pipes. This will make the total household connection of 3,842 in the project area. Most of the connection will be private.

49. The house connection shall comprise of about 12 m pipe PE or galvanized iron Pipe (as per requirement) and water meters. The house connection pipe shall be PE-80 or 100, 20 mm OD diameter pipe of rating PN-16 for tapping from ductile iron or PE pipes. In the case of tapping from galvanized iron pipes, the house connection pipe shall be medium class galvanized iron of 15 ND.

50. Tapping of household connections in PE pipe have been proposed from PE saddles with ferrules and in the case of ductile iron pipe; ductile iron saddles shall be used with ferrules without touching the ductile iron pipes by the ferrules. Tapping from galvanized iron pipes has been proposed from PE saddle with ferrules.

51. A dry dial volumetric rotary piston type water revenue meter for all house connections are proposed. These household water meters have 15 mm ND.

52. **Appurtenances.**

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

(ii) **Pressure reducing valves.** Pressure reducing valves (PRVs) are recommended to maintain a preset, reduced, generally constant outlet (downstream) pressure for a range of flow rates and inlet (upstream) pressure in the distribution system. The bypass arrangement has been provided in PRV arrangements to maintain the system during breakdown of PRV and maintenance of the valves. All PRV valves shall be with nominal pressure rating PN 16 unless in special circumstances where a higher-pressure rating is required.

(iii) **Air (Release) Valves.** Air valves will be installed at all high points of the pipeline, in sections, which form a peak on the hydraulic gradient and on the downhill side of line valves. Air valves shall be of combined type with a larger and smaller venting orifice, which permits passage of large volumes of air for vacuum breaking, and venting on starting up and closing down operation and a small venting cross section for the release of small volumes of air under full internal operation pressure. All air valves shall be Double Orifice Air Valves and shall be with nominal pressure rating PN 16 unless in special circumstances where a higher-pressure

rating is required.

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

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

(vi) **Fire Hydrant.** Fire hydrants are provided at major road junctions. These fire hydrants shall also be used for extinguishing fire in emergencies and flushing of the system as required. Fire hydrants, namely, stand post type, conforming to IS 908 is recommended.

53. **Chambers.** Two types of chambers have been proposed in the subproject. A chamber with brick masonry walls has been provided in non-vehicular and rural areas. In other vehicular carriageway and city area chambers constructed with RCC have been provided.

54. **Guard Quarter, Other Buildings and Boundary Wall**. To safeguard storage tanks and RVT from vandalism as well as contamination, a Chain-link boundary (CLBW) wall and barbed wire fencing (BWF) have been proposed. A galvanized chain link fencing over the 450 mm high parapet wall has been proposed from aesthetic and economic considerations. Barbed wire with concrete posts have been proposed for fencing in a fringe area of town and rural areas of the municipality.

55. A two bay two storied building for office (OFF-1) is proposed at Charighyang Area. The building comprises of a big meeting hall, water quality laboratory, administrative rooms, store for household meters and other small gadgets in addition to the guardroom, kitchen and bathroom.

56. Three single storied Guard House (GH-1) are proposed at the three WTP locations (WTP-2, WTP-3, and WTP-4). The Guard House building comprises of residence facilities for a guard and a room for tools for repair and maintenance.

57. Similarly, four small Guard Houses (GH-3) are proposed at the three reservoir locations. The Guard House comprises of two rooms.

58. To add bleaching solution in distribution, each RVT sub-system has its dosing system. The dosing pump house (DPH) with two compartments has been proposed. The one compartment house dosing pump and other compartment is recommended for the chemical store. Altogether nine numbers of Dosing Pump House have been proposed.

59. As the system comprises of many RVTs and other structures to be protected and

operated, different sizes of building structures and different types of boundary have been discussed with the WUSC and proposed in the project. Table 6 summarizes these in detail.

Table 6: Proposed Buildings and Boundary Type

Location	Component	Building	Boundary Type
Charighyang	Main Office	OFF- 1	GI Chain link with B/W
Deurali	VVTP-1+ RVT #1	DPH	Fencing by Barbed Wire
Tower	VVTP-2+ RVT #2	GH-1 + DPH	GI Chain link with B/W
Bisuna	RVT-3 + RVT- #4+ Existing Office	2 nos. of DPH	Exist
Bhutpokhari	VVTP-3 + RVT- #5	GH-1 + DPH	GI Chain link with B/W
Tindhare	RVf # 6	GH-3 + DPH	GI Chain link with B/W
Simpani	RVT # 7	GH-3 + DPH	GI Chain link with B/W
Ghatta	SB of VVTP-4		Fencing by Barbed Wire
Matti	VVTP-2 (HRF+SSF) + RVT # 6	GH- 1 + DPH	GI Chain link with B/W
Jilu	RVT # 7	GH-3 + DPH	GI Chain link with B/W
Various Locations	Intakes, IC, CC and BPTs		Fencing by Barbed Wire

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

61. An important factor in lowering and subsequently maintaining a low level of leakage in a water network is pressure control. The division of the network into DMAs facilitates the creation of a permanent pressure control system, thus enabling pressure reduction in DMAs, which reduces the level of background leakage, the rate of flow of individual bursts and the rate of the annual burst frequency. To manage NRW in the proposed system, the total system has been divided into 6 DMA according to the serving reservoir.

E. Implementation Schedule

62. Table 7 presents the indicative timeframe of key activities about the subproject implementation schedule. Similarly, Table 7 presents training for capacity building programs for the subproject.

Table 7: Environmental Management Implementation Schedule

Activity			Indicative Time Frame
Project implementation			
	Detailed Design and Bidding Documents		
	Procurement		
	Construction		
	Defects Liability Period		
	Operation and Maintenance		
Environmental management			
	Overall		
	1.	Design Review and Technical Audit Consultant of Environmental Specialist	Starting (4 years of intermittent inputs)

Activity			Indicative Time Frame
	2.	Project management office's (PMO) submission of Environmental monitoring report (EMR)	
		Monthly EMR for Project's Monthly Progress Report	8th day after effective month
		Semi-Annual EMR during construction for submission to ADB	8th day after effective 6-months
		Semi-Annual EMR for submission to ADB during O&M until ADB issues a Project Completion Report	8th day after effective year
	Before Construction Mobilization		
	1.	Finalization of environmental management plan (EMP), (if applicable) revision of initial environmental examination (IEE)	
	2.	ADB review and approval of revised IEE and EMP.	
	3.	Obtaining Government's approval of IEE Report	
	4.	Community preparation (including disclosure of Final IEE and its EMP)	
	5.	Establishment of baseline data (as set out in the EMP)	(shall have been done before award of contract)
	6.	Preparation of site-specific environmental management plan (SEMP) by selected Contractor, review of SEMP	before start of works on site
		Against Safeguard Policy Statement (SPS)-compliant EMP.	or establishment of construction-related facilities.
	Construction		
		Mobilization to Demobilization	
	1.	Implementation of mitigation measures and conduct of environmental effects monitoring following the SEMP.	
	2.	Submission of EMR	
		Monthly, by Contractor	5th day of the month following the effective month
		Quarterly, by Contractor or by Licensed Laboratory	3rd day of the month following the effective quarter
	Operation (potentially could start even before DLP is over)		
	1.	Implementation of mitigation measures and monitoring activities as	Starting Q/Q Y
		Specified in the EMP	
	2.	Submission of EMR	Starting Q/Q Y
		Monthly, by Operator	5thday of the month following the effective month
		Quarterly, by Operator or (if applicable) by Licensed Laboratory	3rd day of the month following the effective quarter

III. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

A. ADB Safeguard Policy Statement

63. ADB SPS requires borrowers to meet a set of requirements (Safeguards Requirements 1) when delivering environmental safeguards for projects supported by ADB. The objectives are to ensure the environmental soundness and sustainability of projects, and to support the integration of environmental considerations into the project decision-making process. Hence, UWSSP is required to comply with these requirements. Summary of the step by step process is discussed below in this section. Detailed discussions are provided in the ADB SPS.[11]

[11] ADB. 2009. *Safeguard Policy Statement*. Manila.

64. **Screening and Categorization.**[12] Subprojects are to be screened for their expected environmental impacts, and are assigned to a specific category (footnote 14). Categorization is to be based on the most environmental sensitive component. However, for subproject(s) with component(s) that can trigger Category A or with potentially significant adverse impacts that are diverse, irreversible, or unprecedented, PMO shall examine alternatives to the subproject's location, design, technology, and components that would avoid, and, if avoidance is not possible, minimize adverse environmental impacts and risks, and to meet Category B categorization. The rationale for selecting the subproject location, design, technology, and components will be properly documented, including, cost-benefit analysis, taking environmental costs and benefits of the various alternatives considered into account. The "no action" alternative will be also considered. In general, criteria that can trigger subproject's 'Category A' are in Section V below.

65. **Environmental Assessment.** Environmental assessment shall include description of environmental and social baseline to provide an understanding of current conditions forming the benchmark against which subproject impacts are assessed. Environmental impacts and risks will be analyzed for all relevant stages of the project cycle, including design and planning stage, construction, operations, decommissioning, and post-closure activities such as rehabilitation or restoration. The structure and composition of the typical IEE report is provided in Appendix 4. The IEEs of sample subprojects prepared during the ADB loan processing stage[13] may be used as model documents for UWSSP subprojects.

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

67. **Public Disclosure**. MOWS, through PMO, shall submit to ADB for disclosure on ADB website so affected people, other stakeholders, and the public can provide meaningful inputs into the subproject design and implementation:[14]

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

[12] Per ADB SPS, (i) **Category A**: A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment is required. (ii) **Category B**: A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible and, in most cases, mitigation measures can be designed more readily than for category A projects. An initial environmental examination is required. (iii) **Category C:** A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed. (iv) **Category FI**: A proposed project is classified as category FI if it involves investment of ADB funds to or through a financial intermediary.

[13] Subprojects with IEEs prepared during project processing include (i) Charikot WSS, (ii) Ilam WSS, (iii) Tumdadi Chakiffanta WSS, (iv) Charikot DEWATS, and (v) Katahariya Storm Drain.

[14] Per ADB SPS, 2009, prior to disclosure on ADB website, ADB reviews the "borrower's/client's social and environmental assessment and plans to ensure that safeguard measures are in place to avoid, wherever possible, and minimize, mitigate, and compensate for adverse social and environmental impacts in compliance with ADB's safeguard policy principles and Safeguard Requirements 1-4."

upon receipt.

68. **Consultation and Participation.** PMO and RPMOs shall carry out meaningful consultation[15] with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. The consultation process and its results are to be documented and reflected in the environmental assessment report.

69. **Grievance Redress Mechanism.** MOWS, through PMO, shall establish a mechanism to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the subproject's environmental performance. The grievance mechanism shall be scaled to the risks and adverse impacts of the subproject. As of the ADB loan processing for UWSSP, a Grievance Redress Mechanism has been established and discussed in detail in Section VI below.

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

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

72. **Pollution Prevention and Control Technologies**. During the design, construction, and operation of the subproject the PMO and RPMOs shall apply pollution prevention and control technologies and practices consistent with international good practices, as reflected in internationally recognized standards. When the Government of Nepal regulations differ from these levels and measures, PMO shall achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific subproject circumstances, PMO will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

73. **Occupational Health and Safety.** PMO[16] shall ensure that workers[17] are provided with a safe and healthy working environment, taking into account risks inherent to the sector and specific classes of hazards in the subproject work areas, including physical, chemical, biological, and radiological hazards. PMO shall ensure to take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work by (i) identifying and

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

[16] In case where responsibility is delegated to subproject contractors during construction phase, PMO shall ensure that the responsibilities on occupational health and safety as described herein are included in the contract documents.

[17] Including nonemployee workers engaged by the borrower/client through contractors or other intermediaries to work on project sites or perform work directly related to the project's core functions.

minimizing, so far as reasonably practicable, the causes of potential hazards to workers; (ii) providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; (iii) providing appropriate equipment to minimize risks and requiring and enforcing its use; (iv) training workers and providing them with appropriate incentives to use and comply with health and safety procedures and protective equipment; (v) documenting and reporting occupational accidents, diseases, and incidents; and (vi) having emergency prevention, preparedness, and response arrangements in place.

74. PMO shall ensure to apply preventive and protective measures consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's *Environmental, Health and Safety Guidelines.*[18]

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

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

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

78. **Bidding and Contract Documents.** IEEs and EMPs are to be included in bidding and contract documents and verified by the RPMOs. The PMO and RPMOs shall also ensure that bidding and contract documents include specific provisions requiring contractors to (i) comply with all other conditions required by ADB,[19] and (ii) 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 SEMP; and (iv) budget for SEMP implementation. No works can commence prior to approval of SEMP. 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 shall require corrective actions.

79. **Conditions for Award of Contract and Commencement of Work.** PMO shall not award

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

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

any Works contract for a subproject until (i) relevant provisions from the EMP are incorporated into the Works contract; and (ii) the IEE is updated to reflect subproject's detailed design and PMO has obtained ADB's clearance of such IEE. For "design, build, and operate" type contracts, PMO shall ensure no works for a subproject which involves environmental impacts shall commence until (i) relevant provisions from the EMP are incorporated into the Works contract; and (ii) the IEE is updated to reflect subproject's detailed design and PMO has obtained ADB's clearance of such IEE.

B. Government Environmental Legislations

80. **Environmental Protection Act (EPA), 1997.** This Act requires a proponent to undertake IEE or environmental impact assessment (EIA) of the proposed project and have the IEE or EIA Report approved by the concerned sector agency (CSA)[20] or Ministry of Science, Technology and Environment (MOSTE)[21], respectively, prior to implementation.

81. **Environmental Protection Rules (EPR), 1997, and its amendments in 1999 and 2007**. The Rules defines implementing rule and regulations of the IEE or 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 require IEE and EIA respectively, as amended in 2007. Table 8 presents the required environmental assessment for activities/works under the subproject.

Table 8: Required Environment Assessment for the Activities of the Subproject Per Environment Protection Rules

S. No.	Schedule 1: Activities Requiring Initial Environmental Examination Only	Schedule 2: Activities Requiring Environmental Impact Assessment	Applicable Environmental Assessment
Drinking Water Supply			
1	Surface water source with not more than 4 ft^3 safe yield and supply of not more than 50% of the water during the dry season.	Surface water sources with more than 1 ft^3 safe yield, and the use of its entire part during the dry season.	Initial environmental examination (IEE)
2	Processing of water at the rate of more than 25 lps.		IEE
3	Recharging of up to 50% of the total aquifer for the development of underground water sources.	Recharging of more than 50% of the total aquifer for the development of underground water sources.	IEE
4	Displacement of not more than 100 persons for operating a water supply scheme.	Displacement of more than 100 persons for the operating a water supply scheme.	IEE
5	Settlement of not more than 500 persons on the upper reaches of water sources.	Settlement of more than 50 persons on the upper reaches of water sources.	IEE
8	Supply of drinking water to a population ranging between 2,000 to 20,000.	Supply of drinking water to a population of more than 20,000.	IEE

[20] The CSAs are responsible for the: (i) review of applications for EIA scoping and approval of IEE schedules of work and TORs; review of submitted IEE or EIA Reports; (iii) approval of IEE Reports; (iv) forward of reviewed EIA Reports together with its review opinions and suggestions to MOSTE; and (v) monitoring and evaluation of project implementation impacts.

[21] MOSTE is responsible for the: (i) approval of EIA schedules of work and TORs; (ii) approval of EIA Reports; and (iii) conduct of environmental audit of completed project after two years of operation.

S. No.	Schedule 1: Activities Requiring Initial Environmental Examination Only	Schedule 2: Activities Requiring Environmental Impact Assessment	Applicable Environmental Assessment
9	Supply of drinking water to a population ranging between 10,000 and 100,000 upon connecting new sources.	Supply of drinking water to a population of more than 100,000 upon connecting new sources.	IEE

82. **Compliance of the Subproject with EPR 1997 (as amended in 1999 and 2007).** The subproject falls under Schedule 1 activities and therefore requires an IEE. In compliance with this requirement, the PMO needs to prepare an IEE report following the procedures in the EPR and submit the report for approval to MOWS, which is the CSA (footnote 20) for the subproject. PMO needs to obtain an approved IEE from MOWS prior to award of any contracts under the subproject. PMO may opt to use one IEE report for compliance with ADB and government's environmental clearance requirements, provided that the IEE report complies with both ADB SPS and EPR 1997 requirements.

83. **Status of Securing MOWS−Approved IEE.** The PMO is currently in the process of securing MOWS-approved IEE in compliance with the EPR. PMO will ensure that the MOWS-approved IEE will be secured prior to the award of any contract under the subproject. A copy of the approval document from MOWS will be attached in the updated version of this IEE that will be submitted to ADB for final review and disclosure.

C. Other Relevant National Laws, Policies and Guidelines

84. Table 9 below summarizes all other relevant national laws, policies and guidelines that will be complied with under UWSSP. As UWSSP will avoid projects with potential triggers for Category A classification per ADB SPS, all laws, policies and guidelines governing these types of projects are already excluded in the Table 9.

Table 9: Other Relevant National Laws, Policies, and Guidelines of Nepal

Policy/Law/ Guideline	Year *	Relevant Provisions	Remarks
Aquatic Animal Protection Act	1960 (1997)	It prohibits the closure or demolition of fish ladders and other structures that are placed in streams, rivers, lakes and other surface water bodies, to aid movement and migration and/or protect aquatic animals (Article 3A). Concerned water supply projects shall build fish ladder or make an aquatic nursery in the vicinity of affected water bodies for the artificial breeding of aquatic animals (Article 5B).	Relevant to subprojects that will tap surface water as source.
Water Resources Act	1992	A comprehensive law on the development, use and conservation of water resources in Nepal, it aims to minimize damage to water bodies by requiring the conduct of environmental impact assessment (EIA) and preparation of EIA Report before granting license to use water resources for any purpose. Proponents shall make sure that the beneficial use of water resources does not cause damage to other water uses/users (Article 4). Article 7 ranks "drinking and domestic use" as	Relevant to all subprojects. initial environmental examination (IEE) required for grant of use of water resources. Compliance with National Drinking

Policy/Law/ Guideline	Year *	Relevant Provisions	Remarks
		first in the priority order of use of water resources, which will be one of the bases of decision in case of water use dispute Article 17 requires proponents to apply for any necessary land acquisition accordingly; Article 18, the compliance to quality standards in making use of water resources. Article 19 prohibits the pollution of water resources. Under the Act are two regulations for drinking water purposes: (i) Water Resources Regulation, 1993, setting out the implementation procedures for the Act; and (ii) the Drinking Water Regulation, 1998, which specifies compliance with the drinking water quality standards and control of water pollution (or sanitation) as it affects drinking water.	Water Quality Standards (NDWQS).
Labor Act	1992	Chapter 5 stipulates health and safety provisions at work places, keeping work premises clean and safe, e.g., (i) with provisions for solid waste, sewage and hazardous substance management; (ii) instituting measures to prevent dust, fumes and other impure materials that would adversely affect health; (iii) with supply of potable water and water for emergency situations; (iv) with arrangements for the use of protective devices and wears; (v) with fire safety arrangements; and (vi) measures for protection from hazardous machines/equipment and from physical injury or harm from lifting of heavy weights.	Environmental management plan (EMP) provides measures to mitigate workers' health and safety hazards.
National Environmental Policy and Action Plan (NEPAP)	1993	Of its five objectives, the most relevant to UWSSP are to: (i) mitigate adverse environmental impacts of projects; and (ii) safeguard national and cultural heritage and preserve bio-diversity, within and outside protected areas.	EMP implementation is the overall measure to mitigate adverse impacts. Heritage sites and protected areas shall be avoided.
National Water Supply and Sanitation Policy	1998	The Policy requires the monitoring of water quality supplied by completed WSS projects.	Monitoring of supplied water in compliance with the NDWQS and its Directives will meet the Policy's requirement.
Drinking Water Rules	1998	The Rules: (i) gives the procedure for the settlement of dispute on use of water sources; (ii) requires water supplier to maintain the water quality as prescribed in the Water Resources Act; (iii) prohibits water supplier to construct structures and conduct activities that would pollute the water source and cause significant adverse effect on the environment.	Subprojects to ensure adequate consideration of other water uses of same source during design to avoid disputes; to implement the EMP (both mitigation and monitoring) during construction and

Policy/Law/ Guideline	Year *	Relevant Provisions	Remarks
			operation.
Local Self-Governance Act	1999	The Act gives local government the functions, duties and powers to, among others: (i) conserve and protect their local environment and natural resources; (ii) plan, implement and/or operate and maintain local water supply projects; (iii) implement or arrange for implementation local sanitation/sewerage and drainage projects; (iv) protect cultural heritage and religious sites; and/or (v) monitor project activities within their jurisdictions.	Provides basis for local government to monitor the environmental performance of the subprojects.
National Urban Policy	2007	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.	Relevant to all subprojects.
National Urban Water Supply and Sanitation Sector Policy	2008	The Policy requires the IEE or EIA of proposed WSS projects in accordance with the Environment Protection Act (EPA) and Environment Protection Rules (EPR). Such assessments are to: (i) incorporate consultations with key stakeholders, including end-point users; and (ii) specify measures to mitigate environmental impacts prior to and during construction and during operation, as well as corrective measures.	Requires IEE or EIA of all subprojects.
Implementation Directives for the National Drinking Water Quality Standards	2005	It sets out the water sampling, testing, analysis, monitoring and surveillance procedures to certify that the quality of supplied drinking water conforms to the National drinking Water Quality Standards.	Guide to drinking water quality monitoring.
Solid Waste Management Act	2011	Article 4 provides that the management of hazardous, medical, chemical or industrial waste rests upon the generators of such wastes. Management shall be as prescribed in the Act. Article 5 provides that individuals and entities have the duty to reduce the amount of solid waste generated while carrying out work or business.	All subprojects to manage generated solid wastes accordingly.

* (Year) - Year last amended.

85. Following requirements of ADB SPS, PMO and RPMOs shall apply pollution prevention and control technologies and practices consistent with international good practice. When the Government of Nepal regulations differ from these levels and measures, PMO shall achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific subproject circumstances, PMO will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

Table 10: Ambient Air Quality Standards

Parameter	Averaging Period[a]	Nepal's Ambient Air Quality Standard, 2003[b] (µg/m^3)	WHO Air Quality Guidelines (µg/m^3)		Standard values to be followed by the subproject[e] (µg/m^3)
			Global Update[c] 2005	Second Edition[d] 2000	
TSP	Annual	-	-	-	
	24-hour	230	-	-	230
PM_{10}	Annual	-	20	-	20
	24-hour	120	50	-	50
PM_{25}	1-year	-	10	-	10
	24-hour	-	25	-	25
SO_2	Annual	50	-	-	50
	24-hour	70	20	-	20
	10-minute	-	500	-	500
NO_2	1-year	40	40	-	40
	24-hour	80	-	-	80
	1-hour	-	200	-	200
CO	8-hour	10,000	-	10,000	10,000
	15-minute	100,000	-	100,000	100,000
Pb	1-year	0.5	-	0.5	0.5
Benzene	1-year	20	-	-	20

[a] Due to short term duration of civil works, the shortest period will be more practical to use.

[b] as implementing rules on ambient air quality standards under the Environmental Protection Act, 1997. Summary available from Environment Statistics of Nepal 2011, Government of Nepal, National Planning Commission Secretariat, Central Bureau of Statistics, Kathmandu, Nepal.

[c] Source: World Bank Group. IFC. 2007. *Environmental, Health and Safety General Guidelines*.

[d] Source: Air Quality Guidelines for Europe, Second Edition, 2000; WHO Regional Office for Europe, Copenhagen

[e] If less stringent levels or measures are appropriate in view of specific project circumstances, the PMO will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS; Subject to capacity of executing agency to do the test, including the availability of facilities to do the test in the country.

Table 11: Noise Level Standards

Receptor/ Source	National Noise Standard Guidelines, 2012[a] (dB)		WHO Guidelines Value For Noise Levels Measured Out of Doors[b] (One Hour LA_q in dBA)		Standard Values to be Followed by Subproject[c] (dB)	
	Day	Night	07:00 – 22:00	22:00 – 07:00	Day	Night
Industrial area	75	70	70	70	70	70
Commercial area	65	55			65	55
Rural residential area	45	40	55	45	45	40
Urban residential area	55	50	55	45	55	45
Mixed residential area	63	55	55	45	55	45
Quiet area	50	40	-	-	50	40
Water Pump	65		-		65	
Diesel generator	90		-		90	

[a] Environmental Protection Act, 1997 (as implementing rules on noise standard guidelines). Source: Government of Nepal National Planning Commission Secretariat, CBS. 2014. *Environment Statistics of Nepal 2013.*

[b] Guidelines for Community Noise, WHO, 1999**.** Source: World Bank Group. IFC. 2007. *Environmental, Health and Safety General Guidelines*.

[c] If less stringent levels or measures are appropriate in view of specific project circumstances, the PMO will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

Table 12: Applicable Drinking Water Quality Standards

Group	National Drinking Water Quality Standards, 2006			WHO Guidelines for Drinking-Water Quality, 4th Edition, 2011[a]	Applicable Standards for the Subproject[b]
	Parameter	Unit	Max. Concentration Limits		
Physical	Turbidity	NTU	5(10) *	-	5(10) *
	pH		6.5 – 8.5	none	6.5 – 8.5
	Color	TCU	5 (15)	none	5 (15)
	Taste and Odor		Would not be objectionable	-	Would not be objectionable
	TDS	mg/l	1000	-	1000
	Electrical Conductivity	µc/cm	1500	-	1500
	Iron	mg/l	0.3 (3)	-	0.3 (3)
	Manganese	mg/l	0.2	-	0.2
	Arsenic	mg/l	0.05	0.01	0.01
	Cadmium	mg/l	0.003	0.003	0.003
	Chromium	mg/l	0.05	0.05	0.05
	Cyanide	mg/l	0.07	none	0.07
	Fluoride	mg/l	0.5 – 1.5 ^	1.5	0.5 – 1.5 ^
	Lead	mg/l	0.01	0.01	0.01
	Ammonia	mg/l	1.5	none established	1.5
Chemical	Chloride	mg/l	250	none established	250
	Sulphate	mg/l	250	none	250
	Nitrate	mg/l	50	50	50
	Copper	mg/l	1	2	More stringent
	Total Hardness	mg/l	500	-	500
	Calcium	mg/l	200	-	200
	Zinc	mg/l	3	none established	3
	Mercury	mg/l	0.001	0.006	0.001
	Aluminum	mg/l	0.2	none established	0.2
	Residual Chlorine	mg/l	0.1 - 0.2	5 ^^	0.1 - 0.2
Micro Germs	E-coli	MPN/100ml	0	Must not be detectable in any 100 ml sample	0
	Total Coliform	MPN/100ml	0 in 95% of samples taken		Must not be detectable in any 100 ml sample

[a] Health-based guideline values.

[b] If less stringent levels or measures are appropriate in view of specific project circumstances, the PMO will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

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

^ These standards indicate the maximum and minimum limits.

^^ From WHO (2003) Chlorine in Drinking-water, which states that this value is conservative; Source: National Drinking Water Quality Standards 2006. Environment Statistics of Nepal 2011, Government of Nepal, National Planning Commission Secretariat, Central Bureau of Statistics, Kathmandu, Nepal.

D. International Environmental Agreements

86. Table 13 below lists the relevant international environmental agreements that Nepal is party to, and their relevance to various subprojects under UWSSP.

Table 13: International Environmental Agreements Relevant to UWSSP

International Environmental Agreement	Year*	Relevant Provisions	Remarks
World Heritage Convention	1978	Parties to ensure the protection and conservation of the cultural and natural heritage situated on territory of, and primarily belonging to, the State	Urban Water Supply and Sanitation (Sector) Project (UWSSP) will help the Government of Nepal comply with this agreement. UWSSP will not support subprojects that negatively impact cultural and natural heritage of the country.
Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention)	1987	Parties to conserve and wisely use wetlands (i.e., maintaining their ecological character) as a contribution towards achieving sustainable development locally and throughout the world	UWSSP will help the Government of Nepal comply with this agreement. UWSSP will not support subprojects that will locate in wetlands and other protected areas of the country.
Convention on Biodiversity	1992	Parties to require the environmental assessment of projects that are likely to have significant adverse effects on biological diversity with a view of avoiding or minimizing such effects	UWSSP will help the Government of Nepal comply with this agreement. UWSSP will not support subprojects that impact biodiversity in the country.
UN Framework Convention on Climate Change	1992	Parties to take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects.	UWSSP will help the Government of Nepal comply with this agreement. UWSSP will ensure implementation of environmental management plans (EMPs) as measure to minimize the causes of climate change.
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	1996	Parties to, among others, minimize the amount and toxicity of hazardous waste generated, manage the hazardous and other wastes they generate in an environmentally sound manner and as close as possible to the source of generation.	UWSSP will help the Government of Nepal comply with this agreement. UWSSP will ensure implementation of EMPs as measure to avoid or minimize the generation and

International Environmental Agreement	Year*	Relevant Provisions	Remarks
			disposal of hazardous wastes.

* (Year) - Year last amended.

IV. ANALYSIS OF ALTERNATIVES

A. With- and Without-Project Alternatives

87. **'Without-project' or 'do-nothing' Alternative'.** The residents of the subproject area are consuming either untreated or partially treated water from the existing water supply systems. Though there are not any evidence of impacts of untreated water on the lives of local people at present situation, there is possibility of incidence of water-borne diseases in the future due to poor access to safe and potable water supply. This will result in the health hazards in the subproject area exposing the surroundings to environmental problems.

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

89. 'Without Subproject' or 'Do-Nothing' alternative will toughen the chance of the occurrence of the abovementioned threats to the environment of the subproject area. Without subproject, people of the subproject area will continue to consume the partially treated or untreated water from the existing water supply system. Drinking untreated water will increase the risk of bacterial infection resulting health issues that will obviously have impact on public health, animal health and the health of the ecosystems. This would further impede (i) further social and economic development of the municipality and (ii) 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.

90. **With Project Alternative.** The proposed subproject will be the best alternative to overcome the aforementioned threats that is likely to occur in the absence of this subproject. With the subproject, 22,0755 people (2018) will have convenient access to reliable and adequate safe and potable water supply, and the local people will have easy access to sanitation in public places so as to improve the health and sanitation. As a result, good hygiene and sanitation practices will be promoted and there will be reduced health and safety risks. Overall, the 'with project alternative' will bring about improved public health and living environment that will contribute to improved quality of life in the municipality. Improved water supply and sanitation will create an enabling environment for local economic development and improved social services that communities within the sphere of influence of the municipality will benefit from; thus, contributing to the overall local economic development of the District.

91. The 'with project' alternative will contribute to the realization of the Updated 15-Yr Development Plan for Small Towns Water Supply and Sanitation Sector and the delivery of Nepal's commitment to SDG 6.

B. Alternatives Relative to Planning and Design

92. **Alternative Sources.** There are no alternative sources available in the nearby vicinity to meet the overall demand for this subproject.

93. **Alternative Design.** As the proposed system is unique and does not have any alternative source than surface to carry out comparative study, there is no suitable alternative system to analyze.

C. Selected Alternative for Detailed Design/Proposed Subproject

94. The proposed Charikot subproject has been conceptualized as a totally gravity surface water system. The overall concept has been developed with a distribution system comprising a bulk water system (BDS) and a household distribution system (DS). In this concept the whole of the service area will be divided into a number of service areas with dedicated storage reservoirs for that particular service area, Therefore, the main system comprises of a number of sub-systems. The service area will be divided on the basis of elevation differences and proximity. At the same time it will also reduce pipe costs considerably, provide flexibility to operate the system, avoid excessive large numbers of break pressure tanks and follow the principles of DMA.

95. As the service area is very scattered and stretched (15 to 20 km) with very high elevation differences within the service area (in the range of 1000 m), the concept of BDS has been conceptualized in order to reduce inequality of pressure in HH connections within the service area so that households at high elevation and at tail end of the service area will get equal service levels.

96. Each service reservoir will have a control mechanism with a bulk meter so that it will support the principles of DMA.

97. The entire distribution network is to be supplied from multiple (nine) reservoir systems. The total supply of the sub-system will be divided into nine reservoirs in order to manage the RVT wise demand. The demand of 2018 and 2038 of each sub-system has been calculated and shown in Table 14.

Table 14: Proposed Demand Subsystem and Demand Reservoir Tank/DMA Wise

	Sub-System	**Demand** (Liter per Day)						**Storage Volume** (cum)
		2016	**2018**	**2023**	**2028**	**2033**	**2038**	
1	A (Tower Area)	47,944	50,272	56,602	63,728	71,751	80,785	40
	B (EXT.Charikot Bazar)	353,062	360,794	416,821	469,299	528,384	594,907	250
	C (Deurali)	11,385	11,938	13,441	15,133	17,039	19,184	40
	Sub-Total	412,390	423,004	486,864	548,160	617,174	694,876	340
2	A (Pakha Tole/Dolakha Bazar)	484,622	505,186	562,125	625,172	695,481	773,903	250
	B (Charighang)	565,835	593,156	667,376	750,890	844,863	950,605	250
	C (Tindhare)	336,490	352,522	396,045	444,971	499,975	561,813	150
	D (Makai Bari)	362,296	374,486	406,802	441,930	480,117	521,631	150
	Sub-Total	1,749,242	1,825,350	2,032,348	2,262,963	2,520,434	2,807,952	800
3	A(Zillu)	248,826	257,754	281,545	307,598	336,135	367,400	150

	Sub-System	Demand (Liter per Day)						Storage Volume (cum)
		2016	2018	2023	2028	2033	2038	
	B(Matti)	361,031	372,384	402,374	434,814	469,909	507,879	250
	Sub-Total	609,857	630,138	683,919	742,413	806,045	875,279	400
	TOTAL	2,771,489	2,878,492	3,203,131	3,553,536	3,943,653	4,378,107	1,530

98. All subsystems can be operated independently. The nine distribution subsystems are also inter-linked, where possible, and water from neighboring subsystems can be supplied to another adjacent subsystem in case of maintenance and other unforeseen events. Appropriate valve chambers have been proposed to regulate this. This option considers integration of the existing system. However, the provision of water audit has not been provided in these interconnections.

V. DESCRIPTION OF THE ENVIRONMENT

A. Physical Environment and Resources

99. **Landforms and topography.** The Subproject is located in Bhimeshwore Municipality, which is situated in Dolakha district in Janakpur Zone of the Eastern Development Region of Nepal. It lies between 27º37'58" N to 27º44'42" N latitude to 85º05'12" E to 85º59'31" E longitude. The municipality is in a hilly region with an altitude ranging between 950 to 2560 m above mean sea level with an average altitude of 1554 m.

100. Bhimeshwore Municipality is bounded by Nandu VDC in the east, Bonch VDC in the west, Suspa Kashemawoti VDC in the north and Phasku VDC in the south. The Lamosanghu-Jiri road passes through the Bhimeshwore Municipality. Lamosanghu is located on the Arniko Highway (also referred to as the Kodari Rajmarga). The subproject area is approximately 139 km from Kathmandu. Regular local and express bus services are available from Kathmandu. The Municipality has a subtropical to a temperate climate and is heavily influenced by the monsoon (June-September) with an average annual rainfall of about 1710 mm.

101. About 2% of Dolakha District with an altitude of 300 to 1000 meters has an upper tropical climatic zone. About 26% of the district with an altitude of 1000 to 2000 meters has a subtropical climate. About 29% of the district with an altitude of 2000 to 3000 meters has a temperate climate. About 17% of the district with an altitude of 3000 to 4000 meters has a subalpine climate. About 9% of the district with an altitude of 4000 to 5000 meters has an Alpine climate. About 17% of the district with an altitude of over 5000 meters has a Nival climate.

102. **Geology and Soils.** Dolakha District is characterized by Ulleri and Seti formations of the Midland Group. In the subproject area, rocks of the Ulleri Formation are represented by augen gneiss and feldspathic schists whereas the rocks of the Seti Formation are mainly composed of grey to greenish-grey phyllites and quartzites. Colluvial deposits and rocks are predominantly found on the surface. The subproject area also has weathered rocks of phyllite to gneiss and colluvium to alluvium deposits. The thickness of the colluvial range 2 to 5 m and alluvial deposits of more than 5 m.

103. **Climate.** The average temperature in Charikot, Dolakha ranges from 7.5 degree Celsius (°C) during January (the coldest month of a year) and 19.3 °C during July (the hottest month of a year). Similarly, the average rainfall in Charikot, Dolakha ranges from the most dry month of January with 10mm to the most wet month of July with 543 mm.

104. Dolakha is ranked as a highly vulnerable district to climate change on NAPA's "Climate Change Vulnerability Mapping for Nepal" (Government of Nepal/NAPA 2010). GLOF is the biggest threat to the people in Dolakha with a very high vulnerability index. Tsho Rolpa Lake is among the 20 potentially dangerous glacial lakes in Nepal (Mool 2001). Beside GLOFs, Dolakha is also highly vulnerable to drought and rainfall/temperature hazards. However, the subproject area will not be affected by such vulnerabilities.

105. Data from Jiri agro-meteorological station shows an increasing trend for average annual maximum temperature while average annual minimum temperature has been decreasing (0.011ºC/year) over the 30 years period (1981-2010). In case of rainfall, the average annual rainfall is increasing (11 mm/year) over the same period with an inter-annual variability.

106. **Water Quality.** The consumers get water virtually without any treatment in many systems. The socio-economic survey of 2015 shows that the perception of water users about water quality is divided into good (21%), moderate (78%) and bad (1%), respectively.

107. Some of the major systems carry out occasional disinfection (use of 3-5 kg bleaching powder once in a month during the rainy season). Water samples collected from different sources were tested for various physical, and chemical. The results of the tests conducted in 2015 are shown in Table 15. All parameters of the sampled wells are within the permitted value of NDWQS. See Appendix 6 for copies of laboratory results.

Table 15: Water Quality Test Results

S. N.	Parameters	Unit	Observed Value of Sample			NDWQS, Nepal	WHO Guideline Values
			Jhapre	Hattichahara	Odare		
1	pH at 26°C	-	7.0	7.4	7.7	6.5-8.5	7-8.5
2	Electrical Conductivity	µmhos/cm	31	162	272	1500	
3	Turbidity	NTU	**2.0**	2.1	2.1	5(10)	5(25)
4	Taste and Odor		N.O.	N.O.	N.O.	N.O.	N.O.
5	Color	TCU	0.09	0.15	0.14	500	500
6	Total hardness as $CacO_3$	mg/l	20	80	124	5(15)	-
7	Total Dissolved Solid	mg/l	19	98	165	1000	500-1500
8	Total Residual Chlorine	mg/l	<0.10	<0.10	<0.10	0.1-0.2	
9	Chloride	mg/l	<0.50	<0.50	<0.50	250	250
10	Ammonia	mg/l	0.45	0.46	0.47	1.5	
11	Nitrate	mg/l	0.80	0.89	0.84	50	50
12	Aluminum	mg/l	<0.01	<0.01	0.02	0.2	0.2
13	Fluoride	mg/l	0.15	0.51	0.13	0.5-1.5	0.5-1.5
14	Sulfate	mg/l	4.2	9.7	12.4	250	200-400
15	Mercury	mg/l	<0.001	<0.001	<0.001	0.001	0.001
16	Calcium	mg/l	4.8	12.8	24	200	75-200
17	Iron	mg/l	0.21	<0.05	<0.05	0.30(3)	0.3-1.0
18	Manganese	mg/l	<0.05	<0.01	<0.01	0.2	0.05
19	Lead	mg/l	<0.01	<0.003	<0.003	0.01	<0.1
20	Cadmium	mg/l	<0.003	<0.05	<0.05	0.003	0.005
21	Chromium	mg/l	<0.05	<0.05	<0.05	0.05	<0.05
22	Copper	mg/l	<0.05	<0.02	<0.02	1	1-1.5
23	Zinc	mg/l	<0.02	<0.01	<0.01	3	5-15
24	Arsenic	mg/l	<0.01	<0.01	<0.01	0.05	<0.01

108. **Air Quality.** There are a few industries in the subproject area. Air pollution is caused by

fugitive dust from vehicle movements e.g. old buses, tractors, heavy and overloaded trucks, old jeeps particularly over unpaved roads, construction activities, and wind action on unpaved exposed surfaces. Air emissions also originate from household cooking, and open burning. Emissions from these sources are scattered regarding both locations and timing. However, the magnitude of air quality problems in Charikot, Dolakha is not that severe.

109. **Acoustic Environment.** The sources of noise in the subproject area are from construction activities, vehicle movements, and industrial activities. The anthropogenic noise is confined in few clustered settlements and market places only during the day.

B. Ecology, Environment and Resources

110. **Flora and Fauna.** There are no critical habitats in and around the subproject sites. The common species of plants within and around the proposed subproject area are shown in Table 16. None of these plants are considered endangered or critically endangered.

Table 16: List of Plants in the Subproject Area

S. No.	Scientific Name	Local Name	Family
1	*Vepris bilocularis*	Ainselu	Rosaceae
2	*Emblica offficinalis*	Amala	Euphorbiaceae
3	*Pieris ovalifolia*	Angeri	Ericaceae
4	*Cedrealla toona*	Tuni	Meliaceae
5	*Lagerstroemia indica*	Ashare phul	Lythraceae
6	*Adhatoda vasica*	Asuro	Acanthaceae
7	*Melia azedarach*	Bakaino	Meliaceae
8	*Ficus bengalensis*	Bar	Moraceae
9	*Terminalia bellirica*	Barro	Combretaceae
10	*Aegle marmelos*	Bel	Rutaceae
11	*Rhus wallichii*	Bhalayo	Anacardiaceae
12	*Populus ciliate*	Bhote Pipal	Salicaceae
13	*Lagerstroemia Parviflora*	Bot Dhayaro	Lythraceae
14	*Schima wallichii*	Chilaune	Theaceae
15	*Bassia butyracea*	Chyuri	Sapotaceae
16	Berberis aristata	Chutro	Berberidaceae
17	*Debregeasia salicifolia*	Daar	Urticaceae
18	*Garuga pinnata*	Dabdabe	Burseraceae
19	*Mussaenda macrophylla*	Dhobeni	Rubiaceae
20	*Colebrookea oppositifolia*	Dhursul	Labiatae
21	*Dioscorea bulbifera* L.	Githa	Dioscoreaceae
22	*Callicarpa macrophylla*	Guyanlo	Verbenaceae
23	*Lannea coromandelica*.	Hallunde	Anarcardiaceae
24	*Terminalia chebula*	Harro	Combretaceae
25	*Syzygium cumini*	Jamun	Myrtaceae
26	*Phoebe lanceolata*	Jhankri syaula	Lauraceae
27	*Ficus lacor*	Kabro	Moraceae
28	*Anthocephalus chinensis*	Kadam	Rubiaceae
29	*Myrica esculenta*	Kafal	
30	*Adina cordifolia*	Karam	Rubiaceae
31	*Acacia catechu*	Khayar	
32	*Ficus semicordata*	Khanayo	Moraceae
33	*Sapium insigne*	Khirro	Euphorbiaceae
34	*Morus alba*	Kimbu	Moraceae
35	*Litsea monopelata*	Kutmiro	Lauraceae

S. No.	Scientific Name	Local Name	Family
36	*Duabanga grandiflora*	Lampate	Lythraceae
37	*Engelhardtia spicata*	Mauwa	Juglandaceae
38	*Erythrina stricta*	Phaledo	Leguminosae
39	*Ficus religiosa*	Pipal	Moraceae
40	*Pinus roxiburghii*	Sallo	Coniferae
41	*Terminalia tomentosa*	Saj	
42	Bombax ceiba	Simal	Bombacacea
43	*Vitex negundo*	Simali	Verbenaceae
44	*Mallotus philippensis*	Sindure	Euphorbiaceae
45	*Albizia chinensis*	Siris	Leguminosae
46	*Dalbergia sisoo*	Sisoo	
47	*Bauhinia vareigata*	Tanki	Leguminosae
48	*Alnus nepalensis*	Uttis	Betulaceae

111. Some of the mammals reported to be present in the nearby forests are listed in Table 17. None of these mammals is considered endangered. Nonetheless, the subproject will not impact any habitats of these animal species as the subproject sites will not be located in these areas.

Table 17: Mammals in the Subproject Area

S. No.	Scientific Name	English Name	Local Name	Status
1	*Canis Lupus*	Gray Wolf	Bwanso	LC
2	*Panthera pardus*	Common Leopard	Chituwa	VU
3	*Histrix indica*	Indian Crested Porcupine	Dumsi	Not available in IBAT
4	*Vulpes vulpes*	Red Fox	Rato Fyauro	LC
5	*Canis aureus*	Golden Jackal	Syaal	LC
6	*Mus Musculus*	House Mouse	Musa	Not available in IBAT
7	*Felis Chaus/Prionailurus bengalensis*	Jungle Cat	Ban Dadhe	LC
8	*Funambulus Pennantii*	Five Stripped Palm Squirrel	Paanch Dharke Lokharke	LC
9	*Taphozous longimanus*	Long-winged Tomb Bat	Chamera	Not available in IBAT
10	*Martes flavigula*	Yellow Throated Marten	Malsapro	LC
11	*Macaca mulatta*	Rhesus Monkey	Rato Badar	LC
12	*Semnopithecus schistaceus*	Nepal Grey Langur	Langure Badar	LC

Note: Though 'Common Leopard' falls under VU category, the subproject activities will not affect the habitat of this species.
Source: IEE Field Visit Survey, 2016.

112. Some of the birds reported in the forest areas are listed in Table 18. The subproject will not impact these bird species including their habitat. The nature of subproject activities will not endanger the existence of these species.

Table 18: List of Birds in the Subproject Area

S. No.	Scientific Name	English Name	Local Name	Status
1	*Eudynamys Scolopaceus*	Western Koel	Koili	LC
2	*Tyto alba*	Barn owl	Gothe Latokoshero	LC
3	*Turnix Sylvaticus*	Common Quail	Battai	LC
4	*Passer domesticus*	House Sparrow	Bhangera	LC

S. No.	Scientific Name	English Name	Local Name	Status
5	*Ciconia espiscopus*	Asian Woollyneck	Bhudi Phor	VU
6	*Pellorneum ruticepa*	Puff-throated Babbler	Bhyakur	LC
7	*PsilopogonAsiaticus/Megalaima australis*	Blue Throated Barbet	Kuthurke	LC
8	*Ictinaetus malaiensis*	Black Eagle	Chil	LC
9	*Arborophila torqueola*	Hill Patridge	Chyakhura	LC
10	*Acridotheres tristis*	Common Myna	Dangre Rupi	LC
11	*Streptofelia sp*	Oriental Turtle Dove	Tame Dhukur	LC
12	*Bubo Bengalensis*	Rock Eagle Owl	Huchil	LC
13	*Cuculus micropterus*	Indian Cuckoo	Kafal Pakyo	LC
14	*Pycnotus cafer*	Red- Vented Bulbul	Jureli	LC
15	*Corvus macrorhynchos*	Large Billed Crow	Kaalo Kaag	LC
16	*Lophura leucomelans*	Kalij Pheasant	Kalij	LC
17	*Caprimulgus macrurus*	Large Tailed Night Jar	Lampuchhre	
18	*Bubo nipalensis*	Spot Bellied Eagle Owl		LC
19	*Megalaima Virens/Psilopogon Virens*		Nyauli	LC
20	*Psittacula cyanocephala*	Plum Headed Parakeet	Tuisi Suga	LC

Note: Though 'Asian Wollyneck' falls under VU category, the subproject activities will not affect the habitat of this species.
Source: IEE Field Visit Survey, 2016.

113. The commonly found reptiles and amphibians observed in the subproject area. Their status according to Proximity Report generated by IBAT are listed in Tables 19 and 20.

Table 19: List of Reptiles Found in the Subproject Area

S. No.	Scientific Name	English Name	Local Name	Status
1	*Ptyas mucosus*	Rat Snake	Dhaman	Not available in IBAT
2	*Ovophis monticola*	Chinese Mountain Pit Viper	Andho Sarpa/Chhirbire Sarpa	LC
3	*T. albolabris*	Green Pit Viper	Hariyo Sarpa	Not available in IBAT
4	*Calotes versicular*	Garden Lizard	Chheparo	Not available in IBAT
5	*Hemidactylus brookii*	Common Lizard	Mausuli	Not available in IBAT

Source: IEE Field Visit Survey, 2016.

Table 20:List of Amphibians Found in the Subproject Area

S. No.	Scientific Name	English Name	Local Name	Status
1	*Bufo melanostictus/Duttaphrynus Himalayanus*	Common toad/Himalayan Toad	Bhyaguto	LC
2	*Rana cyanophylectis*	Steam Frog	Bhyaguto	Not available in IBAT

Source: IEE Field Visit Survey, 2016.

114. Similarly, common fishes found in the subproject area are given in Table 21.

Table 21: List of Fishes Found in the Subproject Area

S. No.	Scientific Name	English Name	Local Name	Status
1	*Barilius Vagra*		Faketa	Not available in IBAT
2	*Garra* Annandalei	Annandale Garra	Buduna	LC
3	*Glyptothorax* Indicus	Catfish	Kabre	LC
4	*Heteropneustes fossilis*	Stinging Catfish	Singhi	LC

S. No.	Scientific Name	English Name	Local Name	Status
5	*Neolissochilus Hexagonolepis / Neolissochilus Dukai*	Katli	Katli	DD
6	*Nemacheilidae(Schistura Multifasciata)*		Gadela	LC
7	*Psilorhynchus Pseudecheneis*	Stone Carp	Tite	LC
8	*Schizothorax Progastus*	Dinnawah Snowtrout	Asala	LC
9	*Channa gachua*	Dwarf Sankehead	Hile	LC
10	*Tor tor*	Mahseer	Sahar	

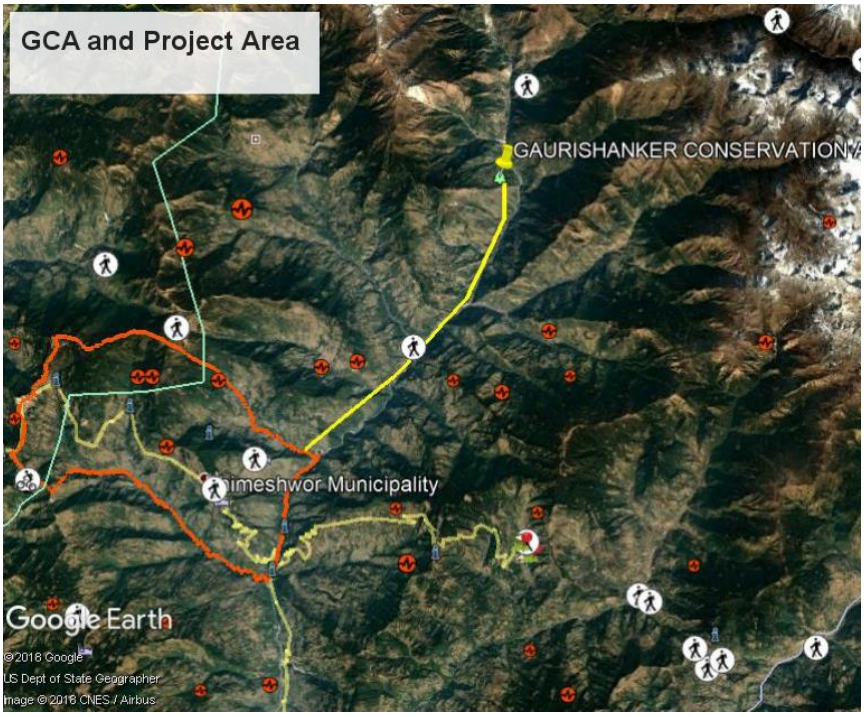
115. **Protected Area.** The list of protected area in Nepal as specified by IUCN is given below to identify the presence of protected areas within the subproject areas, if any.

Table 22: List of Protected Areas in Nepal

S. No.	Type of Protected Areas	Name of the Protected Areas
1	National Parks	Chitwan National Park
		Sagarmatha National Park
		Langtang National Park
		Rara National Park
		Khaptad National Park
		Shey Phoksundo National Park
		Bardiya National Park
		Makalu Barun National Park
		Shivapuri Nagarjun National Park
		Banke National Park
		Shuklaphanta National Park
		Parsa National Park
2	Wildlife Reserves	Koshi Tappu Wildlife Reserve
3	Conservation Areas	Annapurna Conservation Area
		Kanchenjunga Conservation Area
		Manaslu Conservation Area
		Blackbuck Conservation Area
		Api Nampa Conservation Area
		Gauri-Shankar Conservation Area
4	Hunting Reserves	Dhorpatan Hunting Reserves
5	Ramsar Sites	Bishazari Tal
		Ghodaghodi Tal
		Gokyo Lake Complex
		Gosainkunda
		Jagadishpur Reservoir
		Koshi Tappu Wildlife Reserve
		Mai Pokhari
		Phoksundo Lake
		Rara Lake
		Lake Cluster of Pokhara Valley

116. With reference to the above given table, Gauri-Shankar Conservation Area that falls under IUCN Category V-VI is located in the district of the subproject area. Apart of this, no other ecologically sensitive areas is located in the subproject area. The location of this conservation area is shown in Figure 2.

Figure 2: Google Earth Map showing Location of Subproject and Gauri-Shankar Conservation Area



Source: Google Earth.

117. The location of Gauri-Shankar Conservation Area does not indicate that the protected area will be affected by the proposed subproject. Its distance from the subproject area confirms its vulnerability. The proximity report generated by the Integrated Biodiversity Assessment Tool report shows that this conservation area lies within 10 km from the Charikot town. However, the analysis on google earth shows that the subproject municipality is about 20.3 km far from the conservation area. It is illustrated in the above given Figure 2. Similarly, the subproject site is downstream of the protected area. Hence, this confirms that the proposed subproject activies will not affect the protected area.

118. **Community Forest.** The community forests within and nearby of the proposed subproject are Charnawati Community Forest, Suppa Community Forest, Gaurasoara Community Forest and Khorthali Community Forest. These community forests are not protected forests of the country and are managed by the communities for their own use. Some of the subproject components are located within the community forest area. However, the construction activities will not affect the community forest features, except for the clearing of small bushes. Regarding this, consent letter has been secured from the concerned community forest committee copy is in Appendix 5.

C. Socioeconomic and Cultural Environment

119. **Settlement Pattern.** The spatial distribution pattern of settlements in Bhimeshwore Municipality is found to be scattered in the agricultural village areas and agglomerated in the accessible commercial areas, and clustered in the main road area. There is a dense linear settlement in the main Charikot Bazaar. The rural area of the VDC is gradually shifting towards the urban area with emerging markets along the main roads and settlements. However, such urban growth has been hindered by limited population growth and steep terrain of the area.

120. **Population and Demographic Characteristics.** The total population of Bhimeshwore Municipality as per census of 2011 is 22,537. The population of this municipality during 2001 was 21,916. The analysis of census population shows that the overall annual growth rate of the municipality is only 0.28%. Many wards have declining population growth rates in last one decade.

Table 23: Population of the Concerned Wards of the Subproject Town

Ward	W. Area (ha)	Census 2001			Census 2011			Growth Rate
		HHs	Pop	Densities (PPHA)	HHs	Pop	Densities (PPHA)	
1	395.12	662	3,036	7.68	1134	4,330	10.96	3.61
2	263.23	501	2,018	7.67	476	1,615	6.14	(2.20)
3	474.22	238	947	2.00	242	978	2.06	0.32
4	494.10	384	1,707	3.45	266	978	1.98	(5.42)
5	461.23	250	1,190	2.58	371	1,437	3.12	1.90
6	658.00	471	2,011	3.06	510	1,866	2.84	(0.75)
7	132.00	147	671	5.08	273	1,011	7.66	4.18
8	592.00	140	721	1.22	355	1,276	2.16	5.87
9	197.00	314	1,484	7.53	275	1,056	5.36	(3.35)
10	527.00	854	3,559	6.75	1,312	4,626	8.78	2.66
11	500.00	382	1,927	3.85	338	1,212	2.42	(4.53)
12	204.00	259	1,209	5.93	256	1,043	5.11	(1.47)
13	921.00	307	1,436	1.56	268	1,109	1.20	(2.55)
Total	5,818.90	4909	21,916	3.77	6,076	22,537	3.87	0.28

Source: CBS 2001 and 2011.

121. The average household size of the area has decreased from 4.46 in 2001 to 3.71 in 2011. Ward 1 of the municipality, old Charikot bazaar area, is the only comparatively densely populated ward. The population density of this ward is slightly high. The overall population density of the subproject area increased from 3.77 (2001 AD) to 3.87 (2011 AD) person per hectare.

122. **Beneficiaries Households.** The Consultants conducted a socio-economic survey in 2016 of the proposed service area. It shows that the total population of the service area is 21,909. Table 24 shows the coverage of population including beneficiaries' households in the subproject area.

Table 24: Beneficiaries Households

Ward	Households	Population
1	937	6,214
2	211	938
3	72	303
4	68	393
5	220	1,056
6	344	1,570
7	305	1,408
8	241	1,043
9	32	136
10	843	5,984
12	287	1,607
13	282	1,257
Total	3842	21,909

Source: Socio-economic survey 2016.

123. **Ethnicity and Caste.** The survey revealed that Brahmins/Chhetris are the major caste groups of the subproject area comprising about 49% of the total households where the Janajatis comprise about 41%. Similarly, the Dalits and other caste groups (Mushalmans and Madheshis

etc.) are 10% and 1%, respectively.

124. **Education.** The institutional data shows that twelve educational institutions including two Multiple Campus one Nursing campus, eight higher secondary level schools as well as one children home was recorded in the service area with 5363 people including students, staff and teachers. Likewise, about 14 governmental, non-governmental and financial institutions exist in the area and provide service to the community.

125. There are several educational institutes like schools and colleges in the Municipality. The socio economic survey of 2016 AD shows that the overall literacy rate is 90.73%. About 9.27% are still illiterate and only 6.77% have graduated or reached above the graduate level.

126. **Health.** Medical facilities for diagnosis and treatments are available in the service area. There are seven medical institutions including three hospitals, four healthpost and polyclinics with 49 bed capacity.

127. **Economic Activities.** The economy of the municipality is extensively agrarian although most of the households in the subproject area depend on more than one occupation. During the course of the household survey of the subproject area, detailed information has been collected about the major occupation and economic activities of all the household head. The social survey shows that, highest number of population ie about 36% engaged in Agriculture, whereas 26.68% are service holders, about 24% depend on business about 7% are engaged in foreign employment, 3% are labor and 0.10% are dependents.

128. There are more than 10 hotels/lodges with a 104 bed capacity and managed by 14 staff in the subproject area. Now, there are a few industries and businesses in Charikot. The survey shows that there are 4 industries operating in the subproject area. The type of industries operating in the municipality are rice mills, cotton, grill and carpet mill etc.

129. There are four public and private banks proving banking services to the people of the municipality. Similarly some cooperatives are also in operation in the service area.

130. There are 12 educational institutions and 18 government/NGO offices. The major government offices are district based offices and the Municipality office.

131. **Poverty Conditions.** The survey revealed that main sources of household income of the service area are agriculture, service, remittance and wage labour, respectively. Among the total households 11.37% have monthly income less than NRs7500 which is considered as poor household. About 12.05% of households have monthly income ranges of NRs7501 to NRs10875. Similarly, 38.44% of households have income range of NRs10,875 to NRs20,000, 32.3% of household have income range of NRs20001 to NRs50,000 and about 5.83% of households have income ranges above than NRs50,000 in a month (Table 25). Similarly, the survey shows that about 11.37% of total population live below the poverty level.

Table 25: Distribution of Mean Monthly Household Income

Income Range (NRs)	Ward												Grand Total	%
	1	2	3	4	5	6	7	8	9	10	12	13		
<7500	47	82	18	23	16	81	31	57	0	48	14	20	437	11.37
7501-10875	40	34	18	15	24	95	54	62	0	73	16	32	463	12.05
10876-20000	319	50	18	24	73	103	123	83	11	342	164	167	1477	38.44
20001- 50000	468	25	13	5	95	56	79	32	21	304	84	59	1241	32.30

Income Range (NRs)	Ward												Grand Total	%
	1	2	3	4	5	6	7	8	9	10	12	13		
> 50000	63	20	5	1	12	9	18	7	0	76	9	4	224	5.83
Grand Total	937	211	72	68	220	344	305	241	32	843	287	282	3842	100

Source: Socio-economic survey 2016.

132. **Existing Water Supply.** There are several piped water supply systems constructed under various programmes by different agencies in different years. There are about 17 major system operated by 17 different WUSCs. The detail of each system with regard of name of source, number of taps and storage tanks are shown in Table 26.

Table 26: Name List of WUSC and Details

SN	Name of WUSC	Source	No. of Taps	No. x Cum of RVT
1	Charikot WUSC BNP	Dund Khola, Gairi Khola, Arupate in WN 13, Odare 1 , 2 , 3 WN 9, Jhule Khola WN 10 and Suspa WN 6 all are in BNP	707	1-200, 2-95, 3-130,1-100
2	Chothang WUSC BNP -10	Jhule Khola	60-65	1
3	Maidane WUSC BNP-10	Beesauna	40-50	NA
4	Khole WUSC BNP-12	Local spring	20	
5	Taknagi WUSC BNP-10	Tagnagi	60	No
6	Ramkot WUSC BNP-10	Ramkot spring	75	No
7	Gauri Swora Thapa Group BNP-10	Mulkharka	95	3x10
8	Purano Bazar WUSC BNP-1	Darfe ko Jungle Tundikhel	125	1x100
9	Dolakha WUSC BNP 2 and 3	Gautam Tole,	500	1x20, 2x50, and 1x90
10	Hatti Chara Charighang Manedanda BNP	Hattichara,		18
11	Jilu Bhatmase BNP 7	Jhulekhola	80	1x200
12	Upper Marti WUSC BNP 8	Thulo Dharo, Sano& Thulo Pokhari	125	3x10
13	Middle Marti WUSC BNP 8	Banpale and Trishul Muhan	200	1x10, 3x20 and 1-25
14	Junge Chanse WUSC BNP6	Chanse Muhan	200	
15	Jilu WUSC BNP 5&7		200	
16	Khanepani WUSC(Dolakha)	Darfe Jungle	155 PVT. +35 P	2x20, 1x50 and 1x90
17	Dolakha WUSC	Teekhatal and Chakthali	110 PVT and 3 P	1x20 and 1x40

133. **Sanitary Facilities.** The overall sanitary condition of the Municipality is found to be reasonably satisfactory. In the core area, almost all households have private toilets whereas in isolated/semi-urban areas some people still practice open defecation. The socio-economic survey (2016) reported that 4% households still practice open defecation in the subproject area and the majority of households i.e. 58% have either water-sealed private toilets or improved pit latrines (Table 27).

Table 27: Toilet Coverage

(HH)

Type of Toilet	Service Area												Grand Total	%
	1	2	3	4	5	6	7	8	9	10	12	13		
No toilet	36	31	10	11	4	5	4	6	0	22	12	7	148	3.85
Pit Latrine	76	21	10	9	214	338	299	232	0	21	175	79	1474	38.37
V. Pit	462	156	50	48	2	1	2	1	32	270	100	196	1320	34.36
Pour flush	357	3	2	0	0	0	0	2	0	527	0	0	891	23.19
Cistern flush	6	0	0	0	0	0	0	0	0	3	0	0	9	0.23
Grand Total	937	211	72	68	220	344	305	241	32	843	287	282	3842	100.00

Source: Socio-economic survey, 2016.

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

135. **Drainage Facilities.** There is no proper drainage system for storm water as well as for domestic sewage in Bhimeshwore Municipality. The core area of the city along the highway has about 1 km of open surface drains on each side in ward 1 and other few stretches of surface drains to avoid local pondage. As the terrain is mostly steep, people are less concerned about storm water drains.

136. **Wastewater Management Practices.** There is no sewerage system in the subproject area. Wastewater from individual households is managed inside the house. The socio-economic survey conducted in 2016 shows that 96% households have their own toilet. Some of them have constructed septic tanks and some have directly connected the waste with surface drains. The municipality is planning to construct a separate unit for septage and solid waste management. This issue is addressed by UWSSP with the inclusion of a separate sewer network and DEWAT subproject, which will aim to collect sewage from households through as sewage collection network and directed for treatment to DEWAT facilities prior to disposal. The survey shows that 99% of the sampled households showed an interest in improving the septage management system and are interested to pay for it.

137. **Solid Waste.** The major sources of waste generation in Bhimeshwor Municipality are households, hotels, hospitals, vegetable and fruits market, meat stores, groceries, clothing/ fancy stores/tailors etc. There has been no study about types and volume of solid wastes. The municipality does not have an integrated solid waste management infrastructures in place yet. Nonetheless, the municipality implements measures to minimize generation of wastes, such as the adoption of the reduce-reuse-recycle scheme.

D. Existing Institutional Situation

138. **Existing Institutions involved in Water Supply and Sanitation Field.** The main institutions involved in water supply and sanitation sector in the subproject area are Bhimeshwore Municipality, Water Supply and Sanitation Division Office (WSSDO), Charikot water users' and sanitation committee, other WUSC Committees and some NGOs. WSSDO, Dolkha has been actively supporting most of the WUSCs in operating the existing water supply system and carry out different WASH activities in the subproject area. It has been providing both financial and technical support for large-scale maintenance and providing pipes, bleaching powder and human resources as and when needed.

139. DWSS through WSSDO, Dolkha constructed and then rehabilitated the water supply systems. WUSCs have been managing the existing systems.

140. **Water Supply and Sanitation User's Association.** The Integrated Charikot Water Supply and Sanitation Committee consist of eight members representing various WUSCs and clusters within the service area. The executive committee consists of six males and two female members and Three male members are in the key positions of chairperson, vice chairperson and secretary where as one female member is working as the treasurer. According to the caste/ethnicity status of WUSC body, six members are from Brahmans/Chhetris and 2 women members are from Janajatis (Newar Community) groups respectively in Charikot WUSC.

141. **Registration of WUSC in Water Resource Committee.** Charikot was registered in 1997 A.D. as per the Water Resource Act 1991 and Water Resource Rule 1992 and involved in the management and improvement of the water supply system in Dolkha Bazaar. Similarly, renewal of WUSC and annual general meetings are carried out regularly. The namelist and position of the existing WUSC member are given in Table 28.

Table 28: Members of Charikot STWS Users and Sanitation Committee

S.N.	Name	Position
1	Mr. Ram Krishna K.C	Chairperson
2	Mr. Krishna Bahadur Khadka	Vice Chairperson
3	Mr. Dhurba Bashnet	Secretary
4	Ms. Anita Shrestha	Treasurer
5	Mr. Moti Prasad Chaulagai	Members
6	Mr. Ram Saran Thapa	Members
7	Ms. Kamala Maharjan	Members
8	Mr. Ram Sharan Thapa	Members

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

143. **Organization Structure of operators of the Existing System.** Charikot WUSC is the operator of the existing largest system. WUSC has assigned three water supply technicians for managing water distribution, maintenance and meter reading of the whole system. Two staffs are also deployed for office management.

E. Site-Specific Environmental Conditions

144. Table 29 summarizes site-specific conditions of the component locations/sites/alignments.

Table 29: Site-specific Environmental Conditions

Site	Description	Photograph
Source Hattichhahara fed by Charnawati River	This source is Hattichhahara fed by the Charnawati river. Simple bottom trash rack has been proposed (TYP-5) on the hard bedrock at the Hattichahara (Charnawati River near waterfall). The bed is of hard rock as stilling basin in this waterfall area. An appropriate simple Bottom Rack Intake has been proposed in this river. A gravel trap at the end the bottom rack, in the form of chamber, has been provided to trap the heavy sediment, which enter from the bottom rack and rolled in the gallery. The gravel trap shall be cleaned occasionally by manual means. Diverted water from two streams will be collected at collection chamber. In totality cumulative discharge of about 31 lps have been proposed. Relative Level (RL) of these intakes is around 2318 m amsl.	
Ghatte Khola Source fed by Charnamwati River	This place of existing Ghatta (Water Mill) is very close to Lamosangu - Jiri Road. The Ghatta is drawing water from the tributary of the Charnawati River near Highway. Relative Level (RL) of this intake is around 1889 m amsl. This tributary have safe yield of 6 lps. A simple RCC chamber intake (TYP-4) has been proposed to divert water from the tailrace of the watermill (Ghatta) in Sub-system (SS-3).	
Charnawati River is a tributary of Tama Koshi River which ultimately drain into river Sunkoshi. Although the source river, Charnawati, is medium sized river, most of the river stretches are in steep gradient.The Charnawati originates from the Middle Mountain region also known as the Mahabharat range.The Charnawati is perennial fed through springs. The river flow rates during low season is 98.08 lps(Hattichhahara) and181.94 (Ghatta) while during high seasons they are 2000lps (Hattichhahara) and 3880 lps (Ghatta). All the six local sources are fed by Charnawati River. Similarly, other four sources i.e. Hattichhahara 1 & 2 and Ghatte Khola 1 & 2 are also the tributaries of Charnawati River.		

Site	Description	Photograph
Existing RVT: Pani Tank	It is surrounded by scattered settlements.	
Proposed Matti RVT	It is located at at Bichaur Community Forest. This site has been finalized under the consent of the concerned community forest committee. It has suffiecient barren land to construct the proposed RVT.	
Existing RVT at Dharamghar	It is located at the right hand side of Kathmandu-Jiri Highway which is 200m away from the highway. It has slightly steep topography. It is 2 km far fom Charikot Bazaar. It has no settlements in the surroundings.	
Existing and Proposed RVT at Barsedanda	It is also located at the right hand side of Kathmandu-Jiri Highway. Its location is within the Barsedanda Community Forest. There is no interference from the concerend forest committee for the construction of the propsoed RVT.There is no settlements around this area.	

145. Altogether the proposed system will be divided into three sub systems namely, Old sub-system, Hattichahara Sub- system and Ghatta Sub-system. All the three sub-system will draw water from local sources and Charnawati (called Charange Khola). These local sources are also tributary of Charnawati. An old sub-system is drawing water from these sources in the past with a cumulative safe yield of about 11 lps, the safe yield for the transmission system of this sub- system has been adopted as 10.6 lps. However, the other two sub-systems are drawing comparatively larger discharge water from the same river (River

Charnawati) at different location. Therefore, hydrological analyses of River Charnawati have been done in detail in two locations i.e. Hattichahara and Ghatta.

146. There are no hydrological stations in Charnawati River and so the exact data on flow characteristic of the river is not available. As the water are abstracting from two location (Hattichahara and Ghatta), hydrological analysis of the river in two locations has been carried out with the help of discharge measurements at these location. The observed flow in Charnawati River during the survey time in March has been measured as 106 lps and 182 lps in Hattichahara (SS-2) and Ghatta (SS-3), respectively.

147. The catchment area of Charnawati River at the proposed head work site of Sub-system 2 (Abstraction point 1 at Hattichahara) and Sub-system 3 (Abstraction point 2 at Ghatta) have been calculated using the recent topographic map (based upon 1:50,000 and 1:25,000 scale topographic map with MUTM Projection). Total catchment areas of the river at Hattichahara and Ghatta are about 7.48 and 15.47 km^2.

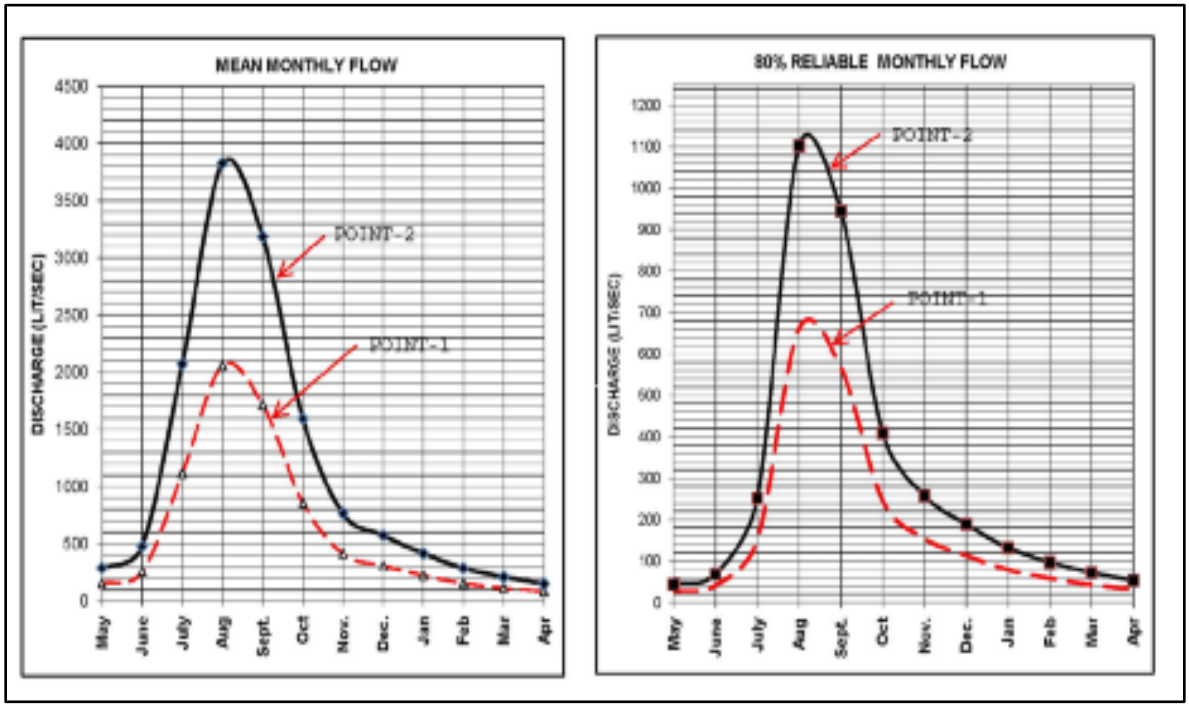
148. About 46% of the total catchment area is above 3,000 m amsl for abstraction point at Hattichahara. Similarly, about 33% of the total catchment area is above 3,000m amsl for abstraction point at Ghatta.

149. The mean monthly flows over the river at two abstraction points have been estimated according to the regional hydrograph prepared for Region 3 in the PDSP manual. The anticipated low flows during end week of March are 98.08 lps and 181.94 lps at abstraction point 1 and abstraction point 2, respectively.

150. The predicted value of specific discharges has been compared with the regional specific discharge value for all months and found quite comparable. The predicted specific discharges for all months are slightly more than the given regional specific discharge. This may be due to good vegetation cover and altitude of catchment area. In addition to that, this region (region 3) all tributaries of Sunkoshi show higher specific discharge in comparison to other rivers in that region. Hence, no adjustment has been made to the regional hydrograph.

151. Figure 3 below presents the predicted mean monthly flows and predicted 80% reliable flow at proposed Hattichahara abstraction points (Points 1) and Ghatta abstraction point (Point 2).

Figure 3: Predicted Mean monthly Flows and Predicted Reliable Flow at Hattichahara and Ghatta Abstraction Locations



Source: Project Office, Third Small Towns Nepal: Third Small Towns Water Supply and Sanitation Sector Project.

152. It is clear that 80% reliable discharges in the river have been estimated about 33 lps and 53 lps at Hattichahara and Ghatta abstraction points, respectively. Therefore, drawing water of about 31 lps at Hattichahara's intake site and 11 lps at Ghatta's intake is possible without any technical point of view.

VI. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Beneficial Impacts

153. Availability of clean and adequate drinking water is the basic human need. The development of drinking water supply facilities will have numerous beneficial impacts to individuals and communities. There will be significant improvement in the quality of life of the subproject area through provision of safe and potable drinking water. Some of the major beneficial impacts of this proposed water supply subproject are described below along with suggestions for achieving optimal benefits.

154. **Employment Generation.** The subproject will generate direct employment opportunities e.g. skilled and non-skilled work for the local people. Construction activities such as laying and joining of pipelines will create opportunities for about fifty local people. The earning will positively affect the local economy, thereby reducing the chances of seasonal migration of the local people. To obtain such benefits, priority will be given to employing local laborers. The impact is thus direct in nature, local in extent, medium in magnitude and short term in duration.

155. **Skill Enhancement.** The construction of the subproject will not only provide direct employment opportunities but also ensure the transfer of skills and technical proficiency to the local workforce. The subproject activities i.e. constructing mechanical treatment plants, surface

drains, valve chambers and buildings will generate transferable skills. In future, these skills will be useful for locals to generate income as well as implement when the need arises. To obtain or augment such benefits, proper work plans and codes of conduct should be implemented during the construction. The impact is thus indirect in nature, local in extent, medium in magnitude and long-term in duration.

156. **Local Trade and Business Opportunity.** The proposed subproject creates business opportunities in the subproject area. Because construction work involves many workforces, sales from few shops with food items and agriculture and livestock products will increase around the construction site. This demand and supply chain will boost local trade and the business sector. The impact is thus direct in nature, local in extent, medium in magnitude and long-term in duration.

157. **Improved Health and Hygiene.** Deteriorating water quality and unsanitary conditions are often the causes of waterborne communicable diseases. After the implementation of the subproject, the hygiene of the local people will improve which will reduce the occurrence of waterborne diseases thereby improving the public health in the area. Regular maintenance of the subproject components needs to be carried out so that the subproject operates smoothly and the benefits are kept intact. The impact is thus direct in nature, local in extent, high in magnitude and long-term in duration.

158. **Increased Economic Opportunity**. After the completion of the subproject, there might be increased rural-town migration due to better facilities and opportunities. The increased economic level may increase the value of the land, thereby uplifting the economic status of the local people. 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 impact is thus indirect in nature, local in extent, medium in magnitude and long-term in duration.

159. **Women Empowerment.** Women and girls are mainly responsible for household activities. Improved water supply and sanitation will contribute towards better health and hygiene of women, girls and the entire household members. The beneficial impacts to women and girls can be augmented by conducting health and awareness programs to the local community. The impact is thus indirect in nature, local in extent, low in magnitude and long-term in duration.

160. Overall, the subproject will lead to improved public health and environment, significantly improving the quality of life of the Bhimeshwore Municipality residents.

161. To sustain the positive outcomes, effective operation, and maintenance guided by an O&M manual that contains Water Safety Guide, among others, is essential. Continuing hands-on training of WUSC in EMP implementation particularly water quality monitoring is necessary.

B. Assessment of Potential Impacts

162. The nature of the subproject and scope of the civil works will generate impacts, issues and concerns prior to construction, during construction and during operation. The potential impacts, issues and concerns from assessed sample subprojects and future subprojects using ADB REA checklist for water supply (Appendix 1) and “no mitigation measures scenario” checklist developed for UWSSP (Appendix 2) are presented in Table 30 below.

Table 30: Water Supply and Sanitation Subproject Potential Environmental Impacts, Issues and Concerns (No Mitigation Measures Scenario)

Design	Construction	O&M
• pollution of raw water supply from upstream wastewater discharge • hazard of land subsidence caused by excessive groundwater pumping • excessive abstraction of water affecting downstream water users • competing uses of water • 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 • inadequate protection of intake works or wells, leading to pollution of water supply • inadequate buffer zone around treatment plants • health hazards arising from inadequate design of facilities for receiving, storing and handling of chlorine and other hazardous chemicals • increased sewage flow due	• noise • dust • traffic • impairments associated with transmission lines and access roads • health and safety hazards to workers • continuing soil erosion/ silt runoff • population influx that causes 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 • risks to community health and safety due to transport, and use and/or disposal of materials such as explosives, fuel and other chemicals • community safety risks due to both accidental and natural hazards, especially where structural elements or components of the subproject are accessible to the members of the affected community or where failure could result in injury to the community • clearance of existing land, vegetation or building • pre-construction investigations (boreholes, soil testing, etc.) • construction works • demolition works • temporary sites used for construction works or housing of construction workers • cut and fill or excavations • working in stream crossings • use of resources (materials, water, energy, etc.) • changes in occurrence of disease or affect disease vectors (e.g. insect or water-borne disease) due to worker's camp • solid wastes such as spoils, overburden, etc. • solid wastes from worker's camp • emission from burning of waste in open air (e.g. worker's camp, slash	• unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents) • delivery of unsafe water to distribution system • excessive algal growth in storage reservoir • health and safety hazards to workers from handling and management of chlorine used for disinfection, other contaminants, and biological and physical hazards • delivery of unsafe water due to poor O&M treatment processes (especially mows accumulations in filters) • inadequate chlorination due to lack of adequate monitoring of chlorine supply • delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals • accidental leakage/spillage of chlorine • increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant • population influx that causes 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 • risks to community health and safety due to transport, and use and/or disposal of materials such as explosives, fuel and other chemicals • community safety risks due to both accidental and natural hazards, especially where structural elements or components of the subproject are accessible to the members of the affected community or where failure could result in injury to the community • use of resources (materials, water, energy, etc.)

Design	Construction	O&M
to increased water supply • dislocation or involuntary resettlement of people • disproportionate impacts on the poor, women and children, indigenous peoples or other vulnerable groups • permanent or temporary change in land use or topography including increases in intensity of land use	materials, construction debris)	• WTP sludge • positive impacts - employment to local people; safe and easy access to improved water supply which will enhance people's health, and boost economic conditions of municipalities

163. **Location and Design.** The impacts, issues, concerns and mitigation measures during the design phase are given in Table 31. As subproject locations/sites are screened during selection process, environmental impacts due to location are not anticipated in Charikot (Dolakha) water supply and sanitation subproject. The environmental assessment of the subproject shows that it is not likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. Potential impacts are unlikely to affect areas larger than the sites or facilities subject to physical works. These impacts are site-specific and few if any of them are irreversible.

164. Planning principles, subproject selection criteria, and design considerations have been reviewed and incorporated into the site planning and design process wherever possible; thus, environmental impacts as being due to the subproject design or location were not significant. Mitigation measures have been developed to reduce all negative impacts to acceptable levels. These were discussed with specialists responsible for the engineering aspects, and as a result significant measures have already been included in the subproject designs.[22]

165. In most cases mitigation measures can be designed with uncomplicated measures commonly used at construction sites and known to civil works contractors. Once the subprojects are operating, the facilities will operate with routine maintenance, which shall not affect the

[22] For the water supply and sanitation subprojects, various design-related measures suggested for: providing safe water following WHO Guideline values, uninterrupted power supply provision; standard operating procedures for operation and maintenance; and imparting necessary training for WUCs and Municipality staff, personal protection equipment for workers and WTP sludge handling, and development of green buffer zone around the WTP, OHTs and GLSRs. For the sanitation subprojects, various design-related measures suggested for: providing safe disposal of treated wastewater; efficient treatment to meet disposal standards, odor control at facilities, uninterrupted power supply provision; standard operating procedures for operation and maintenance; and imparting necessary training for WUCs and municipality staff; providing necessary safety no manual cleaning of sewers, and personal protection equipment for workers (protection against oxygen deficiency, harmful gaseous emissions) and sludge handling, and development of green buffer zone around the DEWAT plant.

environment. Improved system operation will comply with the operation and maintenance manual and standard operating procedures to be developed for all the subprojects.

Table 31: Impacts and Mitigation Measures during Design Phase

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsibility
Detailed Design			
Incorporation of sloped areas in project design	Soil erosion and slope instability	• Incorporate measures and sites for handling excessive spoil materials • Incorporate drainage plan in final design	Project management office (PMO), regional project management office (RPMO) and design, supervision and management consultant (DSMC)
Manual preparation	Health and safety of community and workers	• Prepare training manuals in Nepali with sketches on community health and safety and potential occupational health and safety	PMO, RPMO and DSMC
Location of pipes and photographs of sites and utilities before construction, particularly in heritage areas	False claims from people; water quality changes due to construction. Interference with other utilities and photo of heritage areas to avoid impacts to heritage structures during construction	• Place water pipes away from utilities during design • Provide budget for restoration/replacement of damaged utilities • Avoid placing alignment near heritage buildings • Photograph all sites within heritage areas to enable before and after comparison (note: all roads are to be reinstated to original character especially in heritage areas) • Ensure compliance with any Department of Archaeology (DOA) rules during design including preparation of Archaeological Impact Assessment, or other agreed document by DOA if required.	PMO, RPMO and DSMC/Contractor
Inadequate protection of intake structures	The water from intake will flow and may cause soil erosion.	Intake well has adequate land for perimeter fencing	PMO, RPMO and DSMC
Sludge disposal	Inadequate disposal of sludge from reservoirs and treatment plant will cause nuisances to affected properties.	The design of sludge disposal sites will be made at designated sites approved by the municipalities.	PMO, RPMO and DSMC

166. **Environmental Audit of Existing Facilities.** Results of the environmental audit of WTPs (Appendix 9) to be rehabilitated in Charikot (Dolakha) water supply and sanitation subproject

show compliance with government regulations and requirements. Currently treated water quality meets both Nepal and WHO guideline values. Sludge is not considerably generated as raw water quality is good. Corrective actions such as ensuring government clearances are in place and valid, safe handling and storage of powder chlorine, managing filter media (sand) washing, among others are included in the subproject design and EMP.

167. **Impacts during Pre-construction Phase.** The pre-construction works will involve field survey and investigation, development of design and detailed drawings, carrying out cost estimate etc. This also includes discussion with WUSC and revision of design if necessary. As there will be no construction activities involved; there will be no anticipated environmental impacts.

168. **Impacts during Construction Phase.** Except the pipelaying works, all other construction activities will be confined to the selected sites, and the interference with the public and community around is minimal. There will be temporary negative impacts, arising mainly from construction dust and noise, hauling of construction material, waste and equipment on local roads (traffic, dust, safety etc.,), mining of construction material, occupation health and safety aspects. Impacts mainly arise from the construction dust and noise; from the disturbance of residents, businesses, traffic by the construction work, safety risk to workers, public and nearby buildings due to trench excavations, especially in narrow roads, dust, access impediment to houses and business, disposal of construction waste, etc. These are all general impacts of construction in urban areas, and there are well developed methods of mitigation that are suggested in the EMP.

169. **Non-Compliance with Environmental Legislation.** This impact is likely to occur during the construction phase when the contractor fails to apply mitigation measures to possible environmental impacts as mentioned in EMP. Such type of failure indicates noncompliance to EPA, 1997.

170. Similarly, EPA also 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. So, if the construction activities pollute the environment and affect the locals, then the contractor should provide compensation to the affected ones. If the contractor does not follow this, this would be noncompliance to EPA, 1997. The impact is thus indirect in nature, local in extent, low in magnitude and short term in duration.

171. Measures to mitigate these concerns include (i) capacity strengthening of contractor to avoid this impact through safeguard guidance to the construction workers; and (ii) ensuring compliance with EPA/EPR, NDWQS, applicable conditions in IEE approvals and registration for carrying out the construction works.

172. **Erosion and Land Surface Disturbance.** Excavation and digging of trenches during construction has the potential to cause erosion and cave-ins 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 aesthetic and economic values of the area. The activity will be a discomfort to the road users and inhabitants. Quarrying activities operated to supply the aggregate demand of the subproject may disturb land that could cause further erosion and landslides. The impact is thus direct in nature, local in extent, high in magnitude and short term in duration.

173. Mitigation measures include: during construction, precautionary measures will be taken; proper backfilling trenches will be done. Temporary access, diversions, and signboards for pedestrians will be provided. The exposed soil will be stabilized and revegetated to prevent further

soil erosion. The contractor must coordinate with DDC and the concerned Ministry on restrictions in quarrying and the legitimacy of extraction operations of identified sources. The contractor must secure permits for quarrying aggregates and implement a restoration plan, which is part of EMP.

174. **Impacts on Air Quality.** Dust will be generated from inadequately managed or haphazard: (i) earthworks such as clearing, grubbing, excavations, and drilling; (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; and (v) on-site rock crushing and concrete mixing; (vi) burning of firewood for cooking and heating in work and labor camps. The impact is thus indirect in nature, local to regional in extent, medium in magnitude and short term in duration.

175. Mitigation measures include:

(i) confining earthworks according to excavation segmentation plan that should be part of site-specific environmental management plan (SEMP);
(ii) watering of dry exposed surfaces and stockpiles of aggregates at least twice daily, or as necessary;
(iii) if re-surfacing of disturbed roads cannot be done immediately, spreading of crushed gravel over backfilled surfaces;
(iv) during demolition, watering of exterior surfaces, unpaved ground in the immediate vicinity and demolition debris;
(v) place signage at active work sites in populated areas;
(vi) requiring trucks delivering aggregates and cement to have tarpaulin cover;
(vii) limiting speed of construction vehicles on access roads and work sites to a maximum of 30 km/h;
(viii) prohibit burning firewood in work and labor camps (promote liquified petroleum gas for cooking purposes and electric heater for heating purposes);
(ix) use of vehicles complying with Nepal Vehicle Mass Emission Standards (NVMES), 2069 enforcement, and green sticker standards; and
(x) prohibit open burning of solid waste.

176. **Noise.** Noise-emitting construction activities include earthworks, concrete mixing, demolition works, movement and operation of construction vehicles and equipment, and loading and unloading of coarse aggregates. The significance of noise impact will be higher in areas where noise-sensitive institutions such as health care and educational facilities are situated. Noise levels should not exceed the national standards for noise or WHO noise level guidelines, whichever is more stringent, or result in increase in background noise level of 3 decibels at the nearest receptor location off-site.[23] The comparative illustration of national standards versus WHO guidelines is in Table 11 of Section III. The impact is thus direct in nature, local in extent, medium in magnitude and short term in duration.

177. Mitigation measures include:

(i) using equipment that emits the least noise, well-maintained and with efficient mufflers;
(ii) restricting noisy activities to day time;
(iii) avoiding use of noisy equipment or doing noisy works at night time;
(iv) limit engine idling to a maximum of one minute;
(v) spread out the schedule of material, spoil and waste transport; and

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

(vi) minimizing drop heights when loading and unloading coarse aggregates.

178. **Impacts on Water Resources**. Some sections of the distribution pipeline will cross water bodies, exposing them to risks of pollution caused by: (i) poorly managed construction sediments, and waste materials; and (ii) poor sanitation practices of construction workers. Polluted water bodies will be harmful to aquatic life and people that depend upon such contaminated sources. The impact is thus direct in nature, local to regional in extent, medium in magnitude and short term in duration.

179. Mitigation measures include:

(i) excess spoils will be disposed as per the Spoil Management Plan attached in Appendix 8;
(ii) locating temporary storage areas on flat grounds at safe distance from main surface drainage routes;
(iii) shielding temporary storage areas with sandbags; and
(iv) providing adequate water supply and sanitation facilities at work sites.

180. For management and final disposal of solid wastes following mitigation, measures that will be applied are:

(i) collection of recyclable solid wastes and supply to scrap vendors
(ii) ensure all the camp wastes and construction wastes are placed in the designated waste collection pits away from receiving water.
(iii) establishment of separate bounded areas for the collection and storage of all the toxic material wastes, including batteries, oil filters, mobile, burnt oils, etc. at the construction site
(iv) collection of biodegradable wastes in separate vessels and transfer to municipal waste disposal system.
(v) application of various waste disposal systems for diverse wastes produced on site as per consultations with environmentalists.

181. **Impacts on River Morphology and Hydrology.** Quarrying from riverbeds could cause the alteration of the river morphology and hydrology. The contractor will obtain quarry materials from government approved areas. The impact is thus direct in nature, local in extent, high in magnitude and short term in duration.

182. To mitigate the negative impacts the contractor needs to coordinate with MOWS and local authorities for any quarrying related activities. Alternative sources should be identified, before finalizing any quarry site approval. An Aggregates Management Plan must be part of the SEMP. The contractors should be required to obtain aggregates only from sources with environmental clearances and licenses.

183. **Impacts on the Quality of Groundwater Resource.** There are no private and community groundwater wells that will be affected by the subproject.

184. **Impacts on Stored Water in Adjacent Ground Reservoir Tanks.** The construction of new ground reservoir tanks will potentially expose the water stored in adjacent existing reservoir tanks. Aside from applicable measures to mitigate impacts on surface water quality (mentioned above), place signages at existing RVTs. Provide sandbags in existing RVTs perimeters to mitigate sedimentation and contamination of stored water in adjacent RVTs.

185. **Impacts on Flora and Fauna.** Haphazard site clearing, parking, and movement of

construction vehicles and equipment stockpiling, will result in disturbance to the land in the subproject area. Though some subproject components' locations are nearby the community forest, the impacts to flora and fauna will be minimal. The impact is thus direct in nature, local in extent, low in magnitude and short term in duration.

186. **Traffic Disturbance.** During construction, few disturbances will occur. Mitigation measures include installing clear signages and markers to direct traffic movement in sites.

187. **Impacts on Physical, Cultural Resources.** The subproject will not encroach into, or be near physical, and cultural resources.

188. **Impacts on the Socioeconomic, Environment and Resources.** The impacts will result from excavation works, stockpiling, the operation of construction vehicles and equipment, and accidental damage to utilities (e.g., power supply poles, open drains, and water taps or hoses). Nuisance and safety hazards are the indirect impacts. The impact is thus indirect in nature, local in extent, medium in magnitude and short term in duration.

189. Mitigation measures include:
- (i) prepare a traffic management plan in collaboration with local authorities;
- (ii) where traffic congestion will likely occur, place traffic flagmen during working hours;
- (iii) provide compensation to affected people;
- (iv) manage pumped water from excavations either to drains or drums for later use;
- (v) relocate the affected power supply poles, and
- (vi) advise the concerned authority during accidental damage to utilities.

190. **Community Health and Safety Hazards**. Communities will be moderately exposed to threats due to impacts on air and water quality, ambient noise level; mobility of people, goods, and services; accesses to properties, economic activities, and social services; service disruptions, etc. Construction workers may potentially bring communicable diseases in the community. The impact is thus indirect in nature, local in extent, medium in magnitude and short term in duration.

191. Mitigation measures include:
- (i) contractor's implementation of SEMP;
- (ii) contractor's inclusion in the SEMP the implementation of community health and safety plan following international best practices on community health and safety such as those in Section 4.3 of World Bank's Environmental Health and Safety (EHS) Guidelines on Construction and Decommissioning Activities.[24] As a minimum and whichever is applicable, the community health and safety plan shall ensure the following:
  - (a) implement risk management strategies to protect the community from physical, chemical, or other hazards associated with sites under construction and decommissioning;
  - (b) restricting access to the site, through a combination of institutional and administrative controls, with a focus on high risk structures or areas depending on site-specific situations, including fencing, signage, and communication of risks to the local community;

[24] World Bank Group. IFC. 2007. *Environmental, Health, And Safety (EHS) Guidelines – General EHS Guidelines: Construction and Decommissioning*.

(c) removing hazardous conditions on construction sites that cannot be controlled affectively with site access restrictions, such as covering openings to small confined spaces, ensuring means of escape for larger openings such as trenches or excavations, or locked storage of hazardous materials; and
(d) implement measure to prevent proliferation of vectors of diseases at work sites;

(iii) adequate space and lighting, temporary fences, shining barriers and signage at active work sites;
(iv) contractor's preparedness in emergency response;
(v) adequate dissemination of GRM and contractor's observance and implementation of GRM; and
(vi) upon availability, local people should be given an opportunity for work in the subproject activities.

192. **Workers' Health and Safety Hazards.** Workers will be exposed to the crosscutting threats of the impacts above during construction. Inadequate supply of safe and potable water and inadequate sanitation facilities; 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 be potentially exposed to communicable and transmittable diseases in the community and the workforce. The impact is thus indirect in nature, local in extent, medium in magnitude and short term in duration.

193. Mitigation measures include implementation of an occupational health and safety plan to include international best practices on occupational health and safety such as those in Section 4.2 of World Bank EHS Guidelines on Construction and Decommissioning Activities (footnote 26). The occupational health and safety plan should be included in the SEMP. As minimum and whichever are applicable, the occupational health and safety plan shall ensure the following:

(i) Communication and Training
  (a) Training of all workers on occupational health and safety prior to construction works;
  (b) Conduct of orientation to visitors on health and safety procedures at work sites;
  (c) Signages strategically installed to identify all areas at work sites, including hazard or danger areas;
  (d) Proper labeling of equipment and containers at construction and storage sites; and
  (e) Suitable arrangements to cater for emergencies, including: first aid equipment; personnel trained to administer first aid; communication with, and transport to, the nearest hospital with an accident / emergency department; monitoring equipment; rescue equipment; firefighting equipment; and communication with nearest fire brigade station;
(ii) Physical Hazards
  (a) Use of personal protective equipment by all workers such as earplugs, safety shoes, hard hats, masks, goggles, etc. as applicable, and ensure these are used properly;
  (b) Avoidance of slips and falls through good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from foot paths, cleaning up excessive waste

debris and liquid spills regularly, locating electrical cords and ropes in common areas and marked corridors, and use of slip retardant footwear;
(c) Use of bracing or trench shoring on deep excavation works;
(d) Adequate lighting in dark working areas and areas with night works;
(e) Rotating and moving equipment inspected and tested prior to use during construction works. These shall be parked at designated areas and operated by qualified and trained operators only;
(f) Specific site traffic rules and routes in place and known to all personnel, workers, drivers, and equipment operators; and
(g) Use of air pollution source equipment and vehicles that are well maintained and with valid permits;

(iii) General Facility Design and Operation
(a) Regular checking of integrity of workplace structures to avoid collapse or failure;
(b) Ensuring workplace can withstand severe weather conditions;
(c) Enough work spaces available for workers, including exit routes during emergencies;
(d) Fire precautions and firefighting equipment installed;
(e) First aid stations and kits are available. Trained personnel should be available at all times who can provide first aid measures to victims of accidents;
(f) Secured storage areas for chemicals and other hazardous and flammable substances are installed and ensure access is limited to authorized personnel only;
(g) Good working environment temperature maintained;
(h) Worker camps and work sites provided with housekeeping facilities, such as separate toilets for male and female workers, drinking water supply, wash and bathing water, rest areas, and other lavatory and worker welfare facilities; and
(i) Maintain records and make reports concerning health, safety and welfare of persons, and damage to property. Take remedial action to prevent a recurrence of any accidents that may occur.

194. **Impacts on the Sustainability of Works.** During construction, seismic events may occur, causing damage to unsettled, unfinished, or uncured and completed structures and affecting their structural integrity. The impact is thus direct in nature, local in extent, medium in magnitude and short term in duration.

195. Mitigation measures include after every seismic event, the contractor must conduct engineering investigations of built structures and implement the necessary corrective actions immediately.

C. Impacts, Issues, Concerns and Mitigation Measures during Operation

196. **Non-compliance with Relevant Environmental Legislation**. This issue will arise when there is a lack of awareness of project staff and management of environmental safeguards requirements, compliance with the requirements and conditions specified in the IEE Report and approvals and permits for the use of water resources. The impact is thus direct in nature, local in extent, medium in magnitude and long-term in duration.

197. Measures to mitigate this concern include:

(i) capacity strengthening of WUSC and continuing capacity strengthening of project staff; and
(ii) ensuring compliance with EPA/EPR, NDWQS, applicable conditions in IEE approvals and registration for the use of water resources

198. **Occupational Health and Safety Hazards.** Mishandling of chemicals and other hazardous substances may pose health and safety hazards to the workers. The impact is thus indirect in nature, local in extent, medium in magnitude and long-term in duration.

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

200. **Generation of Waste Water and Sullage.** Reliable and sufficient water supply will increase the generation of wastewater and sullage. If inadequately managed, this situation will lead to contamination of the water supplied through leaks or broken pipes in the distribution system. The impacts are thus indirect in nature, local in extent, medium in magnitude and long-term in duration.

201. Mitigation measures include:
(i) prompt action to repair broken pipes and leaks;
(ii) monitoring incidence of waterborne disease in the dry and wet seasons; and
(iii) construction of soakpits, diversion of waster after treatment into natural drainages and infiltration trenches will be adopted considering the ground conditions, topography, quality and quantity of waste generated.

D. Indirect, Induced and Cumulative Impacts

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

203. **Cumulative Impacts.** There is a Dolakha- Singati Road project ongoing in Charikot that connects Charikot with the rural area of Singati. The road also serves as the access road for one of the national pride project, the Upper Tamakoshi Hydroelectric Project. This road is one of the three priority roads in the recent earthquake affected districts considered for upgrading by ADB. The total length of the road is 35 km, which passes through various settlements, agricultural lands, and forests in Dolakha District. Out of the total 35 kilometers length of the roads, only a few kilometers lie within the Charikot area. Therefore, a cumulative impact is not expected in a magnitude that negatively affects the local environment.

204. The cumulative impacts will arise mainly from the construction of the main subproject

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

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

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

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

VII. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

207. Stakeholder consultation and participation was an essential process during subproject preparation. The process of engaging stakeholders and affected people involved key informant interviews, on-site discussions with WUSC, and random field interviews of stakeholders. Table 32 lists the persons consulted during the IEE study.

Table 32: Lists of People Consulted During Initial Environmental Examination Study

S. No.	Name of the Participants	Designation/Address
1	Mr.Sanjaya Bahadur Rajlawat	Chairman
2	Mr. RamKrishna KC	Charikot Drinking Water
3	Mr. Krishna Bahadur Karki	Hattichahara Drinking Water
4	Mr. Krishna Bahadur Khadka	Charikot Drinking Water
5	Mr. Kailash Shrestha	Hattichahara Drinking Water
6	Mr. Dhruba Basnet	Hattichahara Drinking Water
7	Mr. Anil Shrestha	Dolakha Drinking Water
8	Mr. Ram Prasad Sapkota	Jilu Drinking Water
9	Mr. Dawa Sherpa	Charikot Drinking Water
10	Ms. Roma Karki	S.T.
11	Ms. Krishna Kumari Thapa	
12	Ms. Rupa Bhujel (Shahi)	

S. No.	Name of the Participants	Designation/Address
13	Ms. Geeta KC	Bhimeshwor Municipality-10, Taganagi
14	Mr. Suku Shrestha	Treasurer, Drinking water committee
15	Mr. Ram Das Shrestha	Bhimeshwor Municipality
16	Mr. Lalbahadur Khadka	Chairman,Taganagi
17	Mr. Kabindra Das Shrestha	Bhimeshwor Municipality-07, Jilu
18	Mr. Jhamak Bahadur Basnet	
19	Mr. Yadav Prasad Dahal	Bhimeshwor Municipality-10, Taganagi
20	Mr. Dhan Bahadur Chaulagain	
21	Mr. Shree Krishna Neupane	Ramkot Drinking Water
22	Mr. Gokul Prasad Neupane	Ramkot Drinking Water
23	Mr. Manbir Dhanuke	Bhimeshwor Municipality-01
24	Mr. Taranath Chaulagai	Bhimeshwor Municipality-01
25	Mr. Bal Bahadur Shrestha	Bhimeshwor Municipality-07, Jilu
26	Mr. Gyan Bahadur Shrestha	Bhimeshwor Municipality-07, Jilu
27	Mr. Upendra Bahadur Khadka	Bhimeshwor Municipality-07, Jilu
28	Mr. Kumar Chaulagain	
29	Mr. Ram Bahadur KC	
30	Mr. Ganesh Bahadur KC	
31	Mr. Birsha Bahadur Budhathoki	
32	Mr. Mandhwoj Lama	Chothang
33	Mr. Tej Bahadur Shrestha	
34	Mr. Badri Kumar Shrestha	
35	Mr. Rajan Karki	Bhimeshwor Municipality-06
36	Mr. Ram Bahadur Karki	Bhimeshwor Municipality-06
37	Mr. Kamal Bahadur Thawa	Kamal Bahadur Thawa
38	Mr. Lalit Bhujel	Lalit Bhujel… Bhimeshwor Municipality-07
39	Mr. Sangdhwoj Lama	Bhimeshwor Municipality-01
40	Mr. Harihar Prasad Neupane	Ramkot
41	Mr. Durga Prasad Kafle	Charikot Drinking Water
42	Mr. Ranga Dhwoj Budhathoki	Bhimeshwor Municipality-06
43	Mr. Ganga Bahadur Budhathoki	Bhimeshwor Municipality-06
44	Mr. Ram Sharan Thapa	Charikot Drinking Water
45	Mr. Badri Kumar Shrestha	Hattichahara

208. **Summary of Consultations.** The public meeting was organized on 2 January 2016 in the premises of Bhimeshwore Municipality Office for the discussion of the environmental impacts due to the construction of the subproject. The local peoples' concerns regarding the construction of the Project are summarized below.

209. **Common Issues Raised by Stakeholders.** The common issues raised by the local stakeholders during the IEE Study are as follows:

(i) The appropriate water sources that excel in quality and quantity need to be identified for the project that encompasses maximum population of the area.

(ii) The project should give priority to local people while hiring for construction related jobs and inclusion of women in the users committee has been finalized.

(iii) The project must be sustainable in a long run which is achievable by developing solid waste management and a waste disposal plan.
(iv) Issues addressed by the Study Team
(v) The detailed design survey team and environmental specialist have already identified the water sources that have been discussed with the stakeholders to receive positive affirmations.
(vi) Whether the project conforms to the laws will be monitored by DDC, RPMO, etc. during the construction phase.
(vii) The safe disposal of solid waste management plan will be developed for the construction phase of the project
(viii) Local workers of Bhimeshwore Municipality will be given priority for employment.
(ix) Various environmental safeguard measures mentioned in the IEE report will be implemented and the site specific EMP of the project will make this project sustainable.

Figure 4: Stakeholder Consultation in Charikot

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

(i) during construction, if there is a change in design, alignment, and location, PMO and ICG will hold at least one public consultation to solicit perceived impacts, issues, concerns and recommendations from affected communities;
(ii) before construction, 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 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 ICG, WUSC, and municipality;
(iii) during construction, regular random interviews will be conducted by ESA from ICG every month to monitor environmental concerns of subproject communities;
(iv) during operation, periodic random interviews will be conducted by 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.

211. The 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. The IEE and environmental monitoring reports will be disclosed on the ADB's and UWSSP website.

VIII. GRIEVANCE REDRESS MECHANISM

212. A project-specific 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. Grievances may be channelled through letters, emails, text messages (SMS), verbal narration, grievance boxes and registers. Suggested template for grievance redress form is in Appendix 3.

213. 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 and/or indigenous people dialect, 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.

214. A municipal-level public awareness campaign will be conducted on a regular basis as per the communication strategy of the project to ensure awareness on the project and its GRM. The social and environmental safeguards experts of the project management and quality assurance consultant (PMQAC) and regional design, supervision and management consultants (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.

215. A grievance redress committee (GRC) will be formed at the Municipality level, comprising the Mayor as Chairperson of GRC, and Regional Project Manager RPMO as Secretary. The GRC members will comprise of (1) WUSC Secretary; (2) RPMO Engineer; (3) RPMO social /environmental (as relevant) officer, (4) representative of affected persons, (5) RDSMC's safeguards specialist (social/environment as relevant), (6) a representative of reputable and relevant CBO/SHG/organization working in the project area as invitee,[25] 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

[25] 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.

committee members. Along with representatives of the affected persons, civil society and eminent citizens can be invited as observers in GRC meetings.

216. 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 affected persons, 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. The GRM procedure is depicted in Figure 5, and 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. If affected persons are not satisfied with the response they can elevate it to the next level:

(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 as well as to provide feedback to the complainant. 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 Municipality-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. A representative of the Nepal Foundation for Indigenous Nationalities (NEFIN) will be invited to attend any meetings related to resolution of Indigenous Peoples grievances. Decision has to be made within 15 days of receipt of complaint from the Municipality-level GRC. The Project Director will sign off on all grievances received by the PMO. The concerned Deputy Project Director (DPD) and environmental and social safeguards officers (ESO and 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.

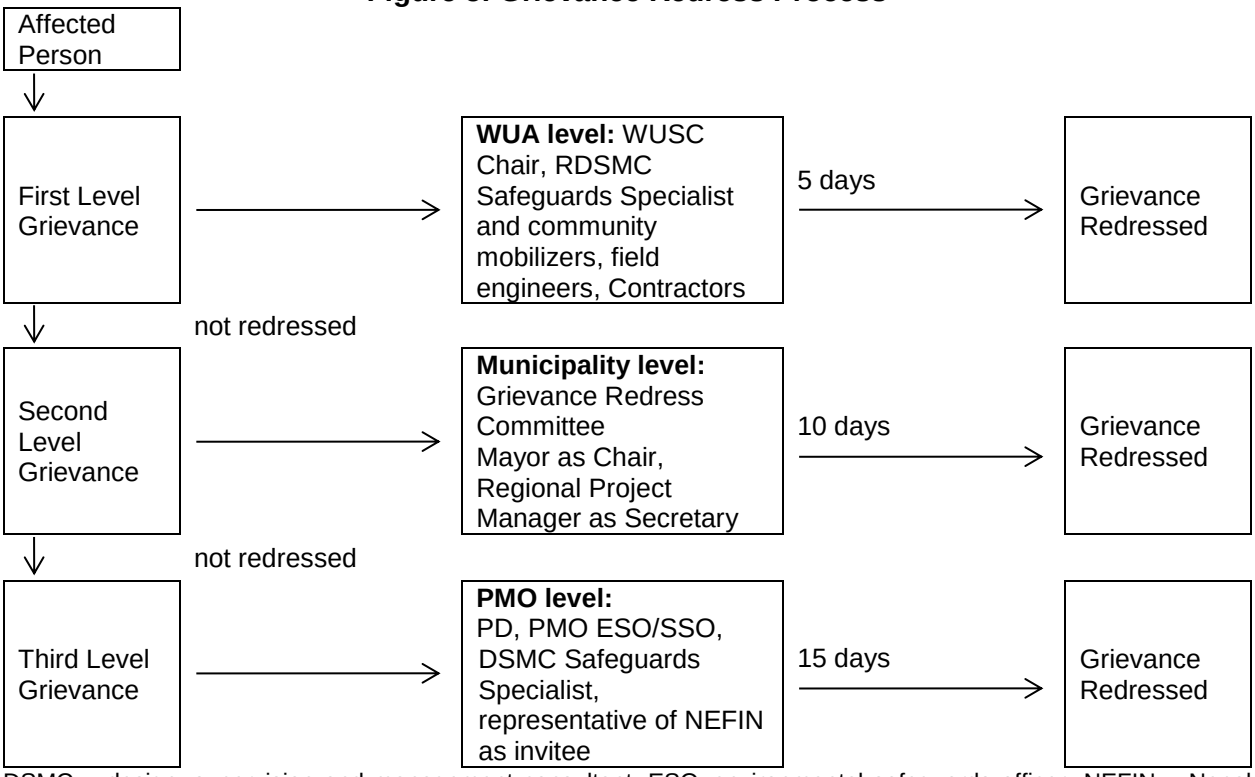
217. All paperwork (details of grievances) needs to be completed by the WUA member secretary assisted by RDSMC and circulated to the WUA Chairperson and members. At

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 affected persons by the RPMO's SSO.

218. 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.

219. 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 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 Accountability Mechanism information will be included in UWSSP Information Datasheet (PID), to be published in web and distributed to the affected communities, as part of the project GRM.

Figure 5: Grievance Redress Process



DSMC = design, supervision and management consultant; ESO=environmental safeguards officer; NEFIN = Nepal Federation of Indigenous Nationalities; PD = project director; PMO = project management office; RDSMC = regional design, supervision and management consultant; SSO = social safeguards officer; WUA = water users' association; WUSC = water users' and sanitation committee.

220. **Record Keeping and Disclosure**. Records at the municipal-level will be kept by the concerned WUA or local bodies member secretary, assisted by RDSMC, of all grievances received, including contact details of complainant, date the complaint was received, nature of grievance, agreed corrective actions and the date of the incident and final outcome. The number

of grievances recorded and resolved, and the outcomes will be displayed/disclosed in the PMO office, WUA, and on the web, as well as reported in the safeguards monitoring reports submitted to ADB on a semi-annual basis. For any grievance escalated to RPMO/ Municipality level, the RPMO's Engineer assigned as GRM focal person will be responsible for record-keeping, calling of GRC meetings and timely sharing of information with WUA or municipalities. For grievances escalated to PMO and above, the PMO's SSO will be responsible for maintenance of records, sending copies to RPMO and WUA for timely sharing of information with the person filing complaint.

221. **Periodic Review and Documentation of Lessons Learned**. The PMO's SSO will periodically review the functioning of the GRM at municipality or WUA level and field level and record information on the effectiveness of the mechanism, especially on the project's ability to prevent and address grievances. Indicators pertaining to grievance redress (no. of grievances received, no. redressed/resolved to be reported by Member Secretary, WUA to RPMO SDO, and by RPMO to PMO SSO) in monthly and quarterly progress reports.

222. **Costs.** All costs involved in resolving the complaints (meetings, consultations, communication and reporting/information dissemination) at local (field/ward/municipal) level will be borne by the concerned focal organizations at each level: WUA at local level, and municipality at municipal level; and PMO at central level. Cost estimates for grievance redress are included in resettlement cost estimates.

Table 33: Suggested Format for Record Keeping of Grievances

S. No.	Date of receipt of grievance	Name and contact details of complainant	Description of complaint	Nature of complaint	Decisions taken	Response given to complainant and date	Whether closed

IX. ENVIRONMENTAL MANAGEMENT PLAN

A. Institutional Arrangement

223. The Ministry of Water Supply (MOWS) will be the Executing Agency, working through the Department Water Supply and Sewerage (DWSS), which will establish a Project Management Office (PMO) for the project[26] headed by a Project Director. The DWSS will also establish two Regional PMOs (RPMOs).

224. The PMO will be responsible for overall project planning, management, implementation, monitoring and reporting for the project. The PMO will also be responsible for screening the proposed subprojects in accordance with the subproject selection criteria for the project,[27] assisting the municipalities in conducting feasibility studies,[28] reporting to and being point of

[26] DWSS will continue the existing PMO established and operational for the Third Small Towns Water Supply and Sanitation Sector project.

[27] Subproject selection criteria (covering all aspects of a proposed subproject other than the specific subproject selection criteria for environment as discussed in this EARF) is attached as Appendix 1 of the PAM.

[28] TDF will assist the municipalities in conducting financial appraisal of the subprojects and advice DWSS on its outcomes prior to the start of detailed design process.

liaison with ADB on the project; quality control of detailed design and construction supervision; procurement of civil works contractors; support for capacity building; and overseeing safeguard compliance. The PMO will liaise with WUSCs or municipalities to sign the management agreement prior to the award of contract for each subproject. The PMO will also engage all consultants under the project.

225. The RPMOs will be established using the existing infrastructure in (i) Itahari, Sunsari, for the eastern region, (ii) in Nepalgunj, Banke, for the western region, and (iii) PMO (Kathmandu) will act as RPMO for central region projects. The RPMOs will report to the PMO and be supported and monitored by PMO to implement the projects in the field and manage contractors and consultants. The RPMOs will manage the detailed design and construction supervision with support from DSMC that PMO would engage (DSMCs for eastern, western, and central region each). Each of the DSMCs will be based at the respective RPMO. For each subproject, a dedicated implementation core group will be established in the field, at each WUA's office,[29] headed by a qualified engineer from the RPMO to conduct day-to-day project management, planning and construction supervision. The TDF will coordinate with RPMOs, WUSCs and municipalities at least on monthly basis.

226. The WUSC, on behalf of the WUA[30] or the municipality[31] will be responsible for operation and maintenance (O&M) of the water supply and sanitation facilities constructed, operating under a management agreement with DWSS. WUSCs consist of nine executive members,[32] at least three of whom are women. The project will fund the WUA's minimum prescribed staffing and other resource requirement, as outlined in the management agreement with DWSS for sustainable operations of the system during the project period. For the subprojects yet to be selected and where WUA does not exist initially, or when the municipality doesn't have the capacity and chooses to delegate the operation to user's representatives, an interim user committee (IUC) will be first established in the feasibility stage by representing potential consumers. The IUC will work with the RPMO and DSMC in undertaking a feasibility study, confirm the technical proposals and the boundaries of the service areas. WUAs will be developed from IUCs at the detailed design stage.

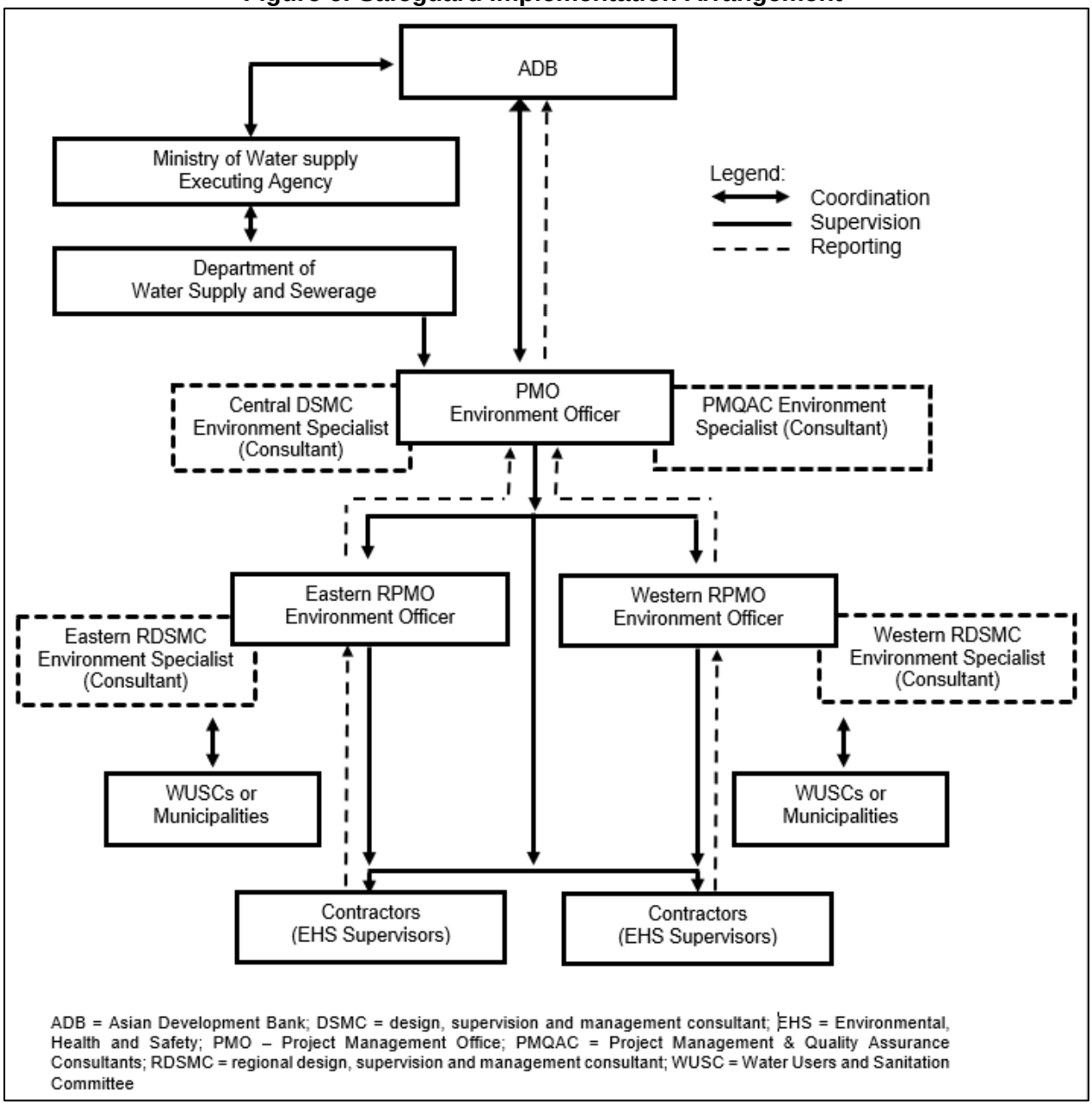
[29] The implementation core group, as a minimum, comprises of (i) an Engineer, a Social mobilizer, and an EMP monitor, RPMO; (ii) an Administration Staff, a Finance Staff, and an Engineer or Junior Engineer, WUSC.

[30] WUAs are registered with the district water resources committee as a user association under the Water Resources Act (1992).

[31] As the project is a demand based open access project, the WUAs or the municipalities can apply for funding a proposed subproject that meets the subproject selection criteria.

[32] WUSCs will be formulated by ensuring proportional representation of gender, caste and ethnic groups. It shall include at least 33% representation of women.

Figure 6: Safeguard Implementation Arrangement



227. **Project Management Office.** 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) assist with ongoing meaningful consultation and assist in setting up of GRM in respect of environment concerns;
(xii) address any grievances brought about through the Grievance Redress Mechanism (GRM) in a timely manner as per the IEEs;
(xiii) undertake regular review of safeguards-related loan covenants, and the compliance during program implementation; and
(xiv) organize periodic capacity building and training programs on safeguards for project stakeholders, PMO, RPMOs, and WUAs.

228. **Regional Project Management Offices.** The environmental officer assigned by DWSS 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;
(viii) assist with ongoing meaningful consultation and assist in setting up of GRM in respect of environment concerns; and
(ix) address any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs.

229. **Project Management and Quality Assurance Consultant.** The Project Management and Quality Assurance Consultants (PMQAC) will provide support to the PMO in the following areas. The detailed TORs are in the PAM:

(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.

230. **Regional Design, Supervision and Management Consultants.** The RDSMCs will

provide support to the RPMOs in the following areas. The detailed TORs are in the PAM:

(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.

231. **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. 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 SEMP; 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.

232. 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.

232. 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 project sites.

233. **Capacity Building**. The design review and technical audit consultant (DRTAC) 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 following both ADB and government requirements as specified below:

(i) Introduction to environment and environmental consideration in water supply and wastewater projects;
(ii) Review of IEEs and integration into the detailed project design;
(iii) Improved coordination within nodal departments; and
(iv) Monitoring and reporting system. The contractors will be required to conduct environmental awareness and orientation of workers before deployment to work sites.

234. **Water Users' and Sanitation Committees.** WUSCs are the eventual operators of the

completed projects. The key tasks and responsibilities of WUSCs are, but not limited to:

235. **Before Construction.**
- (i) Facilitate public consultation and participation, information dissemination and social preparation.
- (ii) Provide available data to DSMC-ESS during IEE
- (iii) Assist in securing tree-cutting permits and/or registration of water source.
- (iv) Participate in training programs.

236. **During Construction.**
- (i) Assist in the observance of the grievance redress mechanism.
- (ii) Actively participate in the monitoring of Contractor's compliance with the IEE and its EMP and the conditions set out with Government's approval of the IEE Reports.
- (iii) Facilitate public consultations, as necessary.

237. **During Operation.**
- (i) Implement the Environmental Management Plan and Water Safety Plan.
- (ii) If applicable, actively work with the engaged licensed and accredited laboratory in water quality monitoring.
- (iii) Prepare the environmental monitoring report as per IEE.
- (iv) Ensure observance of the grievance redresses mechanism.

238. **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 WUSC. The laboratory will ensure 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 WUSC.

B. Environmental Management Plan

239. An environmental management plan (EMP) has been developed to provide mitigation measures to reduce all negative impacts to acceptable levels.

240. The EMP will guide the environmentally-sound construction of the subproject and ensure efficient lines of communication between PMO, RPMO, PIUs, consultants and contractors. The EMP will (i) ensure that the activities are undertaken in a responsible non-detrimental manner; (i) provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site; (ii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iii) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (iv) ensure that safety recommendations are complied with. The EMP includes a monitoring program to measure the environmental condition and effectiveness of implementation of the mitigation measures. It will include observations on- and off-site, document checks, and interviews with workers and beneficiaries.

241. The contractor will be required to (i) carry out all of the mitigation and monitoring measures set forth in the approved EMP; and (ii) implement any corrective or preventative actions set out in safeguards monitoring reports that the employer will prepare from time to time to monitor implementation of this IEE, EMP and site-specific EMP (SEMP). The contractor shall allocate budget for compliance with these IEE, EMP and SEMP measures, requirements and actions. The contractor will be required to submit to PIU, for review and approval, a SEMP including (i)

proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; and (iii) monitoring program as per EMP. No works can commence prior to approval of SEMP.

Table 34: Environmental Management Plan

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
1. Pre-Construction Activities					
Consents, permits, clearances, no objection certificate (NOC), etc.	Failure to obtain necessary consents, permits, NOCs, etc. can result to design revisions and work stoppage	- Obtain all of the necessary consents, permits, clearance, NOCs, etc. before the start of civil works. - Include in detailed design drawings and documents all conditions and provisions if necessary	Project management office (PMO), Regional project management offices (RPMOs) and design, supervision and management consultant (DSMC)	Incorporated in final design and communicated to contractors	Before award of contract
Existing utilities	Disruption of services	- Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction - Require construction contractors to prepare a contingency and spoil management plan. The spoil management plan need to apply international best practices on spoil management, such as for example the siting of stockpiles at least 300m from surface water and covered.	DSMC, RPMOs	List of affected utilities and operators; Bid document to include a requirement for a contingency plan for service interruptions, e.g. provision of water if disruption is more than 24 hours, spoil management plan	During detailed design phase Review of spoils management plan: Twice (once after first draft and once before final approval)
Drinking water supply	Extraction of unsatisfactory raw water quality Delivery of unsafe water to the distribution system Inadequate protection of intake well Health Hazards arising	- Provision of water treatment plant to meet satisfactory water quality - Perimeter fencing around the intake - Intake should be at least 30m upstream from sanitation facilities. - "Housed" dosing unit with ventilation for chlorine - Train operators for handling chlorine	PMO, RPMOs and DSMC	Incorporated in final design and communicated to contractors	Prior to award of contract

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	from inadequate design of facilities for receiving, storing and handling of cast iron and other chemicals				
Construction work camps, stockpile areas, storage areas, and disposal areas	Disruption to traffic flow and sensitive receptors	- Determine locations before award of construction contracts	DSMC, RPMOS	List of selected sites for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas. Written consent of landowner/s (not lessee/s) for reuse of excess spoils to agricultural land	During detailed design phase
Waste generation	Generation of solid waste, wastewater from labor camp and other construction waste may cause pollution	- Follow the principle of "Reduce, Reuse, Recycle, and Recover" - Prohibition of unwanted littering and discharge of waste. - Solid waste is either managed in a pit or disposed in municipal collection system.	Contractor	Contractor records. Visual inspection	Visual inspection by RPMOs and DSMC-ESS on monthly basis
Sources of materials	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, resulting water logging, and water pollution	- Prepare list of approved quarry sites and sources of materials	DSMC, RPMOs	List of approved quarry sites and sources of materials; (ii) Bid document to include requirement for verification of quarry sites	During detailed design phase, as necessary with a discussion with detailed design engineers and PIUs suitability of sources and

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
					permit for additional quarry sites if necessary.
Siting of intake structure	Disruption of the aquatic ecology	- Ensure that the location of the intakes are located in areas and distance that will not disturb the aquatic ecosystem. Conduct study to justify the siting of intake strcutures.	PMO, RPMOs, and DSMC.	Result of study	During detailed design phase.
Quality of ambient air, surface water bodies, and noise	Construction activities and construction camps can impact the ambient quality of air, quality of surface water bodies, and level of noise in the areas of works.	- Conduct baseline data gathering for ambient air, surface water quality and noise level at all construction sites. - Compare all results of environmental quality monitoring during construction and O&M phases with these baseline data to determine any negative impact.	PMO, RPMOs and DSMC	Results of laboratory analyses	Once before construction works commence.
EMP Implementation Training	Impact to the environment, workers, and community	- Project manager and contractors should be trained on EMP implementation, spoils management, standard operating procedures (SOP), health and safety (H&S), Labor Act (1992)	PMO, RPMOs, and DSMC. Contractor's Environmental Supervisor	Record of completion (Safeguards Compliance Orientation) Contractor records for EMP implementation at worksites	During the detailed design phase before the mobilization of workers to site
WTP operations	Impact to the environment, workers, and community due to accidents, leaks, etc.	- Development of O&M manual that is comprehensive by integrating international best practice and guidelines such as the WB EHS Guidelines on Water and Sanitation.	PMO, RPMOs, and DSMC.	Availability of final version of O&M manual	Ongoing basis until O&M manual is finalized, but prior to O&M phase.
2. During Construction Activities					
A. Physical Characteristics					
Topography	Sand, gravel or crushed	- Utilize readily available	Contractor	Records of	Monthly by

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
landforms, geology, and soils and river morphology and hydrology	stone will be required for this project. Extraction of natural aggregate materials may cause localized changes in topography and landforms (if on land) or river morphology and hydrology (if on the river).	sources with environmental clearance and license - Borrow areas and quarries comply with environmental requirements - Coordinate with local authorities for quarrying from rivers. Alternative sources should be identified.		sources of materials	RPMOS
Water quality	Trenching and excavation, run-off from stockpiled materials and chemical contamination from fuels and lubricants may result to silt-laden runoff during rainfall, which may cause siltation and reduction in the quality of adjacent bodies of water.	- Spoils management plan. - Reuse excess spoils and materials - Disposal site in designated areas. - Earthworks during dry season - Stockyards at least 300m away from watercourses. - Fuel storage area away from water drainage - Take precautions to minimize the overuse of water - Prevent wastewater into water sources. - Ensure safe water diversion - No obstruction in flowing water.	Contractor	Areas for stockpile storage of fuels and lubricants and waste materials; Number of silt traps installed along trenches leading to water bodies; No visible degradation to nearby drainage, water bodies due to construction activities	Visual inspection by RPMOS and DSMC-ESS on weekly basis Frequency and sampling sites to be finalized during detailed design and final location of projects components
Air quality	Work at the dry season and transporting construction materials may increase dust, carbon, monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons in air environment	- Use of physical controls, sprays, covers, compaction, screening, enclosure, windbreaks, binders and road surfacing - Cover delivery trucks during transportation - Construction vehicle's speed limited to 30kph. - Use of vehicles complying with NVMES, 2069	Construction Contractor	Location of stockpiles; Number of complaints from sensitive receptors; Heavy equipment and machinery with air pollution control devices;	Visual inspection by RPMOS and DSMC-ESS on monthly basis Frequency and sampling sites to be finalized during the detailed

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		- Prohibition of open burning of solid waste. - Minimize stockpile height		A certification that vehicles are compliant with air quality standards.	design stage and final location of Project components
Acoustic environment	Temporary increase in noise level and vibrations by excavation equipment, and the transportation of materials, equipment and people. However, the proposed project will follow ROW alignment	- Prepare work schedule with community consultation and local administration - Overtime work restricted low noise generating equipment. - Minimize drop heights - No horns until necessary - Use modern vehicles and machinery with low noise emissions - Maintain low noise levels - Warning signs in noise hazard areas. Workers must wear hearing protection there. - Identify vibration risk to nearby structures. Take caution working in such areas.	Contractor	Number of complaints from sensitive receptors; Use of silencers in noise-producing equipment and sound barriers or acoustic housing; Equivalent day and night time noise levels	Visual inspection by RPMOs and DSMC-ESS on monthly basis
Aesthetics	Interference with the enjoyment of the area and creation of unsightly or offensive conditions	- Prepare a debris disposal plan. - Minimize stockpile size - Clear wastes regularly - Avoid stockpiling of excess spoils. - Cover delivery trucks during transportation. - Clean roads. - Use screening enclosure shade cloth, temporary walls - Clean site regularly. - Follow the principle of “Reduce, Reuse, Recycle, and Recover”	Contractor	Number of complaints from sensitive receptors; Worksite clear of hazardous wastes Worksite clear of any wastes unutilized materials, and debris Transport route and worksite	Visual inspection by RPMOs and DSMC-ESS on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
				cleared of dirt	
B. Biological Characteristics					
Biodiversity	Activities in WUSC acquired area. There are no protected areas that will be impacted in or around project sites.	- Though the project district has one of the IUCN categorized conservation areas i.e., Gauri Shanker Conservation Area, the minimum distance between this protected area and the project area is 20.3km. Felled trees will be replaced by compensatory plantation at minimum 1:25 ratio i.e., for every tree cut down, 25 replacements must be planted.	Contractor	PIU and PMO to report in writing the number of trees cut and planted if any (during detailed design stage) Some complaints from sensitive receptors on disturbance of vegetation, poaching fishing, etc.	Visual inspection by RPMOs and DSMC-ESS on monthly basis
C. Socioeconomic Characteristics					
Existing provisions for pedestrians and other forms of transport	The road closure is not anticipated. Hauling of construction materials and operation of equipment on-site can cause traffic problems. However, the proposed project will follow ROW alignment.	- Prepare suitable transportation routes - Safe passage for vehicles and pedestrians - Schedule material deliveries on low traffic. - Erect and maintain barricades if required - Inform through display board about nature, duration of construction and contact for complaints - Complete the work quickly nearby institution, place of worship, business, hospitals, and schools. - Consult with business and institutions for work schedules. - Restore damaged properties and utilities	Construction Contractor	Traffic route during construction works, including number of permanent signs, barricades, and flagmen on worksite; Number of complaints from sensitive receptors; Some signage placed at the project location. Number of walkways, signage, and metal sheets placed at project location	Visual inspection by RPMOS and DSMC-ESS on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Socioeconomic status	Staffing will be required during construction. This can result in an increase in local revenue.	- Engage the local workforce. - Secure construction materials from local market.	Construction Contractor	Employment records; Records of sources of materials Records of compliance to Nepal Labor Act (1992), district wages	Visual inspection by RPMOS &DSMC-ESS on monthly basis
Other amenities for community welfare	Civil works may result in an impact to the sensitive receptors such as residents, businesses, and the communities. Excavation may also damage infrastructure located alongside the roads.	- Identify location and nature of existing infrastructure before excavation - Minimize repeated disturbance to locals by integrating other forms of infrastructures. - Inform local about nature, duration and possible impacts of the construction and integrate their concerns - Promptly relocate infrastructure materials - Take prior permission from local authority for water use - Restore damaged properties and utilities to pre-work conditions.	Construction contractor	Utilities Contingency Plan Number of complaints from sensitive receptors	Visual inspection by RPMOS and DSMC-ESS on monthly basis
Community health and safety	Construction works will impede the access of residents and business in limited cases	- Restrict work force in designated areas. - Identify stockyard areas in consultation with local administration - Work on private land requires written permission of landowners and DSMC. - Prefer small mechanical excavator for trenching - Construct gender friendly toilets for workers	Contractor	The number of permanent signs, barricades, and flagmen on worksites as per Traffic Management Plan Number of complaints from sensitive receptors;	Visual inspection by RPMOS and DSMC-ESS on weekly basis Frequency and sampling sites to be finalized during detailed design and final location of

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		- Prohibit alcohol and drugs on site - Prevent excessive noise; - Code of conduct for workers includes restricting workers in designated areas, no open defecation, no littering, no firewood collection, no fire except designated places, no trespassing, no residence at construction sites, and no obligation to potentially dangerous work - Maintain a complaint logbook in workers camp and take action promptly of complaints		Number of walkways, signs, and metal sheets placed at the project location Agreement between landowner and contractors in case of using private land as work camps storage areas etc.	project components
Workers Health and Safety	There is invariably a safety risk when construction works such as excavation and earthmoving are conducted in urban areas. Workers need to be mindful of the occupational hazards, which can arise from working at height and excavation works.	- Comply Labor Act (1992) of Government of Nepal - Train all site personnel on environmental health and safety - Exclude public from worksites - Provide personal protective equipment to workers and ensure their effective usage - Document procedures to be followed for site activities; and - 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 medical insurance coverage for workers;	Contractor	Site –Specific H&S plan Equipped first-aid stations Medical insurance coverage for workers Number of accidents Records of supply of uncontaminated water Condition of eating areas of workers Record of H&S orientation training Availability of personal protective equipment at construction site % of moving equipment outfitted with audible back-	Visual inspection by RPMOS (monthly) and DSMC-ESS on a weekly basis. Frequency and sampling sites to be finalized during detailed design and final location of project components

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		- Provide orientation for guest visitors - Ensure that visitors do not enter hazard areas unescorted; - Require workers to wear high visibility clothes - Ensure moving equipment is outfitted with audible backup alarms; - Chemical and material storage areas need to be marked clearly - Hearing protection equipment enforced in noisy environment		up alarms Signage for storage and disposal areas Condition of sanitation facilities for workers	
D. Historical, Cultural, and Archaeological Characteristics					
Physical and cultural heritage	There are no archaeological, paleontological, or architectural sites of significance listed by local, national authority and (UNESCO).	- Stop work immediately to allow further investigation if any findings are suspected.	Contractor	Records of chance finds	Visual inspection by RPMOS and DSMC-ESS on Monthly basis.
E. Others					
Submission of EMP implementation Report	Unsatisfactory compliance to EMP	- Appointment of EMP supervisor - Timely monitoring reports with field photographs	Contractor	Availability and competency of appointed supervisor Monthly report	Monthly monitoring report to be submitted by RPMOS to PMO PMO to submit semi-annual monitoring report to ADB
Post Construction Activities	Damage due to debris, spoils, excess construction materials	- Remove spoils wreckage, rubbish, or temporary structures no longer required; - All excavated roads shall be reinstated to original condition.	Contractor	RPMOS/PMO report in writing that (i) worksite is restored to original conditions; (ii)	Before turnover of completed works to WUSC

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		- All disrupted utilities should be restored - All affected structures rehabilitated /compensated - The construction camp needs to clear of spills e.g. oil, paint, etc. and other pollutants after dismantling - All hardened surfaces shall be ripped; all imported materials shall be removed and all temporary services shall be cancelled - Request PMO/PIU in writing that worksites and camps are vacated and restored to pre-project conditions		camp has been vacated and restored to pre-project conditions; (iii) all construction related structures not relevant to O&M are removed, and (iv) worksite cleanup is satisfactory.	
Environmental legislation compliance	Lack of awareness in project managers and WUSC about legislations and IEE requirements	- Strengthen capacity of WUSC and project staffs - Ensure compliance with NDWQS	PMO, RPMOs, DSMC, and WUSC	Monitoring reports and checking operations against O&M manuals and permits/clearances	After commissioning of systems and semi-annually
Drinking water supply system	Delivery of unsafe Water	- Prepare operations and maintenance plan - Proper handling and storage of calcium Hypochlorite - Ensure qualified persons to handle disinfection, safe storage of chemicals - Ensure capacity of WUSC to implement quick response to hazardous chemical spills - Implement SPS-complaint EMP and a water safety plan - Monitor water quality	PMO, RPMOs, DSMC, and WUSC	Water Quality reports WTP records in the log book	During O&M of the system Quarterly monitoring
	Excessive algal growth in reservoirs.	- Close water tanks all the time - Clean reservoirs as per the O&M schedule.	WUSC	Water quality results	During O&M of the system. Daily maintenance of chlorine

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
					residual, cleaning.
Mishandling of chlorine	Excessive exposure to chlorine, hypochlorous acid, and hypochlorite ion results in irritation of the esophagus, a burning sensation in the mouth and throat, and spontaneous vomiting.	- Ensure proper storage and handling practices for chemicals - Ensure the knowledgeable and skilled person is in charge of chlorine handling - Ensure use of PPE while using chemicals; - Use of chlorine as per WHO guideline	WUSC	Water quality test	
Sanitation facilities (toilets and septage disposal site)	Contamination of land or waterways due to overflow of septic tanks and the uncontrolled dumping of septage	- The project incorporates a pilot for the controlling disposal of septage. This is to reduce the likelihood of uncontrolled septage disposal to land and local waterways (nallas). Further septic tanks will be designed to ensure maximum retention is achieved and will be emptied at the required frequency (min every 3 years). Households will be educated to reduce the likelihood of septic tank overflows and uncontrolled dumping of septage.	WUSC, DSMC, RPMOs, and PMO for education campaign	Sanitary inspection reports. Water quality reports from test pits near intake sites	During O&M of the system.

C. Environmental Monitoring Program

242. Environmental monitoring will be done during construction on three levels:
(i) Monitoring the development of project performance indicators by PMO-ESS;
(ii) Monitoring implementation of mitigation measures by the Contractor; and
(iii) Overall regulatory monitoring of environmental issues by PMO.

243. In addition to regular monitoring on-site (at the project level) by ICG and DSMC-ESS on EMP implementation of the mitigation measures, monitoring of key environmental parameters is proposed. Table 35 presents the indicative environmental monitoring program for the project, which includes environmental parameters, with a description of the sampling stations, the frequency of monitoring, applicable standards, and responsible agencies. This will be finalized based on site-specific EMP and monitoring program is commensurate to the impacts of the subproject.

Table 35: Environmental Monitoring Program

SN	Field	Stage	Parameters	Location	Frequency	Standards	Responsibility
1.	Air quality	Before construction to establish baseline Construction phase	PM_{10} SO_2 NO_x	Intake and/or worksite locations Along water transmission main 1-km interval from intake locations Construction campsite locations	24-hour monitoring once in a season (except monsoons) during the construction	National Ambient Air Quality Standards, 2003	Contractor
2.	Noise and vibration levels	Before construction to establish baseline Construction phase	Equivalent day and night time noise levels	Intake and/or worksite locations Along water transmission main 1-km interval from intake locations Construction campsite locations	Once in a season (except monsoons) during construction	National Noise Standard Guidelines, 2012	Contractor
3.	Surface Water quality	Before construction to establish baseline Construction phase Operation phase	TDS, TSS, pH, hardness, BOD, total coliform, E-coli, total nitrogen, total phosphorus, heavy metals, temperature, DO, hydrocarbons,	Adjacent to construction sites (to be identified by the DSMC)	Twice a year (pre-monsoon and post-monsoon) during construction	National Drinking Water Quality Standards, 2006	Contractor

SN	Field	Stage	Parameters	Location	Frequency	Standards	Responsibility
			mineral oils, phenols, cyanide, temperature[a]				
4.	Treated Water quality	Operation phase	All NDWQS and WHO standard parameters, and follow whichever is more stringent.[a]	End of WTP line (after final disinfection)	Daily or as often as practicable.	National Drinking Water Quality Standards, 2006	WUSC
5.	Survival rate of landscaping, tree plantation	O&M phase	Survival rate	In the areas where re-plantation/ landscaping is proposed	Twice a year for 2 years	None	WUSC
6.	Community and occupational health and safety	Construction phase O&M phase	Incidence and types of health and safety issues	Work sites	Twice a year	Zero incidence	Contractor – construction phase WUSC or municipality – in the whole period of O&M of the plants.

BOD = Biochemical Oxygen Demand; DO = Dissolved Oxygen; DSMC = design, supervision, and management consultant, km = kilometer; NO_x = nitrogen oxide; O&M = operation and maintenance; PM_{10} = particles equal to or smaller than 10 microns; pH = potential of hydrogen; SO_2 = Sulphur Dioxide; TDS = total dissolved solids; TSS = total suspended solids; WTP = water treatment plant; WUSC = water users' sanitation committee.

[a] Depending on what parameters laboratories in Nepal can test or analyze.

D. Institutional Capacity Development Program

244. 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 or seminars.

245. WUSC does not have the capacity to monitor the quality of the water supplied as prescribed in NDWQS and its Directives. Although monitoring kits and laboratory rooms will be provided, it does not guarantee that WUSC would be able to handle them for effective monitoring. DWSS has five regional laboratories; however, some are not functioning well due to lack of human resources. For effective monitoring, it is recommended that a licensed and accredited laboratory be engaged in water quality monitoring during the first 2-3 years of operation during when WUSC will enhance its capacity by actively participating. After the engagement period and initial phase of "learning by doing", there should be continuing periodic training to sustain WUSC's capacity. The cost of monitoring during operation takes account of a licensed laboratory for water quality monitoring and training WUSC. A Water Safety Plan is included in the project design and will oblige the operator to carry out water quality monitoring accordingly. There will be sufficient funds to include training by the licensed and accredited laboratory while monitoring water quality.

246. The DRTAC-ESS will be responsible for environmental awareness training and management. Specific modules customized for the available skill set will be devised after assessing the capabilities of the target participants and the requirements of the project. Typical modules would be as follows: (i) sensitization; (ii) introduction to the environment and environmental considerations in water supply and wastewater projects; (iii) review of IEEs and integration into the project detailed design; (iv) improved coordination within nodal departments; and (v) monitoring and reporting system. The contractors will be required to conduct environmental awareness and orientation of workers before deployment to work sites. The proposed training program along with the frequency of sessions is presented in Table 36.

Table 36: Training Program for Environmental Management

Items	Pre-construction	Construction	
Training Title	Orientation workshop	Orientation program/ workshop for contractors and supervisory staff	Experiences and best practices sharing
Purpose	To make the participants aware of the environmental safeguard requirements of ADB and Government of Nepal and how the project will meet these requirements	To build the capacity of the staff for effective implementation of the designed EMPs aimed at meeting the environmental safeguard compliance of ADB and Government of Nepal	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 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

E. Staffing Requirement and Budget

247. Costs required for implementing 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.

248. 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 from PMO-ESS.

249. 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.

250. The operation phase for mitigation measures are good operating practices to mitigate the environmental impacts of this phase and the responsibility remains on WUSC. WUSC will conduct all monitoring during operation and maintenance. The Water Safety Plan, included in each project design, will allocate NRs500,000 annually for operation and maintenance particularly water quality monitoring. 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.

251. Its cost is separately included in the detailed cost estimate under General Works' category as a provisional sum. The cost of WSP during contract period is estimated as NRs10,00,000.00.

252. The indicative cost of EMP implementation is shown in Table 37.

Table 37: Indicative Cost of Environmental Management Plan Implementation

S. No.	Particulars	Stages	Unit	Total Number	Rate (NRs)	Cost (NRs)	Cost covered by
A.	Monitoring Measures						
1.	Air quality monitoring	- Pre-construction - Construction	Per location	4	100,000.00	400,000.00	Civil works contract
2.	Noise levels monitoring	- Pre-construction - Construction	Per location	4	30,000.00	120,000.00	Civil works contract
	Water quality monitoring	- Pre-construction - Construction - O&M	Per location	6 (pre-construction and construction)	100,000.00	600,000.00	Civil works contract (pre-construction and construction) WUSC – in the whole period of O&M of the plants.
B	Capacity Building						
1.	(i) Orientation workshop for officials involved in the project implementation on ADB Safeguards Policy Statement, Government of Nepal environmental laws and regulations, and environmental assessment process; (ii) induction course contractors, preparing them for 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 implementation; and (iii) lessons learned information sharing	Module 1 – immediately upon engagement of DSMC environmental specialists Module 2 – before award of civil works contracts (twice a year for 4 years) Module 3 – before start of Phase 2 and upon completion of the project	lump sum	1 8	Module 1 – 300000.00 Module 2 – 100000.00 Module 3 – 200000.00	300,000.00 800,000.00 200,000.00	DSMC
C.	Human Resources Costs						
1	ICG Environment Safeguard Assistants	Construction phase	1	20	25,000.00	500,000.00	DSMC
2	DSMC Environmental Safeguard Specialist	Responsible for environmental safeguards of the project at ICG level	person months (spread over entire project implementation period)	20	30,000.00	600,000.00	DSMC

S. No.	Particulars	Stages	Unit	Total Number	Rate (NRs)	Cost (NRs)	Cost covered by
D.	Administrative Costs						
1.	Legislation, permits, and agreements	Permit for excavation, tree-cutting permits, etc.	Lump sum		XXX	XXX	These consents are to be obtained by the contractor at his expense.
		Environmental assessment and environmental clearances as per EPA 1996 and EPR, IEE presentation at review committee related expenses	Lump sum	1	50,000	50,000.00	50,000
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	Lump sum		100,000.00	Covered under DSM Contract
2.	GRM implementation	Costs involved in resolving complaints (meetings, consultations, communication, and reporting/information dissemination)		Lump sum		100,000.00	PMO cost
3.	Any unanticipated impact due to project implementation	Mitigation of any unanticipated impact arising during construction		Lump sum	Contractor's liability	As per insurance requirement	Civil works contract – contractor's insurance defect liability period
TOTAL (Indicative and partial. To be finalized in the updated IEE)						**3,770,000.00**	

ADB = Asian Development Bank, DSMC = design, supervision and management consultant, EMP = environmental management plan, EPA = Environmental Protection Act, EPR = Environmental Protection Rules, GRM = grievance redress mechanism, ICG = implementation core group, IEE = initial environmental examination, PMO = project management office, O&M = operation and maintenance, WUSC = water users' and sanitation committee.

253. Hence, the total cost for EMP is estimated to be NRs2,000,000.00 which is included under General Works' category as a provisional sum in the detailed cost estimate of the proposed project.

Table 38: Proposed Topics for Capacity Building/Training

Topic				Target Participants	Timing
1.	By Environmental Specialists				
	1.1	Legal Framework		DWSS, PMO, WSSDO, ICG, RPMO, WUSC (15-18)	Early stage of Output 2
		▪	Relevant national laws, regulations and standards on executing agency and management		
		▪	ADB SPS 2009		
		▪	Executive agency and review procedure under the Project		
	1.2	Environmental Assessment			
		▪	Rapid environmental assessment		
		▪	Initial environmental examination		
	1.3	Some Aspects of executing agency Process and Environmental Management			
		▪	Meaningful consultation and info disclosure		
		▪	Grievance redress mechanism		
		▪	Environmentally responsible procurement		
		▪	Occupational and community health and safety		
	1.4	EMP Implementation, part 1		DWSS, PMO, WSSDO, ICG, RPMO, WUSC, (15-18)	Early stage of Output 2
		▪	Institution arrangements and responsibilities		
		▪	Environmental quality monitoring		
		▪	Emergency response		
	1.5	EMP Implementation, part 2			
		▪	Performance monitoring and indicators		
		▪	Environmental monitoring report		
2.	By External Experts				
	2.1	Other topics, such as:		MOWS, DWSS, PMO, ICG, WSSDO, RPMO, DSMC (30)	During Project's Capacity Devt. Program
		A	Good engineering and construction practices as mitigation measures		
		B	Climate change adaptation (applicable to eligible activities/works under the Project)		
			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 topics that may be suggested by MOWS, DWSS, PMO, ICG and WSSDO		

DWSS = Department of Water Supply and Sewerage, EMP = environmental management plan, ICG = implementation core group, MOWS = Ministry of Water Supply, PMO = project management office, RPMO = regional project management office, WSSDO = Water Supply and Sanitation Divisional Office, WUSC = water users' and sanitation committee.

X. MONITORING AND REPORTING

254. RPMO will monitor and measure the progress of EMP implementation. The monitoring activities will relate to the project's impacts that are identified in IEE. PMO, ICGs will compare the works completed and deviations from the original scope. They will also undertake site inspections

and review documents to verify that the project complies with the EMP.

255. RPMO 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. Project budgets will reflect the costs of monitoring and reporting requirements. For projects likely to have significant adverse environmental impacts during operation, reporting will continue on an annual basis. Monitoring reports will be posted in a location accessible to the public.

256. For projects likely to have significant adverse environmental impacts, the PMO will retain external experts to verify its monitoring information. PMO-ESS 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-ESO, with support from PMO-ESS.

257. ADB will review the project performance against MOWS's 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 visits to projects with adverse environmental or social impacts;
(ii) conduct supervision and 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 EAS to ensure that adverse impacts and risks are mitigated, as planned and as agreed with ADB;
(iv) work with EAS 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; 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.

258. ADB's monitoring and supervision activities are carried out on an on-going basis until a Project Completion Report (PCR) is issued. ADB issues a PCR within 1-2 years after the project is physically completed and in operation.

XI. CONCLUSION AND RECOMMENDATION

259. The proposed project is not an environmentally critical undertaking. IEE indicates that: The proposed project, and its components, is not located within or adjacent to environmentally sensitive areas.

260. The extent of adverse impacts is expected to be local, confined within the projects' main areas of influence, quarry or burrowing sites, waste disposal sites, and the routes to and from these sites. With mitigation measures in place and ensuring that the bulk of earthworks are completed before the onset of the rainy season, the potential adverse impacts during construction would be site-specific.

261. The few adverse impacts of moderate magnitude during construction will be temporary and short-term (i.e., most likely to occur only during peak construction activities). These will not be sufficient to threaten or weaken the surrounding resources. Mitigation measures, integral to

socially and environmentally responsible construction practices, are commonly used at construction sites and are well known to Contractors. Hence, mitigation measures would not be difficult to implement.

262. This IEE shall be updated based on the final detailed design and shall consider the following recommendations:

(i) Study of the impact of the water intakes to the aquatic ecology in the area, including fish survey in all surface water bodies where raw water will be drawn from;
(ii) Assessment of the amount of waste generated during the construction activities, including the volume of spoils and detailed information of disposal site;
(iii) Avoidance or minimal (when avoidance is not possible) cutting of trees;
(iv) Additional information on environmental audit of existing facilities, such as environmental clearances, results of water quality sampling, etc.;
(v) Determination of the users of river water downstream the proposed intake sources and assessment of any impact of the subproject on these users;

263. The updated IEE shall be submitted to ADB for final review and disclosure on ADB website. Ultimately, the updated IEE shall be attached to the bid and contract documents. No works shall commence until ADB clears the updated IEE, including the SEMP.

264. During operation, the potential delivery of unsafe water can be mitigated with good operation and maintenance, prompt action on leaks, and complying with the required quality monitoring of supplied water as prescribed in the National Drinking Water Quality Standards Directives.

265. The proposed project will bring about: (i) the benefits of access to a reliable supply of safe and potable water; (ii) promotion of good hygiene and sanitation practices and reduced health and safety risks as positive impacts; and (iii) enhanced community health, improved quality of life and safe communities as outcomes.

266. Based on the above findings, the classification of the Charikot water supply subroject Category B is confirmed, and no further special study or detailed EIA needs to be undertaken.

XII. LITERATURE REVIEWED

(i) Constitution of Nepal (2015). Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu

(ii) District Development profile of Nepal 2010/11 with VDC Profile. A Socio-Economic Development

(iii) District Health Office, Dolakha 2062/63

(iv) Environment Protection Act, (1997). Ministry of Science, Technology and Environment Kathmandu

(v) Environment Protection Rules, (1997), Ministry of Science, Technology, and Environment, Kathmandu

(vi) Environment Statistics of Nepal, CBS, 2011

(vii) Environmental Impact Assessment Guidelines, (1993). National Conservation Strategy Implementation Project, National Planning Commission, His Majesty's Government, Nepal

(viii) Final Feasibility Study of Charikot Water Supply and Sanitation Project, 2015

(ix) Detailed Engineering Design Report of Charikot Water Supply Sub-Project, 2016

(x) Labor Act (1991), Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu

(xi) Local Self-Governance Act, (1999). Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu

(xii) Ministry of Population and Environment, 1999.Environmental Protection Act, 1997 and Environment Protection Rules, 1999. (Amendment, 1999). Ministry of Law, Justice and Parliament Affairs, Nepal

(xiii) VDCs and Municipalities profile and baseline information of Dolakha, and National Population and Housing 2011, CBS, 2012

(xiv) National Transport Policy, (2001). Ministry of Physical Infrastructure and Transport, Government of Nepal, Nepal

(xv) National Urban Policy (2007). Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu

(xvi) Shrestha K 1998. Dictionary of Nepalese Plant names. Mandala Book Point, Kathmandu, Nepal.

(xvii) Solid Waste Management Act (2011). Ministry of Science and Technology and Environment, Kathmandu

(xviii) The Updated Fifteen-Year Development Plan for Small Towns' Water Supply and Sanitation Sector,2009

(xix) Uprety, B.K (2003). Safeguard the Resources, Environmental Impact Assessment Process and Practice, Kathmandu

(xx) Water Resource Act (1992). Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu

RAPID ENVIRONMENTAL ASSESSMENT CHECKLIST CHARIKOT TOWN PROJECT AND PRELIMINARY CLIMATE RISK SCREENING CHECKLIST FOR SAMPLE PROJECT TOWNS

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 (SDES) for endorsement by the Director, SDES 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: Third Small Towns Water Supply and Sanitation Sector Project**

Subproject: **Charikot Water Supply and Sanitation project**

Screening Questions	Yes	No	Remarks
A. Project Siting: Is the project area			
Densely populated?		√	Charikot town has a moderate population density.
Heavy with development activities?		√	
Adjacent to or within any environmentally sensitive areas?			
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?		√	It is a gravity system; hence, there is no requirement of 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?		√	

Screening Questions	Yes	No	Remarks
Unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?	√		Water Treatment proposed in detailed design and water quality monitoring in EMP will ensure the water supply as prescribed in the NDWQS & its Directives.
Delivery of unsafe water to distribution system?	√		Water Treatment proposed in detailed design, water quality monitoring and continuous trainings to WUSC as stated in EMP will ensure the water supply as prescribed in the NDWQS & its Directives.
Inadequate protection of intake works or wells, leading to pollution of water supply?	√		Design proposes housing for intake wells, and perimeter fencing of the intake wells
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?		√	
Inadequate disposal of sludge from water treatment plants?	√		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?		√	Transmission lines and access roads will not be affected. As stated in EMP, Impaired access roads will be repaired, as appropriate.
Health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.	√		EMP provides measures to mitigate health and safety impacts from improper handling, potential accidents or human error in dosing.
Health and safety hazards to workers from handling and management of chlorine used for disinfection, other contaminants, and biological and physical hazards during project construction and operation?	√		EMP provides measures to mitigate health and safety impacts from improper handling, potential accidents or human error in dosing.
Dislocation or involuntary resettlement of people?		√	
Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		√	
Noise and dust from construction activities?	√		EMP provides mitigation measures.
Increased road traffic due to interference of construction activities?	√		EMP provides mitigation measures.
Continuing soil erosion/silt runoff from construction operations?		√	
Delivery of unsafe water due to poor O&M treatment processes (especially mud accumulations in filters) and	√		EMP incorporates monitoring of distributed water according to the Directives for the NDWQS.

Screening Questions	Yes	No	Remarks
inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?			
Delivery of water to distribution system, which is corrosive due to inadequate attention to the feeding of corrective chemicals?	√		EMP provides mitigation measures.
Accidental leakage of chlorine gas?		√	Regular and Effective Monitoring during operation phase should be strictly carried out
Excessive abstraction of water affecting downstream water users?		√	
Competing uses of water?		√	
Increased sewage flow due to increased water supply	√		EMP provides mitigation measures.
Increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant		√	This is not applicable for this project as this covers only water supply components.
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)?		√	

CHARIKOT TOWN-WATER SUPPLY NO MITIGATION SCENARIO CHECKLIST

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

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

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?
1.19	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?			
1.22	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?	No		
1.23	Stream crossings?	Yes	It may affect the integrity of biological habitat of the encountered rivers & streams.	No, care will be taken during laying of transmission line.
1.24	Abstraction or transfers of water from ground or surface waters?	Yes	It will abstract water from surface water sources i.e., river which may affect the availability of water.	No, design of this system has been done on the basis of assessment of water resources.
1.25	Changes in water bodies or the land surface affecting drainage or run-off?	No		
1.26	Transport of personnel or materials for construction, operation or decommissioning?	Yes	Will generate dust and noise by vehicles for transportation of construction materials	No, because transportation of materials will be intermittent.
1.27	Long term dismantling or decommissioning or restoration works?	No		
1.28	Ongoing activity during decommissioning which could have an impact on the environment?	No		
1.29	Influx of people to an area in either temporarily or permanently?	No		
1.30	Introduction of alien species?	No		
1.31	Loss of native species or genetic diversity?	No		
1.32	Any other actions?	No		

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?	No		
2.2	Water?	No		
2.3	Minerals?	No		
2.4	Aggregates?	No		
2.5	Forests and timber?	No		
2.6	Energy including electricity and fuels?	No		
2.7	Any other resources?	No		
3. Will the Project involve use, storage, transport, handling or production of substances or materials 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 (e.g. insect or water borne diseases)?	Yes	The surroundings of the worker's camp may be affected as they may not have access to safe supply of water and good sanitation practice.	No because it is limited to construction period only and it can also be avoided by provision of safe access to water, sanitation and health care
3.3	Will the project affect the welfare of people e.g. by changing living conditions?	No		
3.4	Are there especially vulnerable groups of people who could be affected by the project e.g. hospital patients, the elderly?	No		
3.5	Any other causes?	No		
4. Will the Project produce solid wastes during construction or operation or decommissioning?				
4.1	Spoil, overburden or mine wastes?	Yes	The spoil if not readily disposed at safe site, it will occupy the land and may create discomfort to the passer-by.	No, because it is short term and can also be avoided by provision of immediate disposal of the spoils at safe site
4.2	Municipal waste (household and or commercial wastes)?	Yes	The living environment of worker's camp may be polluted by the waste generated by the workers.	No, it is short term

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?
4.3	Hazardous or toxic wastes (including radioactive wastes)?	No		
4.4	Other industrial process wastes?	No		
4.5	Surplus product?	No		
4.6	Sewage sludge or other sludge from effluent treatment?	No		
4.7	Construction or demolition wastes?	Yes	Air Pollution by the dust generated from the wastes Discomfort to the passer-by if the wastes are not safely disposed	No, because it is limited to the construction phase only and there will be provision of immediate waste disposal
4.8	Redundant machinery or equipment?	No		
4.9	Contaminated soils or other material?	No		
4.10	Agricultural wastes?	No		
4.11	Any other solid wastes?	No		
5. Will the Project release pollutants or any hazardous, toxic or noxious substances to air?				
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources?	No		
5.2	Emissions from production processes?	No		
5.3	Emissions from materials handling including storage or transport?	Yes	Dust generation by the unloading of materials like cement, aggregates etc.	No -there will be regular monitoring
5.4	Emissions from construction activities including plant and equipment?	Yes	Dust generation by construction works like earthworks	No -there will be regular monitoring
5.5	Dust or odours from handling of materials including construction materials, sewage and waste?	Yes	Air pollution by the dust generation during unloading of materials like aggregates.	No -there will be regular monitoring
5.6	Emissions from incineration of waste?			
5.7	Emissions from burning of waste in open air (eg slash material, construction debris)?	Yes	The locality of the worker's camp may be affected by the open burning of waste generated from the worker's camp.	No, because it is limited to the local area only and is limited to the duration up to which the labours will be residing.
5.8	Emissions from any other sources?	No		
6. Will the Project cause noise and vibration or release of light, heat energy or electromagnetic radiation?				

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?
6.1	From operation of equipment eg engines, ventilation plant, crushers?	No		
6.2	From industrial or similar processes?	No		
6.3	From construction or demolition?	Yes	The noise generated from the demolition of ROW for distribution lines may disturb the people residing at core bazaar area.	No because it is short term (limited to construction phase)
6.4	From blasting or piling?	No		
6.5	From construction or operational traffic?	Yes	Moving of vehicles carrying construction materials may affect core area like Charikot Bazaar	No- because it is short term
6.6	From lighting or cooling systems?	No		
6.7	From sources of electromagnetic radiation (consider effects on nearby sensitive equipment as well as people)?	No		
6.8	From any other sources?	No		
7. Will the Project lead to risks of contamination of land or water from releases of pollutants onto the ground or into sewers, surface waters, groundwater, coastal waters or the sea?				
7.1	From handling, storage, use or spillage of hazardous or toxic materials?	No		
7.2	From discharge of sewage or other effluents (whether treated or untreated) to water or the land?	Yes	The proposed project may attract people from rural areas that will increase the population of the project area which in turn increase the generation of municipal sewage	No, there will be provision of treatment facilities and there will be also regular monitoring of this issue.
7.3	By deposition of pollutants emitted to air, onto the land or into water?	Yes	The land nearby the workers camp may be polluted by the daily activities of the workers residing there temporarily.	No because there will be provision of strict monitoring of this area.
7.4	From any other sources?	No		
7.5	Is there a risk of long term 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,	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?
	handling, use or production of hazardous or toxic substances?			
8.2	From events beyond the limits of normal environmental protection e.g. failure of pollution control systems?	No		
8.3	From any other causes?	No		
8.4	Could the project be affected by natural disasters causing environmental damage (e.g. floods, earthquakes, landslip, etc)?	No		
9. Will the Project result in social changes, for example, in demography, traditional lifestyles, employment?				
9.1	Changes in population size, age, structure, social groups etc?	Yes	There is chance of in migration due to this project that will affect the existing community, cultural identity, economic conditions etc.	No, the ethnicity of project area is of heterogeneous type. So, in migration of new community may not affect the existing community groups' identity.
9.2	By resettlement of people or demolition of homes or communities or community facilities e.g. schools, hospitals, social facilities?	No		
9.3	Through in-migration of new residents or creation of new communities?	Yes	People from the neighbouring remote areas may migrate to this project town to achieve improved living standards and this may bring change in demography as the population of the project area may be increased.	No, despite of change in demography, the proposed project has been designed on the basis of prediction of population growth in the future i.e., for 20 years.
9.4	By placing increased demands on local facilities or 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.

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?
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 e.g. 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 e.g. 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 access to water supply and sanitation by this project may create opportunities for other development infrastructures.	Yes, because it will be the important factor for the sustainable development of the town.
9.5	Will the project have cumulative effects due to proximity to other existing or planned projects with similar effects?	No		

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

Question - Are there features of the local environment on or around the Project location which could be affected by the Project? • Areas which are protected under international or national or local legislation for their ecological, landscape, cultural or other value, which could be affected by the project?	Yes, the core Dolakha bazaar area may be susceptible to traffic congestion during distribution pipeline laying works that may provide discomfort to the passer-by and also may disrupt the access to the roadside shops and houses. Similarly, as the topography of the service area of this project is slightly sloped terrain, during pipeline laying

• Other areas which are important or sensitive for reasons of their ecology e.g. • Wetlands, • Watercourses or other waterbodies, • the coastal zone, • mountains, • forests or woodlands • Areas used by protected, important or sensitive species of fauna or flora e.g. for breeding, nesting, foraging, resting, overwintering, migration, which could be affected by the project? • Inland, coastal, marine or underground waters? • Areas or features of high landscape or scenic value? • Routes or facilities used by the public for access to recreation or other facilities? • Transport routes which are susceptible to congestion or which cause environmental problems? • Areas or features of historic or cultural importance?	works, there is possibility of erosion. Hence, it should be ensured that the trench for pipeline should not be abandoned and the contractor should be recommended to backfill the trench immediately.
Question - Is the Project in a location where it is likely to be highly visible to many people?	Yes. The project area is proposed to serve the Bhimeshwore municipality which includes the main market area due to which it will be highly visible to many people.
Question - Is the Project located in a previously undeveloped area where there will be loss of greenfield land?	No
Question - Are there existing land uses on or around the Project location which could be affected by the Project? For example: • Homes, gardens, other private property, • Industry, • Commerce, • Recreation, • public open space, • community facilities, • agriculture, • forestry, • tourism, • mining or quarrying	No
Question - Are there any plans for future land uses on or around the location which could be affected by the Project?	No
Question - Are there any areas on or around the location which are densely populated or built-up, which could be affected by the Project?	No
Question - Are there any areas on or around the location which are occupied by sensitive land uses which could be affected by the Project? • hospitals, • schools, • places of worship, • community facilities	No

Question - Are there any areas on or around the location which contain important, high quality or scarce resources which could be affected by the Project? For example: • groundwater resources, • surface waters, • forestry, • agriculture, • fisheries, • tourism, • minerals.	No
Question - Are there any areas on or around the location of the Project which are already subject to pollution or environmental damage e.g. where existing legal environmental standards are exceeded, which could be affected by the project?	No
Question - Is the Project location susceptible to earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions e.g. temperature inversions, fogs, severe winds, which could cause the project to present environmental problems?	No
Question - Is the Project likely to affect the physical condition of any environmental media? • The atmospheric environment including microclimate and local and larger scale climatic conditions? • Water – e.g. quantities, flows or levels of rivers, lakes, groundwater. Estuaries, coastal waters or the sea? • Soils – e.g. quantities, depths, humidity, stability or erodibility of soils? • Geological and ground conditions?	Yes, the sloped terrain of the project areas indicates the susceptibility to the soil erosion however if precautions are made, the effects can be made insignificant.
Question - Are releases from the Project likely to have effects on the quality of any environmental media? • Local air quality? • Global air quality including climate change and ozone depletion • Water quality – rivers, lakes, groundwater. Estuaries, coastal waters or the sea? • Nutrient status and eutrophication of waters? • Acidification of soils or waters? • Soils • Noise? • Temperature, light or electromagnetic radiation including electrical interference? • Productivity of natural or agricultural systems?	Yes, the construction activities may affect local air quality through dust emissions especially during dry season. It also generate noise pollution by the movement of vehicles for transporting materials, and demolition works of ROW for distribution pipe laying works.
Question - Is the Project likely to affect the availability or scarcity of any resources either locally or globally? • Fossil fuels? • Water?	No

• Minerals and aggregates? • Timber? • Other non-renewable resources? • Infrastructure capacity in the locality - water, sewerage, power generation and transmission, telecommunications, waste disposal roads, rail?	
Question - Is the Project likely to affect human or community health or welfare? • The quality or toxicity of air, water, foodstuffs and other products consumed by humans? • Morbidity or mortality of individuals, communities or populations by exposure to pollution? • Occurrence or distribution of disease vectors including insects? • Vulnerability of individuals, communities or populations to disease? • Individuals' sense of personal security? • Community cohesion and identity? • Cultural identity and associations? • Minority rights? • Housing conditions? • Employment and quality of employment? • Economic conditions? • Social institutions?	Yes, • This project may offer employment to the local people to involve as a construction worker. This can be viewed as positive impact of the project. • This project may also result in the occurrence or distribution of disease vector due to the temporary settlement of workers as they may not have access to safe water supply and sanitation. • Similarly, this project if properly implemented will have positive effect on the welfare of the local people as they will have safe and easy access to drinking water supply which will enhance their health. • Well planned water supply system of this town will also boost the economic condition of the project town.

Checklist 3: Significance of Impacts

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

Questions to be Considered	
17. Will it be difficult to avoid, or reduce or repair or compensate for the effect?	No

SAMPLE GRIEVANCE REDRESS FORM

(To be available in Nepalese and English)

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

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

FOR OFFICIAL USE ONLY

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

SEMI-ANNUAL ENVIRONMENTAL MONITORING REPORT TEMPLATE

I. INTRODUCTION

- Overall project description and objectives
- Environmental category as per ADB Safeguard Policy Statement, 2009
- Environmental category of each subproject as per national laws and regulations
- Project Safeguards Team

Name	Designation/Office	Email Address	Contact Number
1. PMU			
2. PIUs			
3. Consultants			

- Overall project and sub-project progress and status
- Description of subprojects (package-wise) and status of implementation (preliminary, detailed design, on-going construction, completed, and/or O&M stage)

Package Number	Components/List of Works	Status of Implementation (Preliminary Design/Detailed Design/On-going Construction/Completed/O&M)[a]	Contract Status (specify if under bidding or contract awarded)	If On-going Construction	
				%Physical Progress	Expected Completion Date

[a] If on-going construction, include %physical progress and expected date of completion.

II. COMPLIANCE STATUS WITH NATIONAL/STATE/LOCAL STATUTORY ENVIRONMENTAL REQUIREMENTS[a]

Package No.	Subproject Name	Statutory Environmental Requirements[b]	Status of Compliance[c]	Validity if obtained	Action Required	Specific Conditions that will require environmental monitoring as per Environment Clearance, Consent/Permit to Establish[d]

[a] All statutory clearance/s, no-objection certificates, permit/s, etc. should be obtained prior to award of contract/s. Attach as appendix all clearance obtained during the reporting period. If already reported, specify in the "remarks" column.
[b] Specify (environmental clearance? Permit/consent to establish? Forest clearance? Etc.)
[c] Specify if obtained, submitted and awaiting approval, application not yet submitted
[d] *Example: Environmental Clearance requires ambient air quality monitoring, Forest Clearance/Tree-cutting Permit requires 2 trees for every tree, etc.*

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 plan (refer to EMP TaBLES in APPROVED IEE/s)

- Confirm if IEE/s require contractors to submit site-specific EMP/construction EMPs. If not, describe the methodology of monitoring each package under implementation.

Package-wise Implementation Status

Package Number	Components	Design Status (Preliminary Design Stage/Detailed Design Completed)	Final IEE based on Detailed Design				Site-specific EMP (or Construction EMP) approved by Project Director? (Yes/No)	Remarks
			Not yet due (detailed design not yet completed)	Submitted to ADB (Provide Date of Submission)	Disclosed on project website (Provide Link)	Final IEE provided to Contractor/s (Yes/No)		

- Identify the role/s of Safeguards Team including schedule of on-site verification of reports submitted by consultants and contractors.
- For each package, provide name/s and contact details of contractor/s' nodal person/s for environmental safeguards.
- Include as appendix all supporting documents including **signed** monthly environmental site inspection reports prepared by consultants and/or contractors.
- With reference to approved EMP/site-specific EMP/construction EMP, complete the table below

- Provide the monitoring results as per the parameters outlined in the approved EMP (or site-specific EMP/construction EMP when applicable).
- In addition to the table on EMP implementation, the main text of the report should discuss in details the following items:
  - (i) **Grievance Redress Mechanism.** Provide information on establishment of grievance redress mechanism and capacity of grievance redress committee to address project-related issues/complaints. Include as appendix Notification of the GRM (town-wise if applicable).
  - (ii) **Complaints Received during the Reporting Period.** Provide information on

number, nature, and resolution of complaints received during reporting period. Attach records as per GRM in the approved IEE. Identify safeguards team member/s involved in the GRM process. Attach minutes of meetings (ensure English translation is provided).

- Confirm if any dust was noted to escape the site boundaries and identify dust suppression techniques followed for site/s.
- Identify muddy water was escaping site boundaries or muddy tracks were seen on adjacent roads.
- Identify type of erosion and sediment control measures installed on site/s, condition of erosion and sediment control measures including if these were intact following heavy rain;
- Identify designated areas for concrete works, chemical storage, construction materials, and refueling. Attach photographs of each area.
- Confirm spill kits on site and site procedure for handling emergencies.
- Identify any chemical stored on site and provide information on storage condition. Attach photograph.
- Describe management of stockpiles (construction materials, excavated soils, spoils, etc.). Provide photographs.
- Describe management of solid and liquid wastes on-site (quantity generated, transport, storage and disposal). Provide photographs.
- Provide information on barricades, signages, and on-site boards. Provide photographs.
- Provide information on
- Checking if there are any activities being under taken out of working hours and how that is being managed.

Summary of Environmental Monitoring Activities (for the Reporting Period)[a]

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						

[a] Attach Laboratory Results and Sampling Map/Locations.

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 and 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; and
- 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

Site No.	Date of Testing	Site Location	Parameters (Monitoring Results)		
			PM10 $\mu g/m^3$	SO2 $\mu g/m^3$	NO2 $\mu g/m^3$

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

Site No.	Date of Sampling	Site Location	Parameters (Monitoring Results)					
			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

Site No.	Date of Testing	Site Location	LA_{eq} (dBA) (Monitoring Results)	
			Day Time	Night Time

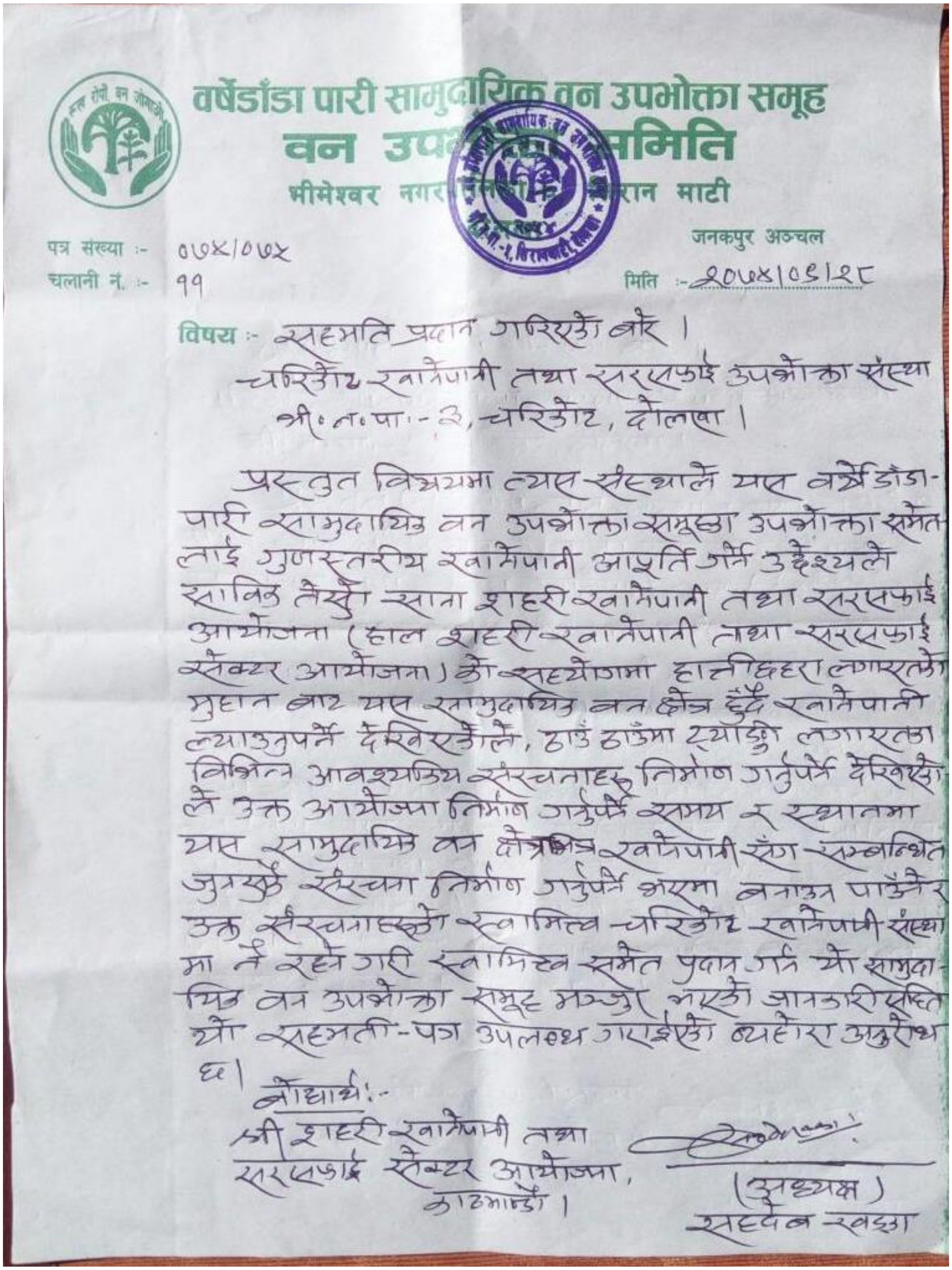
SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

- Summary of follow up time-bound actions to be taken within a set timeframe.

APPENDIXES

- Photos
- Summary of consultations
- Copies of environmental clearances and permits
- Sample of environmental site inspection report
- Other

NO OBJECTION LETTER AND MINUTES OF MEETING



वर्षेडांडा पारी सामुदायिक वन उपभोक्ता समूह
वन उप[...] समिति
भीमेश्वर नगर[...] [...]रान माटी
जनकपुर अञ्चल

पत्र संख्या :- ०७४/०७५
चलानी नं. :- ११
मिति :- २०७४/०६/२८

विषय :- सहमति प्रदान गरिएको बारे ।

चरिकोट खानेपानी तथा सरसफाई उपभोक्ता संस्था
भी.न.पा.-३, चरिकोट, दोलखा ।

प्रस्तुत विषयमा त्यस संस्थाले यस वर्षेडांडा-पारी सामुदायिक वन उपभोक्ता समूहका उपभोक्ता समेतलाई गुणस्तरीय खानेपानी आपूर्ति गर्ने उद्देश्यले साविक तेस्रो साना शहरी खानेपानी तथा सरसफाई आयोजना (हाल शहरी खानेपानी तथा सरसफाई सेक्टर आयोजना) को सहयोगमा हात्तीढुङ्गा लगायतको मुहान बाट यस सामुदायिक वन क्षेत्र हुँदै खानेपानी ल्याउनुपर्ने देखिएकोले, ठाउँ ठाउँमा ट्याङ्की लगायतका विभिन्न आवश्यकिय संरचनाहरु निर्माण गर्नुपर्ने देखिएको ले उक्त आयोजना निर्माण गर्नुपर्ने समय र स्थानमा यस सामुदायिक वन क्षेत्रभित्र खानेपानी सँग सम्बन्धित जुनसुकै संरचना निर्माण गर्नुपर्ने भएमा बनाउन पाउने र उक्त संरचनाहरुको स्वामित्व चरिकोट खानेपानी संस्था मा नै रहने गरी स्वामित्व समेत प्रदान गर्न यो सामुदायिक वन उपभोक्ता समूह मन्जुर भएको जानकारी सहित यो सहमती-पत्र उपलब्ध गराईएको व्यहोरा अनुरोध छ ।

बोधार्थ :-
श्री शहरी खानेपानी तथा सरसफाई सेक्टर आयोजना,
काठमाडौं ।

[signature]
(अध्यक्ष)
सहदेव खड्का

No Objection Letter from Municipality and Community Forest User Committee

Shree BarsedandaPari Community Forest User Committee
Bhimeshwor Municipality 4, Mati, Dolakha

Letter no.2074/75-10 Date: 2074/9/28

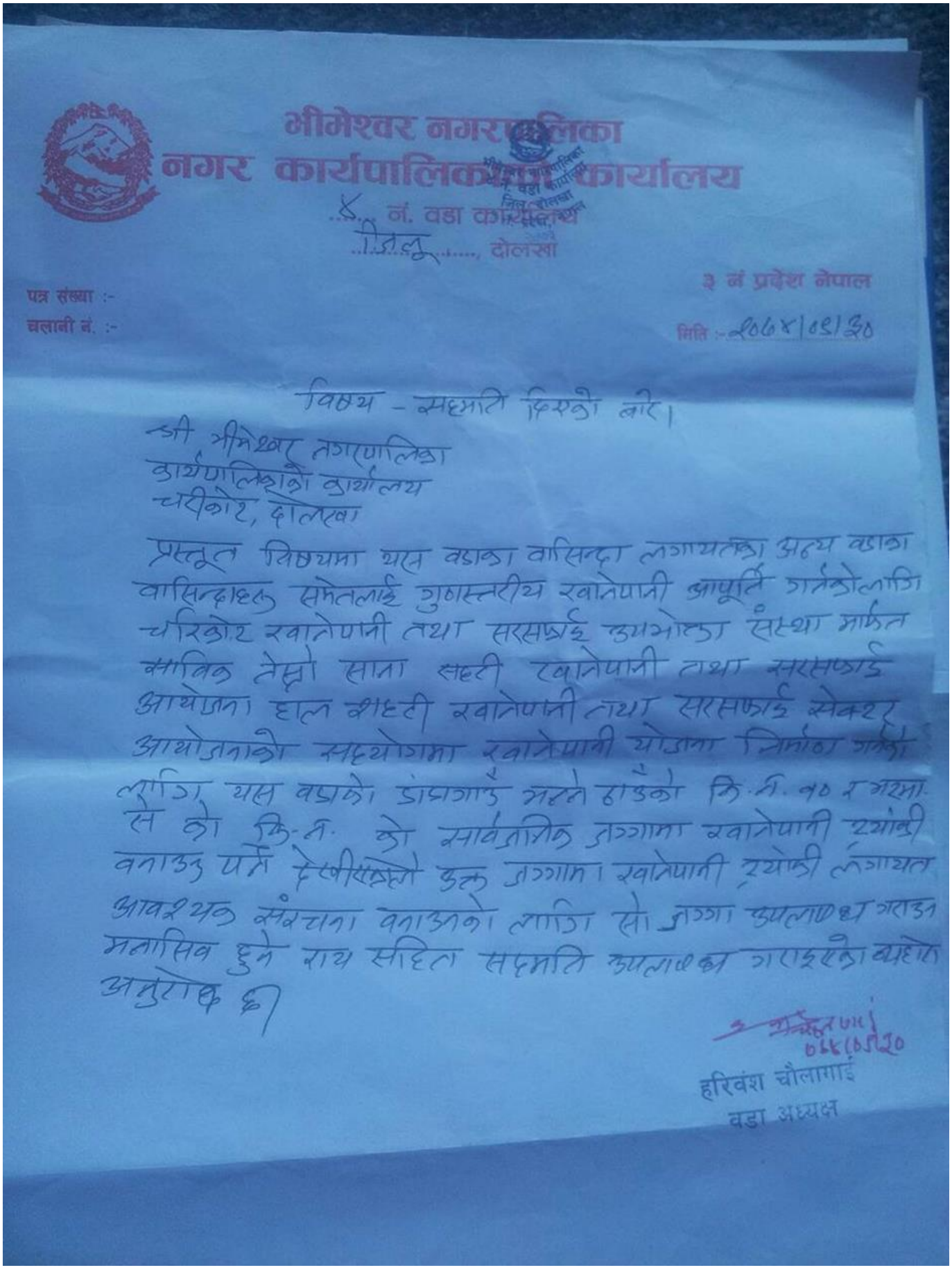
Subject: **About the consent paper**

Shree Charikot Small Town Water Supply and Sanitation Users Committee
Bhimeshwor 3, Charikot

In subject matter, The Former Third Small Town Water Supply and Sanitation Sector Project.Now Urban Water Supply and Sanitation Sector Project. Under the leadership of WUSCCarikot going to implement a water supply project in Bhimeshwor Municipality through the financing by TSTWSSSP. The water supply source is HattichaharaJhaprekhola and Dhungekhola. From this source, the transmission pipeline has to be passed through this community forest and construction of RVT and other necessary structures in the forest area. We are the Shree BarsedandaPari Community Forest User Committee, in the response to the land demand by WUSC. The community forest user committee declared that all necessary structure and pipeline construction work within the forest land all are acceptable for Community forest user committee. So we are ready to provide required land for water supply project. After the construction of the structure and other pipeline works the properties right goes to WUSC. The community forest User committee providing consensus letter to CharikotWUSC.

CC: M/s Urban Drinking Water and Sanitation Sector Project, Kathmandu

Shahadev Khadka
Chairman Forest User Committee



भीमेश्वर नगरपालिका
नगर कार्यपालिकाको कार्यालय
४ नं. वडा कार्यालय
जिलु, दोलखा

३ नं. प्रदेश नेपाल

पत्र संख्या :-
चलानी नं. :-

मिति :- २०७४/०५/३०

विषय - सहमति दिएको बारे।

श्री भीमेश्वर नगरपालिका
कार्यपालिकाको कार्यालय
चरीकोट, दोलखा

प्रस्तुत विषयमा यस वडाका वासिन्दा लगायतका अन्य वडाका वासिन्दाहरू समेतलाई गुणस्तरीय खानेपानी आपूर्ति गर्नेकोलागि चरिकोट खानेपानी तथा सरसफाई उपभोक्ता संस्था मार्फत साविक तेस्रो साना सहरी खानेपानी तथा सरसफाई आयोजना हाल शहरी खानेपानी तथा सरसफाई सेक्टर आयोजनाको सहयोगमा खानेपानी योजना निर्माण गर्नका लागि यस वडाको डाँडागाउँ मल्ले डाँडको कि.नं. ५० र गरमा. से को कि.नं. को सार्वजनिक जग्गामा खानेपानी ट्यांकी बनाउनु पर्ने देखिएकाले उक्त जग्गामा खानेपानी ट्यांकी लगायत आवश्यक संरचना बनाउनको लागि सो जग्गा उपलब्ध गराउन मनासिब हुने राय सहित सहमति उपलब्ध गराइएको व्यहोरा अनुरोध छ।

[illegible]
०७४/०५/२०
हरिवंश चौलागाईं
वडा अध्यक्ष

Bhimeshwor Municipality
Municipal Executive Office
Ward No. 4 Office.Jilu, Dolakha

State no. 3
Date: 2074.9.30

Subject: About the consent paper

To:
Bhimeshwor Municipalit
Executive Office
Charikot, Dolakha

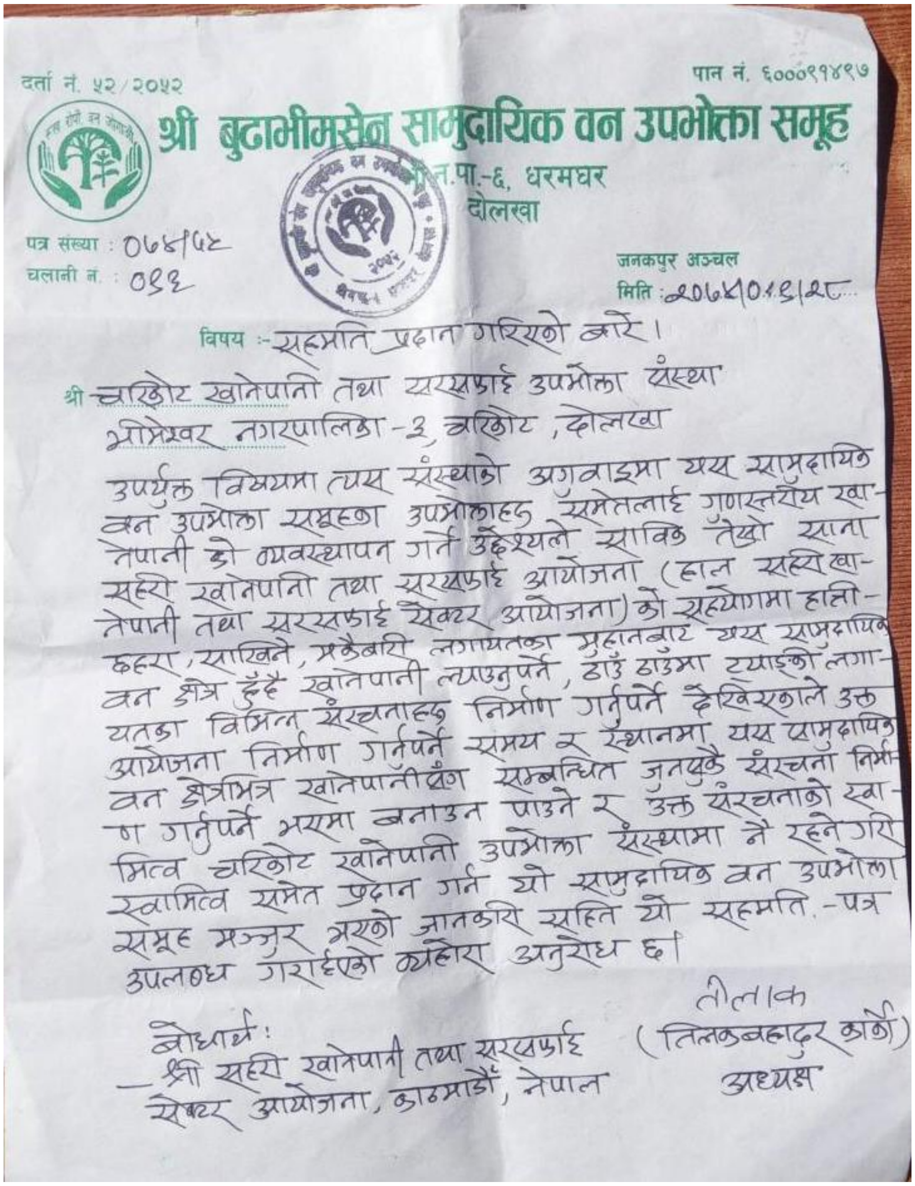
On the subject matter, a resident of ward number four and including other wards to serve potable drinking water the Charikot Water Supply and Sanitation User Committee have to construct water Reservoir Tank (RVT) and other associated structures in the Dandagun area. The suitable land is government own public land plot no 10 of the same ward. The said land construction of RVT and other necessary structures, the ward number four of Vimeshowar Municipality has provided a consensus letter to the water supply project by truly and honestly.
Name of the project:

Third Small Town Water Supply and Sanitation project.

Now: Urban Drinking Water and Sanitation Sector Project.

CC: M/s Urban Drinking Water and Sanitation Sector Project, Kathmandu

Haribamsa Chaulagain
Chairperson, Ward no. 4



दर्ता नं. ५२/२०५२ पान नं. ६०००९१४९७

श्री बुढाभीमसेन सामुदायिक वन उपभोक्ता समूह

न.पा.-६, धरमघर
दोलखा
जनकपुर अञ्चल

पत्र संख्या : ०६४/६५
चलानी नं. : ०१६

मिति : २०६४/०१/२८

विषय :- सहमति प्रदान गरिएको बारे ।

श्री चरिकोट खानेपानी तथा सरसफाई उपभोक्ता संस्था
भीमेश्वर नगरपालिका-३, चरिकोट, दोलखा

उपर्युक्त विषयमा त्यस संस्थाको अगुवाइमा यस सामुदायिक
वन उपभोक्ता समूहका उपभोक्ताहरु समेतलाई गुणस्तरीय खा-
नेपानी को व्यवस्थापन गर्ने उद्देश्यले साविक तेस्रो साना
सहरी खानेपानी तथा सरसफाई आयोजना (हाल सहरी खा-
नेपानी तथा सरसफाई सेक्टर आयोजना) को सहयोगमा हाली-
दहरा, साखिने, मकैबारी लगायतका मुहानबाट यस सामुदायिक
वन क्षेत्र हुँदै खानेपानी ल्याउनुपर्ने, ठाउँ ठाउँमा ट्याङ्की लगा-
यतका विभिन्न संरचनाहरु निर्माण गर्नुपर्ने देखिएकाले उक्त
आयोजना निर्माण गर्नुपर्ने समय र स्थानमा यस सामुदायिक
वन क्षेत्रभित्र खानेपानीसँग सम्बन्धित जुनसुकै संरचना निर्मा-
ण गर्नुपर्ने भएमा बनाउन पाउने र उक्त संरचनाको स्वा-
मित्व चरिकोट खानेपानी उपभोक्ता संस्थामा नै रहने गरि
स्वामित्व समेत प्रदान गर्न यो सामुदायिक वन उपभोक्ता
समूह मञ्जुर भएको जानकारी सहित यो सहमति-पत्र
उपलब्ध गराईएको व्यहोरा अनुरोध छ ।

तीलक
(तिलकबहादुर कार्की)
अध्यक्ष

बोधार्थ :
— श्री सहरी खानेपानी तथा सरसफाई
सेक्टर आयोजना, काठमाडौं, नेपाल

Shree BhudhaBhimsen Community Forest User Committee
Bhimeshwor Municipality 6, Dharamghar, Dolakha
Subject: About the consent paper

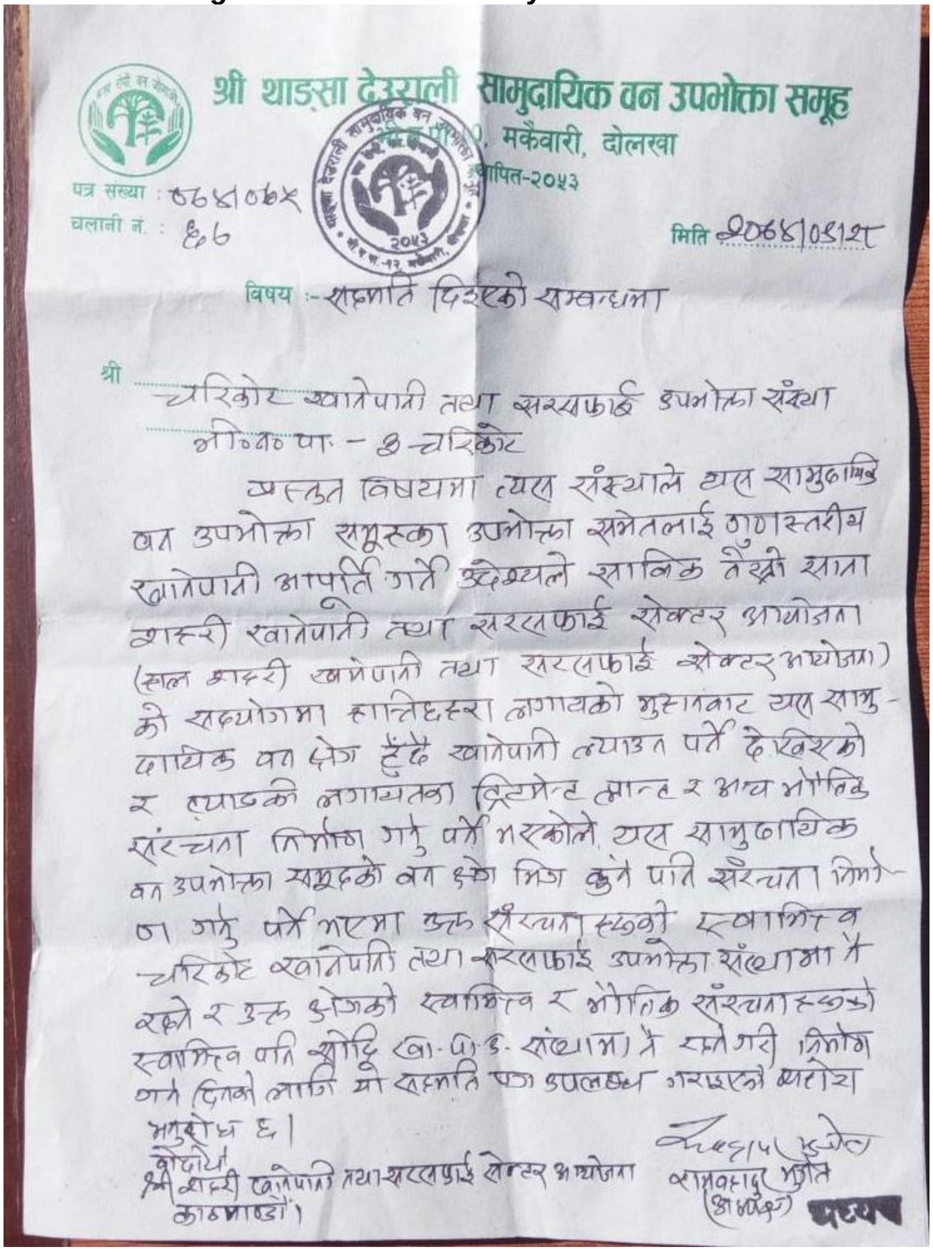
Shree Carikot Small Town water supply and Sanitation User Committee
Bhimeshwor 3, Charikot

In subject matter, The Former Third Small Town Water Supply and Sanitation Sector Project. Now Urban Water Supply and Sanitation Sector Project. Under the leadership of WUSC Carikot going to implement a water supply project in Bhimeshwor Municipality through the financing by TSTWSSSP. The water supply source is Hattichahara and Makaibari. From this source, the transmission pipeline has to be passed through this community forest and construction of RVT and other necessary structures in the forest area. We are the Shree Bhudha Bhimsen community forest User Committee, in the response to the land demand by WUSC. The community forest user committee declared that all necessary structure and pipeline construction work within the forest land all are acceptable for Community forest user Committee, So we are ready to provide required land for water supply project. After the construction of the structure and other pipeline works the properties right goes to WUSC. The community forest User committee providing consensus letter to Charikot WUSC.

CC: M/s Urban Drinking Water and Sanitation Sector Project, Kathmandu

Tilak Bahadur Karki
Chairman Forest User Committee

Shree Thangse Deurali Community Forest User Commiittee



श्री थाङ्सा देउराली सामुदायिक वन उपभोक्ता समूह

[illegible], मकैवारी, दोलखा

स्थापित-२०५३

पत्र संख्या : ०६८।०६९

चलानी नं. : ६६

मिति २०६८।०५।१८

विषय :- सहमति दिइएको सम्बन्धमा

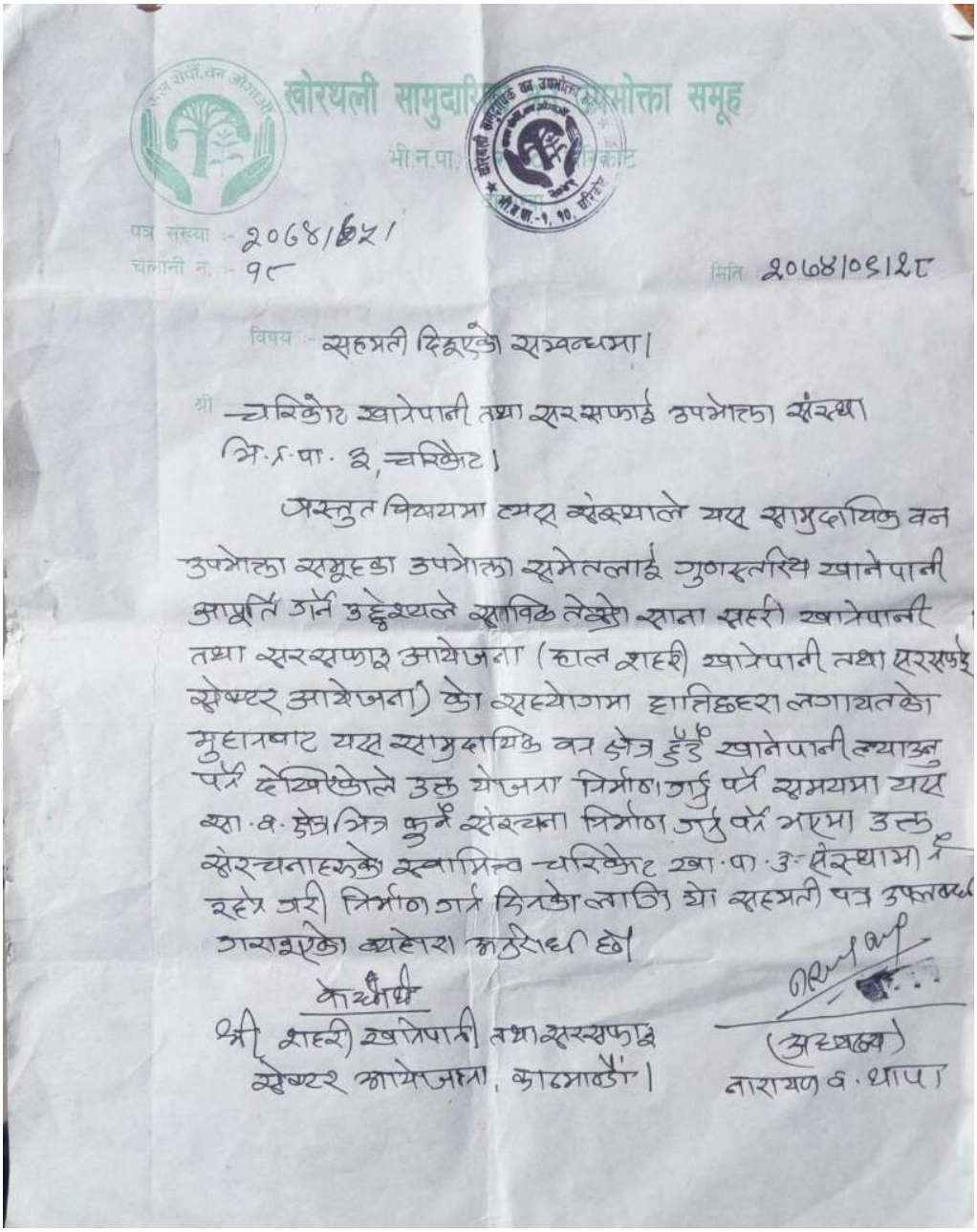
श्री चरिकोट खानेपानी तथा सरसफाई उपभोक्ता संस्था
भी.न.पा. - ३ चरिकोट

प्रस्तुत विषयमा त्यस संस्थाले यस सामुदायिक वन उपभोक्ता समूहका उपभोक्ता समेतलाई गुणस्तरीय खानेपानी आपूर्ति गर्ने उद्देश्यले साविक तेस्रो साना शहरी खानेपानी तथा सरसफाई सेक्टर आयोजना (हाल शहरी खानेपानी तथा सरसफाई सेक्टर आयोजना) को सहयोगमा हात्तिढुङ्गा लगायतको मुहानबाट यस सामुदायिक वन क्षेत्र हुँदै खानेपानी ल्याउन पर्ने देखिएको र ट्याङ्की लगायतका ट्रिटमेन्ट प्लान्ट र अन्य भौतिक संरचना निर्माण गर्नु पर्ने भएकोले यस सामुदायिक वन उपभोक्ता समूहको वन क्षेत्र भित्र कुनै पनि संरचना निर्माण गर्नु पर्ने भएमा उक्त संरचनाहरुको स्वामित्व चरिकोट खानेपानी तथा सरसफाई उपभोक्ता संस्थामा नै रहने र उक्त क्षेत्रको स्वामित्व र भौतिक संरचनाहरुको स्वामित्व पनि छोडि खा.पा.उ. संस्थामा नै रहने गरी निर्माण गर्न दिनको लागि यो सहमति पत्र उपलब्ध गराइएको व्यहोरा अनुरोध छ।

बोधार्थ
श्री शहरी खानेपानी तथा सरसफाई सेक्टर आयोजना
काठमाडौं।

[illegible]
रामबहादुर [illegible]
(अध्यक्ष)
अध्यक्ष

Shrees Khorthali Communittee Forest User Committee



खोरथली सामुदा[illegible] उपभोक्ता समूह

भी.न.पा. [illegible]

पत्र संख्या :- 2068/62/

चलानी न. :- 9८

मिति 2068/08/28

विषय :- सहमती दिइएको सम्बन्धमा।

श्री चरिकोट खानेपानी तथा सरसफाई उपभोक्ता संस्था

भि.न.पा. ६, चरिकोट।

प्रस्तुत विषयमा यस खोरथाले यस सामुदायिक वन उपभोक्ता समूहका उपभोक्ता समेतलाई गुणस्तरिय खानेपानी आपूर्ति गर्ने उद्देश्यले सार्वजनिक तेस्रो खाना सहरी खानेपानी तथा सरसफाइ आयोजना (ग्रामीण शहरी) खानेपानी तथा सरसफाई सेक्टर आयोजना) को सहयोगमा हात्तिछहरा लगायतको मुहानबाट यस सामुदायिक वन क्षेत्र हुँदै खानेपानी ल्याउन पर्ने देखिएकोले उक्त योजना निर्माण गर्नु पर्ने समयमा यस वा.व. क्षेत्र भित्र पर्ने संरचना निर्माण गर्नु पर्ने भएमा उक्त संरचनाहरुको स्वामित्व चरिकोट खा.प.उ. संस्थामा नै रहने गरी निर्माण गर्न सिफारिस गर्ने यो सहमती पत्र उपलब्ध गराइएको व्यहोरा अनुरोध छ।

कार्यालय

श्री शहरी खानेपानी तथा सरसफाई सेक्टर आयोजना, कास्कोट।

(अध्यक्ष)

नारायण ब. थापा

भीमेश्वर नगरपालिका कार्यालय
चरिकोट,दोलखा

पत्र संख्या : २०७२/०७३
चलानी नं. : 9680

मिति २०७२।०९।१९

विषय :– निर्णयको प्रतिलिपि पठाइएको वारे ।

श्री तेस्रो साना शहरी खानेपानी तथा सरसफाई आयोजना
पानीपोखरी, काठमाडौं ।

प्रस्तुत विषयमा यस नगरपालिकाको क्षेत्रमा संचालन हुने तेस्रो साना शहरी खानेपानी तथा सरसफाई आयोजना कार्यान्वयनका लागि एकीकृत तदर्थ समिति गठन गरी आवश्यक परियोजनाका सम्पूर्ण कार्यहरु कार्यान्वयनका लागि प्रक्रिया अगाडि बढाउन हुन उपभोक्ता भेलाको निर्णय प्रतिलिपि यसै पत्र साथ पठाइएको व्यहोरा अनुरोध छ ।

बोधार्थ :

श्री तेस्रो साना शहरी खानेपानी तथा सरसफाई आयोजना
क्षेत्रीय कार्यालय, ईटहरी
श्री अध्यक्ष, तेस्रो साना शहरी खानेपानी तथा सरसफाई आयोजना,
उपभोक्ता तदर्थ समिति, चरिकोट

२०७२/९/१९
रमाजी थापा

Bhimeshwore Municipality Office
Charikot, Dolakha

Date: 072-09-19

Letter no. 072/073, 1790

Subject: About a copy of the decision

Third Small Town Drinking Water and Sanitation Project
Panipokhari, Kathmandu
Presented subject herewith, to implement plan for the third small town drinking water and sanitation project to be operated in this municipal area by forming an integrated adherent committee for implementing the entire works of the projects by proceeding of the users gatherings a copy of decision accompanied by this request letter has been made.
CC
Regional Office, Itahari
Third Small Town and Sanitation Project

Chairman, Users committee
Third Small Town and Sanitation Project

Minutes of Meeting

English Translation of Minute of Meeting

Charikot Small Town Water Supply, Sanitation and User's Committee has organized a public meeting dated 04-5-2016 in the premises of Bhimeshwore Municipality compound under Chairperson of municipality's executive officer Mr. Sanjaya Bahadur Rajlawat. Participation was made from all concerned stakeholders. After discussion in the meeting, it was concluded that about program shall be launched in their town by UWSSP.

Participants

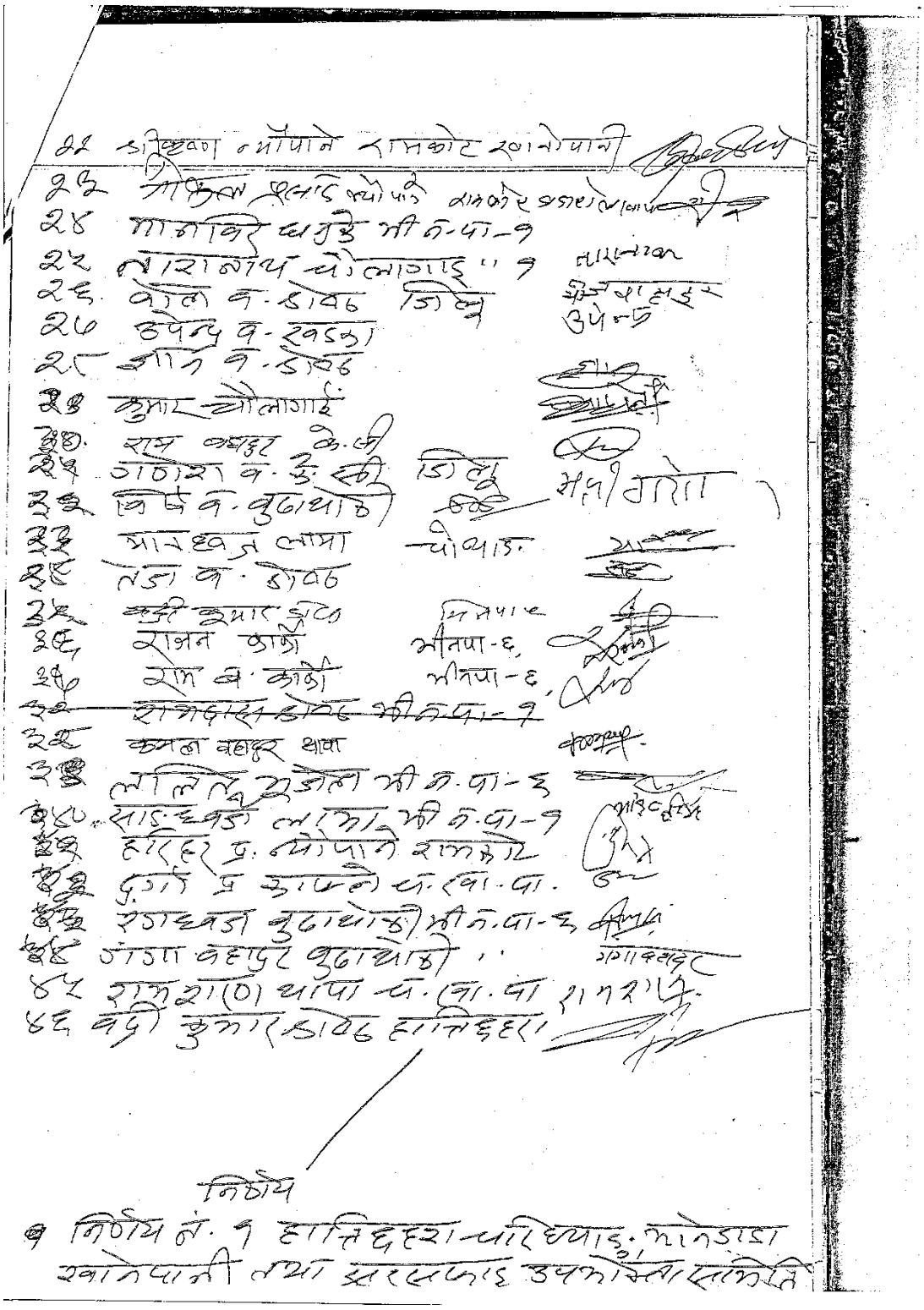
S. No.	Name of the Participants	Designation/Address
1	Mr.Sanjaya Bahadur Rajlawat	Chairman
2	Mr. RamKrishna KC	Charikot Drinking Water
3	Mr. Krishna Bahadur Karki	Hattichahara Drinking Water
4	Mr. Krishna Bahadur Khadka	Charikot Drinking Water
5	Mr. Kailash Shrestha	Hattichahara Drinking Water
6	Mr. Dhruba Basnet	Hattichahara Drinking Water
7	Mr. Anil Shrestha	Dolakha Drinking Water
8	Mr. Ram Prasad Sapkota	Jilu Drinking Water
9	Mr. Dawa Sherpa	Charikot Drinking Water
10	Ms. Roma Karki	S.T.
11	Ms. Krishna Kumari Thapa	
12	Ms. Rupa Bhujel (Shahi)	
13	Ms. Geeta KC	Bhimeshwor Municipality-10, Taganagi
14	Mr. Suku Shrestha	Treasurer, Drinking water committee
15	Mr. Ram Das Shrestha	Bhimeshwor Municipality
16	Mr. Lalbahadur Khadka	Chairman,Taganagi
17	Mr. Kabindra Das Shrestha	Bhimeshwor Municipality-07, Jilu
18	Mr. Jhamak Bahadur Basnet	
19	Mr. Yadav Prasad Dahal	Bhimeshwor Municipality-10, Taganagi
20	Mr. Dhan Bahadur Chaulagain	
21	Mr. Shree Krishna Neupane	Ramkot Drinking Water
22	Mr. Gokul Prasad Neupane	Ramkot Drinking Water
23	Mr. Manbir Dhanuke	Bhimeshwor Municipality-01
24	Mr. Taranath Chaulagai	Bhimeshwor Municipality-01
25	Mr. Bal Bahadur Shrestha	Bhimeshwor Municipality-07, Jilu
26	Mr. Gyan Bahadur Shrestha	Bhimeshwor Municipality-07, Jilu
27	Mr. Upendra Bahadur Khadka	Bhimeshwor Municipality-07, Jilu
28	Mr. Kumar Chaulagain	
29	Mr. Ram Bahadur KC	
30	Mr. Ganesh Bahadur KC	
31	Mr. Birsha Bahadur Budhathoki	
32	Mr. Mandhwoj Lama	Chothang
33	Mr. Tej Bahadur Shrestha	
34	Mr. Badri Kumar Shrestha	

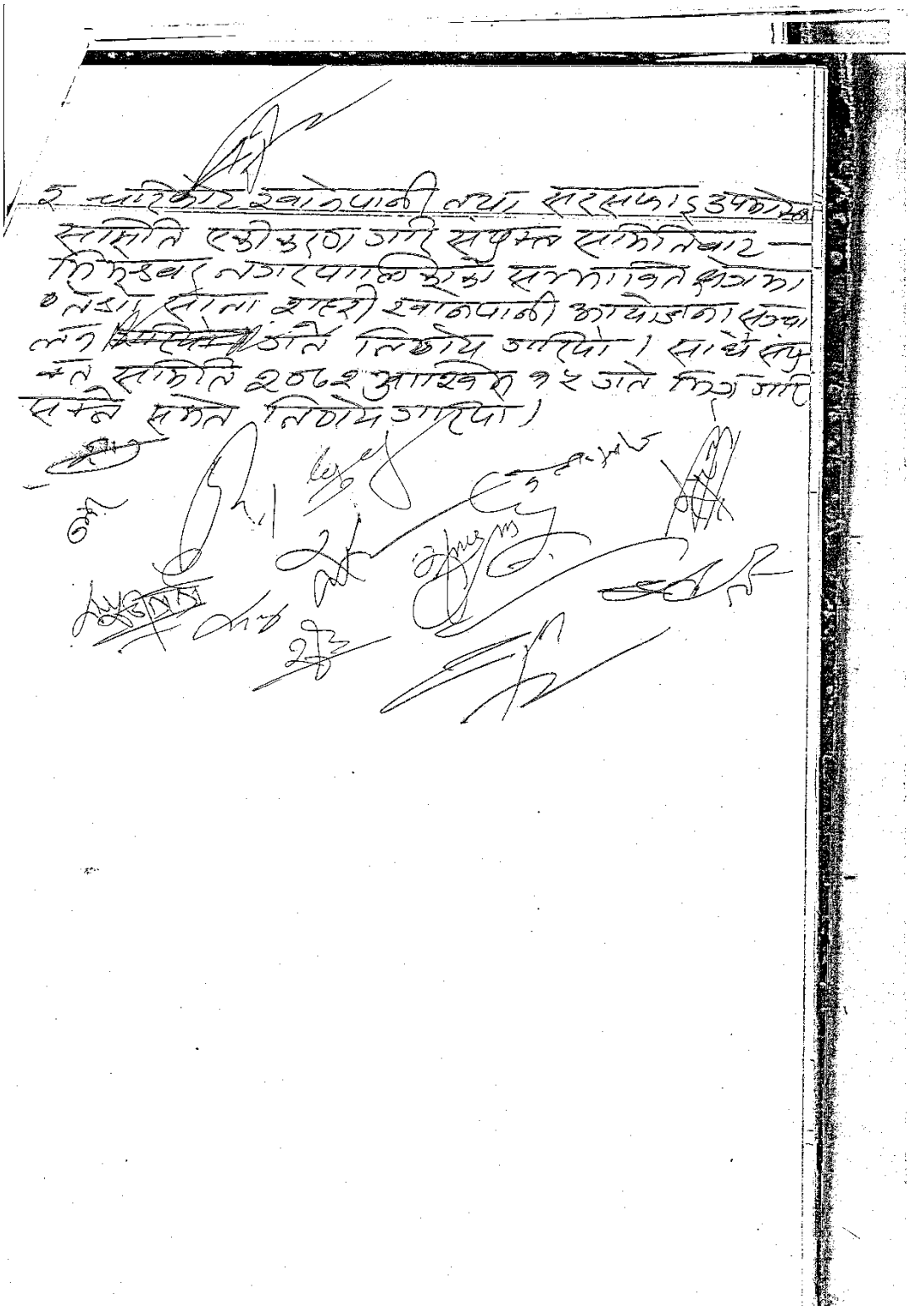
S. No.	Name of the Participants	Designation/Address
35	Mr. Rajan Karki	Bhimeshwor Municipality-06
36	Mr. Ram Bahadur Karki	Bhimeshwor Municipality-06
37	Mr. Kamal Bahadur Thawa	Kamal Bahadur Thawa
38	Mr. Lalit Bhujel	Lalit Bhujel… Bhimeshwor Municipality-07
39	Mr. Sangdhwoj Lama	Bhimeshwor Municipality-01
40	Mr. Harihar Prasad Neupane	Ramkot
41	Mr. Durga Prasad Kafle	Charikot Drinking Water
42	Mr. Ranga Dhwoj Budhathoki	Bhimeshwor Municipality-06
43	Mr. Ganga Bahadur Budhathoki	Bhimeshwor Municipality-06
44	Mr. Ram Sharan Thapa	Charikot Drinking Water
45	Mr. Badri Kumar Shrestha	Hattichahara

आज मिति २०६३ माघ ४ गते भिमेश्वर नगरपालिका भित्र खानेपानी तथा ढल व्यवस्थापन सम्बन्धमा गराउनको लागि विभिन्न खानेपानी उपभोक्ता समितिहरु मिली, भिमेश्वर नगरपालिकामा तेश्रो सामाजिक खानेपानी आयोजना सञ्चालन गर्ने यस नगरपालिकाका कार्यकारी अधिकृत श्री संजय बहादुर राउलवटको अध्यक्षतामा — तपसिल अनुसारका उपस्थितिमा तपसिलका अनुसारको प्रस्ताव माथी छलफल तपसिल अनुसारका निर्णय गरियो।

उपस्थिति

१ संजय बहादुर राउलवट अध्यक्ष
२ राम कृष्ण के. सी. चै. खा. पा.
३ कृष्ण बहादुर कार्की हाकिमहरा खा. पा.
४ कृष्ण बहादुर खड्का चै. खा. पा.
५ केशर [illegible] हाकिमहरा खा. पा.
६ ध्रुव बनेत '' ''
७ कान्छि [illegible] दोलखा खा. पा.
८ रामप्रसाद सापकोटा डिलु खा. पा.
९ दावा शेर्पा चै. खा. पा.
१० सोमा कार्की S. T.
११ कृष्ण कुमारी थापा
१२ माया मुक्तान (शाखी)
१३ गीता के.सी. भि.न.पा १० नागनागी
१४ [illegible]
१५ राजकाजी श्रेष्ठ भि.न.पा. — १
१६ लाल बहादुर खड्का चकलागी [illegible]
१७ रवीन्द्र लाल श्रेष्ठ भि.न.पा.-६ डिलु
१८ [illegible] ब. बनेत —
१९ [illegible]
२० यादव प्र. दहाल भि.न.पा.-१०
२१ धन बहादुर घोलागाउँ [illegible]





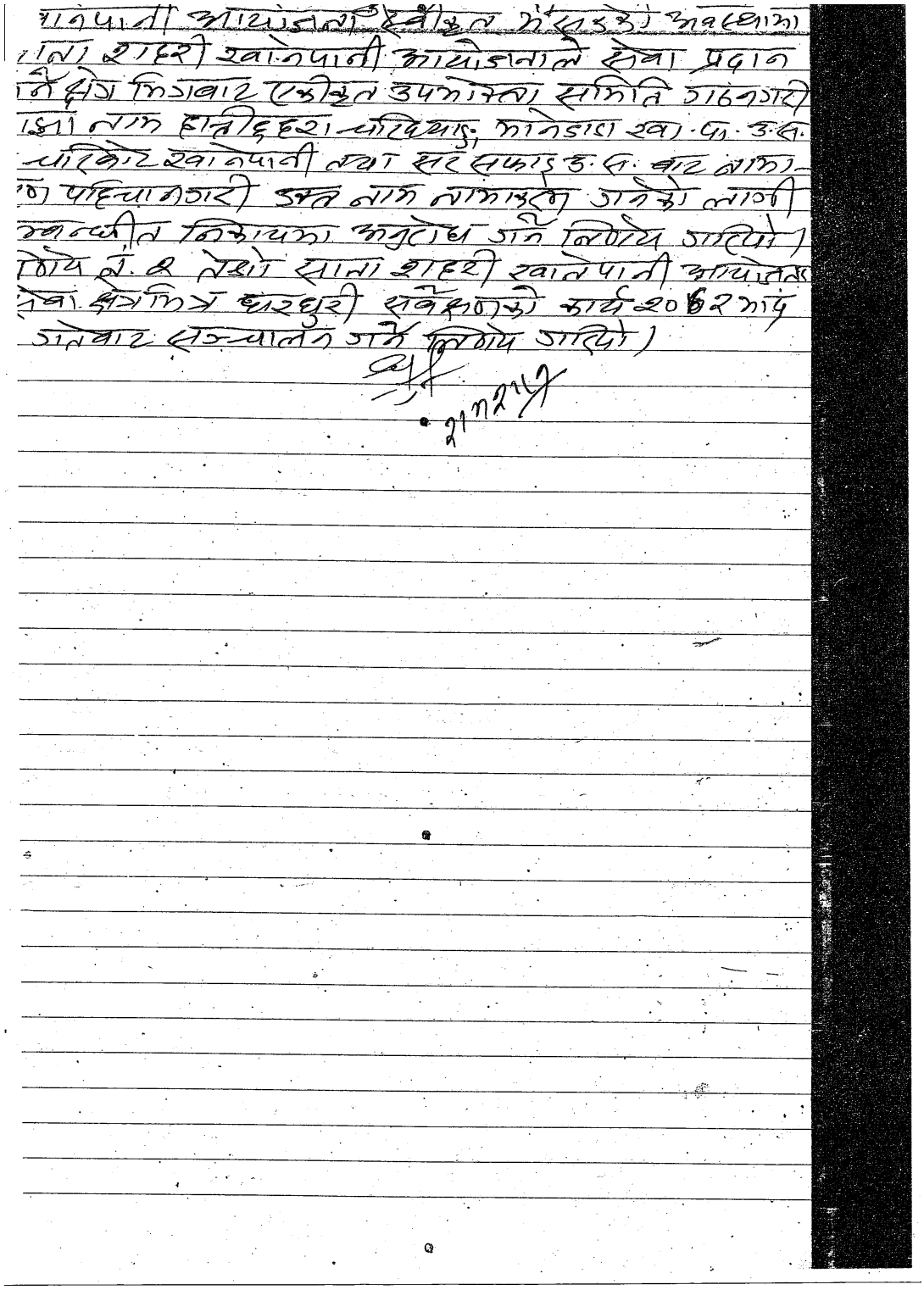
आज मिति २०६२ माघ ५ गते भिमेश्वर नगरपालिका भित्र क्रियाशिल खानेपानी तथा सरसफाइ उपभोक्ता समितिहरु र साना शहरी खानेपानी आयोजनाको परामर्शदाता बिच निम्न अनुसारको उपस्थितिमा निम्न अनुसारको छलफल गरियो ।

उपस्थिति

१ सुदर्शन अधिकारी, Design Engineer TAE RION
२ शिव प्र. ढकाल Social Safeguard Specialist ,,
३ अनिल यादव Community Input Specialist ,,
४ तिर्थ राज भट्ट Field Facilitator
५ गोकुल प्रसाद न्यौपाने रामकोट खानेपानी उ. स. अध्यक्ष
६ रुपा खड्का (कार्की) भि. न. पा. ६
७ दिपा घिमिरे (न्यौपाने) रामकोट खानेपानीका उपभोक्ता
८ सकुन धामी पानी ट्याङ्की उपभोक्ता
९ लाल बहादुर बस्नेत कर्मचारी
१० कर्ण बहादुर बराल
११ नारायण थापा गौरीडाँडा खा. पा. अध्यक्ष
१२ राम. कु. कार्की भि. न. पा. ९
१३ मान बहादुर बस्नेत भी. न. पा. ५ (सिद्धेश्वर खा. पा. उ. स.
१४ कृष्ण कार्की मीरांगे धरमघा (उपाध्यक्ष सा. ख. स.)
१५ बाबुराम कार्की चौकीटे (खा. पा. उ. स. (अ. प.)
१६ बद्री थापा भि. न. पा. १० (खा. पा. स.)
१७ चन्द्र प्र. दहाल ,, ,, ,,
१८ हरिहर प्र. न्यौपाने ,, ,,
१९ राम शरण थापा ,, ,,
२० सिङ्गबहादुर के. सी. ,,
२१ कृष्ण बहादुर खड्का
२२ रीना कार्की सामाजिक परिचालिका
२३ कृष्ण बस्नेत हाकिमहरु चौकीटे
२४ दुर्गाप्रसाद कापले चरिकोट खा. पा. सचिव

निर्णय

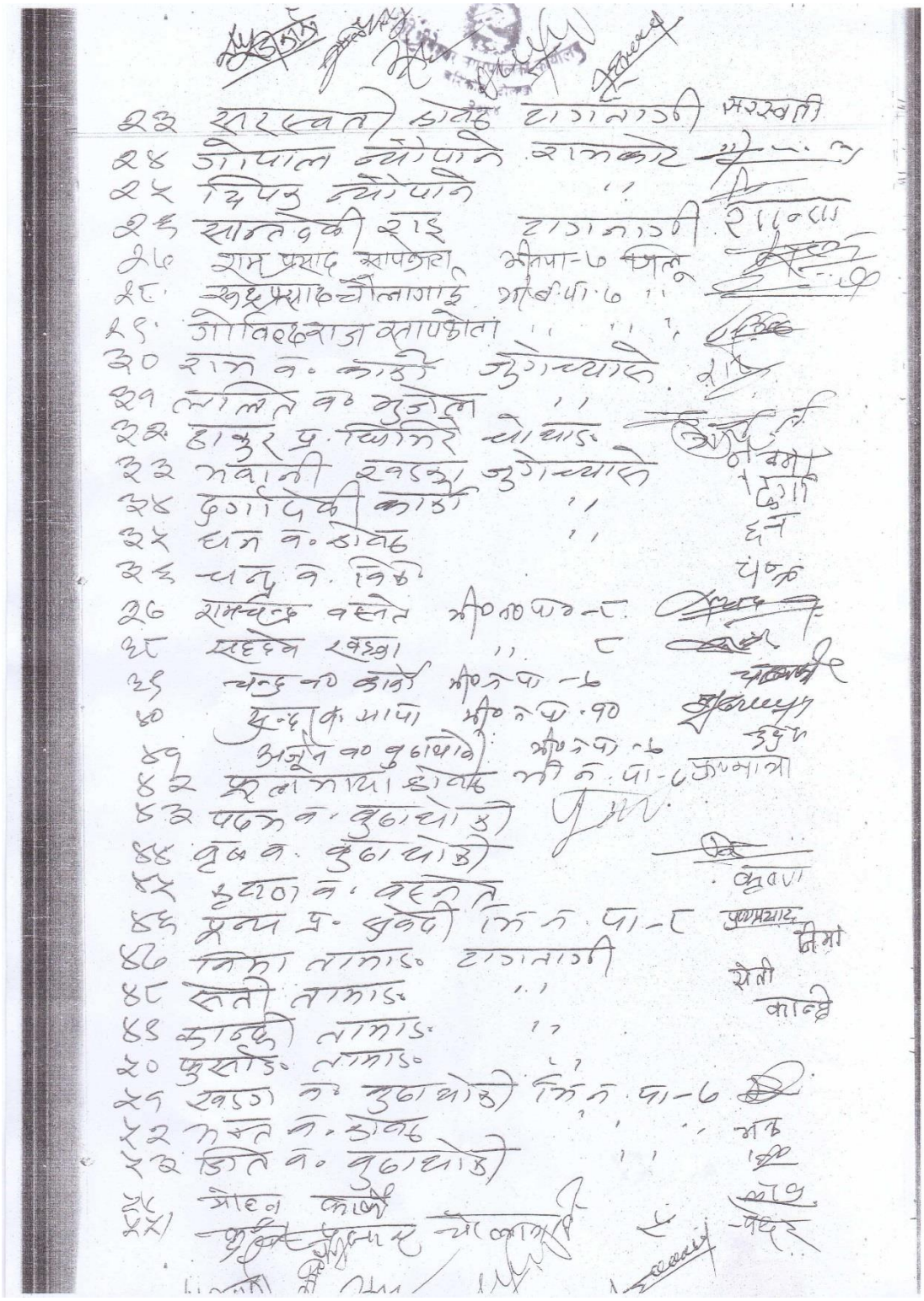
निर्णय नं. १ चरिकोट खानेपानी तथा सरसफाइ उपभोक्ता समितिको आग्रह नीति साना शहरी

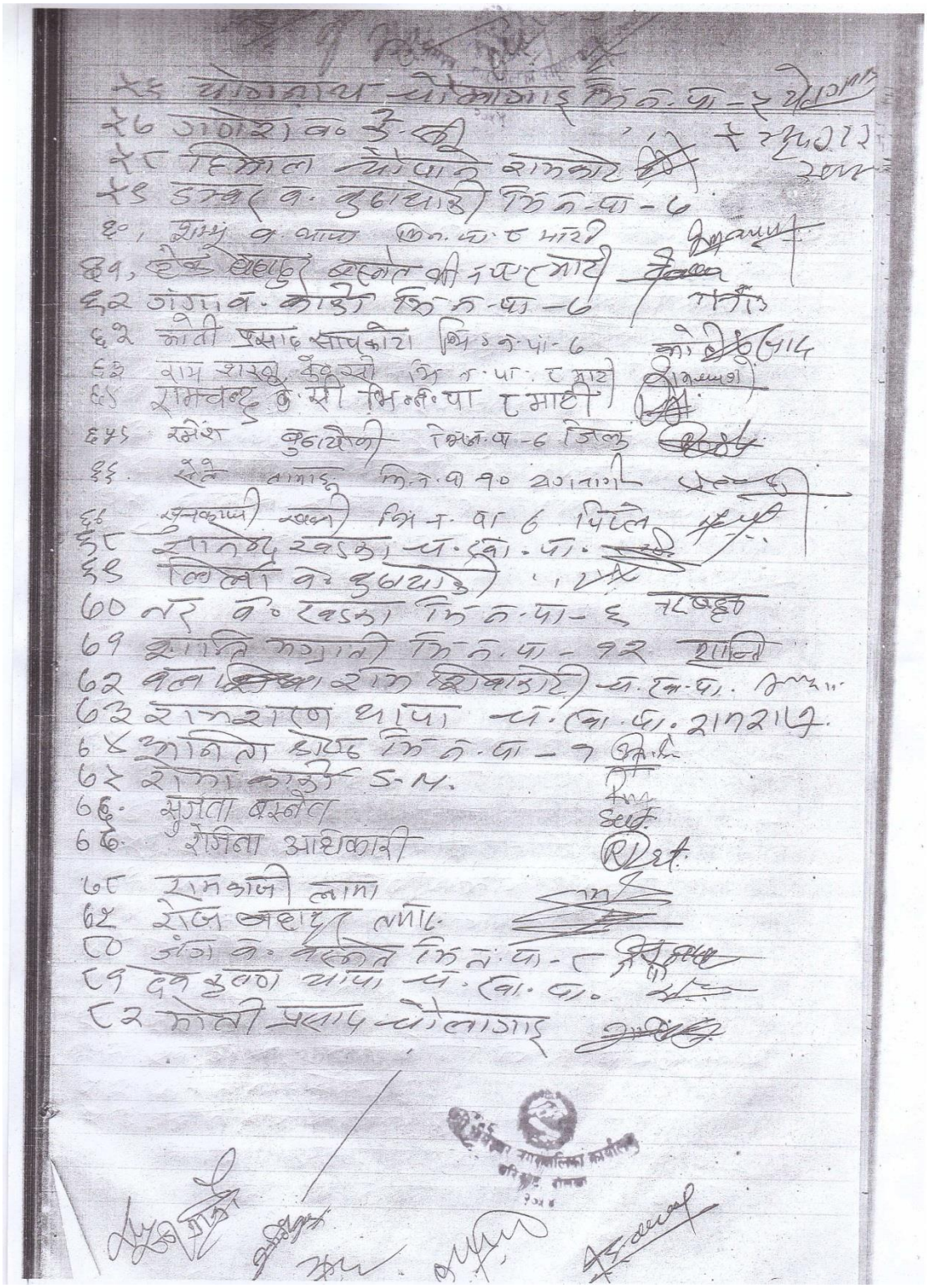


आज मिति २०५४ पौष १४ गते भिमेश्वर नगरपालिका क्षेत्र भित्र तेर्सो साना शहरी खानेपानी तथा सरसफाइ आयोजना सञ्चालन गर्न उक्त क्षेत्रभित्रका लाभान्वित उपभोक्ताहरूको भेला भिमेश्वर नगरपालिकाका कार्यालय प्रमुख श्री राजन्जी थापाको अध्यक्षतामा बसी तपसिल बमोजिमको प्रस्ताव माथी छलफल गरि तपसिल बमोजिमको उपस्थितिमा निर्णय गरियो।

उपस्थिति

अध्यक्ष १ राजन्जी थापा नि. का. प्र. (भि.न.पा.का)
२ बिश्वज्योति प्रकाशमान सिंह पाल्टीन हाकिम
~~[illegible]~~ कहरा चारघण्टा मानडाडा (खा.पा.उ.स.)
३ रामकृष्ण के.सी. उ. खा.पा.
४ कृष्ण ब. खड्का ,, ,,
५ कृष्ण ब. कार्की हाकिमहरा
६ बद्री कुमार डायल उ. खा.पा.
७ नारायण थापा गैराखर्क स.दे.
८ श्याम कृष्ण थापा ,, ,,
९ रंगबहादुर बुढाथोकी कालिके खा.पा.
१० राम ब. के.सी. ,, ,,
११ राम ब. कार्की गोंगल्याने ,,
१२ ध्रुव सापकोटा भरनाले ,,
१३ शंकर ब. थापा फूलबारी
१४ लाल ब. खड्का हाँगनाङ्गी
१५ गोकुल प्र. न्यौपाने राजकोट
१६ गणेश थापा गैराखर्क स.दे. खा.पा.
१७ किरण खड्का हाँगनाङ्गी खा.पा.
१८ ज्ञान ब. खड्का ,,
१९ फूलमती वि.क. ,,
२० रमा न्यौपाने राजकोट
२१ शारदा न्यौपाने ,,
२२ लिलादेवी न्यौपाने





चरिकोट, दोलखा
२०५४

प्रस्ताव तथा निर्णयहरू

प्रस्ताव नं. १. एकिकृत तदर्थ समिति गठन सम्बन्धमा

निर्णय नं. १. प्रस्ताव नं. १ उपर छलफल गर्दा यस भीमेश्वर नगरपालिकाको खानेपानी तथा सरसफाईलाई व्यवस्थित र स्थायी बनाउन भीमेश्वर नगरपालिका भित्र रहेका खानेपानी उपभोक्ता समितिहरू हालिछहरा चरिछ्याङ माथेडाँडा खानेपानी तथा सरसफाई उपभोक्ता समिति, चरिकोट खानेपानी तथा सरसफाई उपभोक्ता समिति, गौराखर्क खानेपानी तथा सरसफाई उपभोक्ता समिति, ठुँगो-च्यौरी घर-मघर खानेपानी तथा सरसफाई उपभोक्ता समिति जिलु खानेपानी तथा सरसफाई उपभोक्ता समिति, रामकोट खानेपानी तथा सरसफाई उपभोक्ता समिति चौथाङ खानेपानी तथा सरसफाई उपभोक्ता समिति लगायतका यस भीमेश्वर नगरपालिका भित्र वडा नं. १ देखि १३ सम्मका आवैभन्दा बढि खानेपानीको अभाव भएका र जनघनत्व बढ्दै गएका क्षेत्रलाई समेटी गरी र उक्त क्षेत्र सेवा क्षेत्र रहने गरी खानेपानी तथा सरसफाईका कार्यक्रम सञ्चालन गर्न सम्बन्धित समितिको विधानमा उल्लेख भएका कार्यक्रमहरूलाई प्रभावकारी बनाउन एकिकृत समितिको विधानमा उल्लेख गर्ने गरी एकिकृत समिति सञ्चालन गर्न एकिकृत तदर्थ समिति गठन गर्ने निर्णय गरियो।

तदर्थ समिति तपसिल अनुसार गठन गर्ने निर्णय गरियो।

१. अध्यक्ष :- रामकृष्ण के.सी.
२. उपाध्यक्ष :- कृष्णबहादुर खड्का
३. सचिव :- ध्रुव बस्नेत
४. कोषाध्यक्ष :- अनिता श्रेष्ठ
५. सदस्य :- कृष्ण बहादुर कार्की
६. सदस्य :- रामशरण थापा
७. सदस्य :- मोतीप्रसाद चौलागाँई

तदर्थ समिति ७ सदस्यीय गठन गरिने भएकोले र साना शहरी खानेपानी तथा सरसफाई परियोजना सञ्चालन गर्न तीन जना महिला सदस्य अनिवार्य व्यवस्था गरेकोले दुई (२) जना महिला सदस्य समितिमा थप गर्न, गठित तदर्थ समितिलाई यस परियोजनाको सेवा क्षेत्रलाई समेट्ने गरी मनोनित गर्ने र जिम्मेवारी तोक्न सम्पूर्ण अधिकार प्रत्यायोजन गर्ने निर्णय गरियो।

प्रस्ताव नं. २. प्रमुख संरक्षकको व्यवस्था गर्ने सम्बन्धमा

निर्णय नं. २. प्रस्ताव नं. २. उपर छलफल गर्दा यस एकिकृत समितिको काम कारवाहीलाई व्यवस्थित र प्रभावकारी बनाउन यस एकिकृत समितिको विधानमा नै प्रमुख संरक्षकको व्यवस्था गर्ने र विधानमा नै प्रमुख संरक्षक काम, कर्तव्य र अधिकार तपसिल अनुसार हुने निर्णय गरियो।

१. यस खानेपानी तथा सरसफाइको अभिभावकत्व प्रमुख संरक्षकले गर्ने छ।
२. यस एकिकृत समितिको बैंक खाता समितिको प्रमुख संरक्षक, अध्यक्ष र कोषाध्यक्षको संयुक्त हस्ताक्षरमा सञ्चालन गर्ने र सोहि अनुसार व्यवस्था गर्ने।

प्रमुख संरक्षक को काम कर्तव्य र अधिकार

३. यस एकिकृत समितिले सञ्चालन गर्ने र यस समिति अन्तरगतको परियोजना सञ्चालन गर्दा प्रमुख संरक्षकको रोहबरमा गर्ने व्यवस्था गर्ने

४. यस समितिमा प्रमुख संरक्षक भएका व्यक्तित्वलाई समितिको मानार्थ सदस्यता प्रदान गरिने व्यवस्था गर्ने

५. यस एकिकृत समिति वा यस समिति अन्तरगत एक कार्यकाल यस समितिमा आवद्ध भएका अधिकार सम्पन्न उपसमिति वा मौजुदा समितिका अध्यक्षहरु वा पदाधिकारीहरु जसले एकिकृत समिति को सफलताको लागि उल्लेखनीय योगदान पुर्‍याउने व्यक्तित्वहरु मात्र यस एकिकृत समितिको प्रमुख संरक्षक रहन सक्ने गरी प्रमुख संरक्षकको व्यवस्था गर्ने

प्रस्ताव नं. ३. तदर्थ समितिको संरक्षक र प्रमुख संरक्षक सम्बन्धमा

निर्णय नं. ३. प्रस्ताव नं. ३ उपर छलफल गर्दा यस एकिकृत तदर्थ समितिको प्रमुख संरक्षक कालिकहरा चरिच्याङ मानेडाँडा खानेपानी तथा सरसफाई उपभोक्ता समितिका अध्यक्ष श्री विश्वनीति प्रकाशमान सिँह पाख्रिनलाई प्रदान गरी सोहि अनुसार जिम्मेवारी प्रदान गर्ने निर्णय गरियो।

प्रस्ताव नं. ४. एकिकृत समितिको विधान बनाउने र जिल्ला जलस्रोत समितिमा दर्ता गरी कार्यक्रम सञ्चालन गर्ने सम्बन्धमा

निर्णय नं. ४. प्रस्ताव नं. ४ उपर छलफल गर्दा

यस समितिको विधान यस एकिकृत समितिमा आवद्ध हुने मौजुदा समितिको विधानमा उल्लेख भएका कार्यक्रमहरूलाई प्रभावकारी बनाउने व्यवस्था सहित विधान तयार पार्ने र जिल्ला जलस्रोत समितिमा दर्ता गर्ने उक्त तदर्थ समितिलाई जिम्मेवारी दिने निर्णय गरियो।

प्रस्ताव नं. ५. तेस्रो साना शहरी खानेपानी तथा सरसफाई आयोजना सञ्चालन गर्ने सम्बन्धमा

निर्णय नं. ५ प्रस्ताव नं. ५ उपर छलफल गर्दा यस भीमेश्वर नगरपालिकाको वडा नं. १ देखि १३ सम्मको खानेपानी र सरसफाईलाई व्यवस्थित गर्न तेस्रो साना शहरी खानेपानी तथा सरसफाई आयोजना सञ्चालन गर्न साना शहरी खानेपानी तथा सरसफाई आयोजनालाई अनुकुल हुने गरी र उक्त परियोजनासँग समन्वय गरी विधान तयार गर्ने र तेस्रो साना शहरी खानेपानी तथा सरसफाई आयोजना सञ्चालन गर्न तदर्थ समितिलाई जिम्मेवारी दिने निर्णय गरियो।

प्रस्ताव नं. ६. मेला समापन सम्बन्धमा।

निर्णय नं. ६. प्रस्ताव नं. ६ उपर छलफल गर्दा एकिकृत समितिका सम्पूर्ण पदाधिकारी र प्रमुख सरोकारवालाहरूले तेस्रो साना शहरी खानेपानी तथा सरसफाई आयोजना सफलता पूर्वक सम्पन्न गर्ने र भीमेश्वर नगरपालिकाको भित्रका अधिकतम क्षेत्रलाई सेवा प्रदान गर्ने शुभकामना सहित मेलाका अध्यक्ष नगरपालिकाका निमित प्रमुखले मेला समापन गर्ने निर्णय गरियो।

आज मिति २०८२ साल पौष ०८ गतेका दिन यस भीमेश्वर नगरपालिका भित्र खाना खाद्दी खानेपानी तथा सरसफाई परियोजना सञ्चालन गर्न र भीमेश्वर नगरपालिकाको खानेपानी तथा सरसफाई व्यवस्थापन गर्न गठन भएको सम्बन्धित समितिका अध्यक्ष श्री रामकृष्ण के.सी. को अध्यक्षतामा यस समितिका पदाधिकारी सदस्य सबको उपस्थितीमा तपसिलमा उल्लेख गरेको प्रस्ताव माथि छलफल गरि निर्णय गरियो उपस्थिती,

प्रमुख संरक्षक:- विश्वनीति प्रकाशभान सिंह पाखिन

अध्यक्ष:- रामकृष्ण के.सी.

उपाध्यक्ष:- कृष्णबहादुर खड्का

सचिव:- ध्रुव बस्नेत

कोषाध्यक्ष:- आनिता श्रेष्ठ

सदस्य:- कृष्ण बहादुर कार्की

सदस्य:- रामशरण थापा

सदस्य:- मोतिप्रसाद चौलागाँई

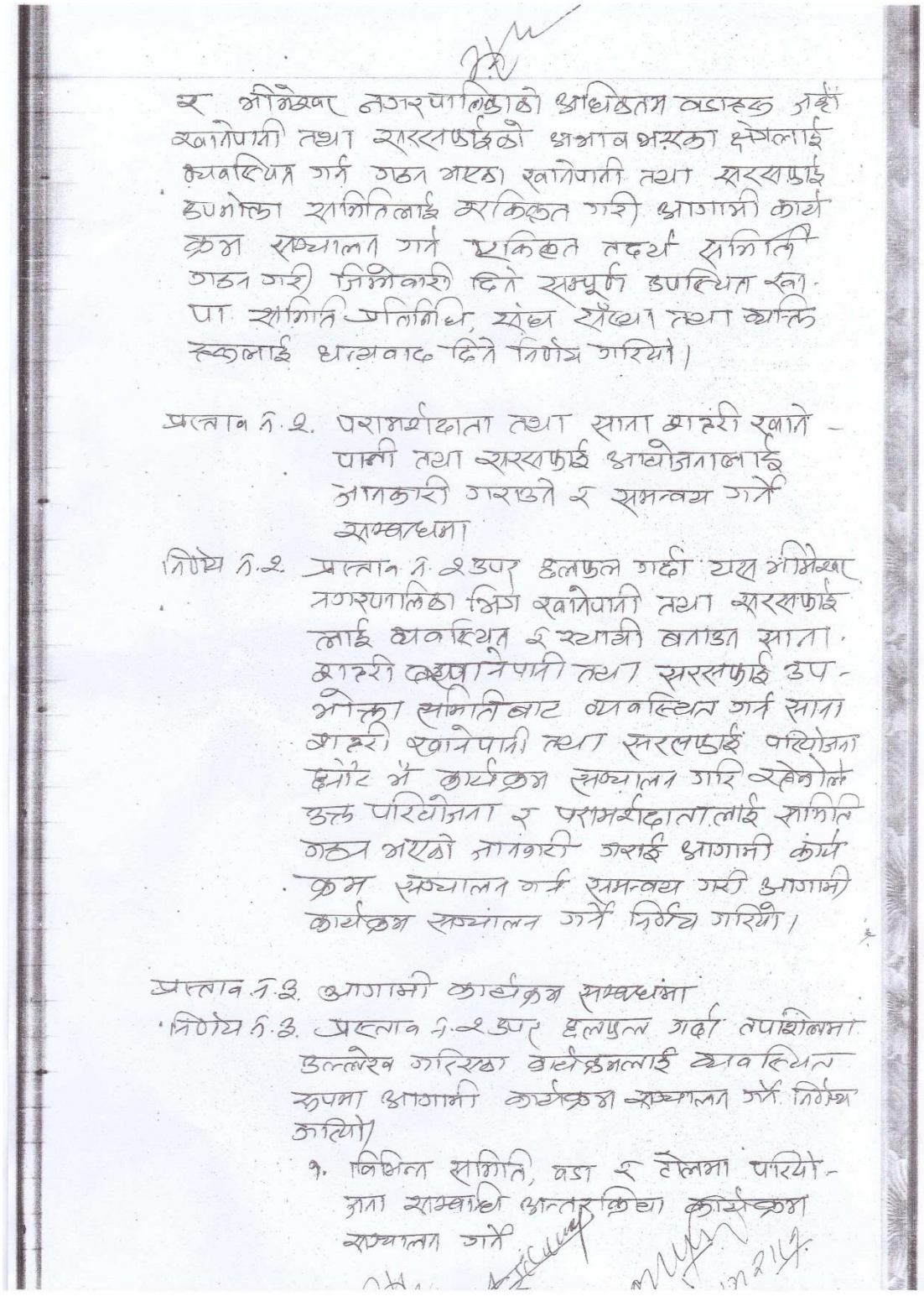
सदस्य:-

सदस्य:-

प्रस्ताव तथा निर्णयहरु,

प्रस्ताव नं. १, धारबाट दिने सम्बन्धमा

निर्णय नं. १, प्रस्ताव नं. १ उपर छलफल गर्दा यस भीमेश्वर नगरपालिका भित्र खाना खाद्दी खानेपानी तथा सरसफाई परियोजना सञ्चालन गर्ने



२ भीमेश्वर नगरपालिकाको आधिकतम बडाहरु सहरी खानेपानी तथा सरसफाईको अभाव भएका क्षेत्रलाई व्यवस्थित गर्न गठन भएका खानेपानी तथा सरसफाई उपभोक्ता समितिलाई समेटिने गरी आगामी कार्यक्रम सञ्चालन गर्न एकिकृत तहगत समिति गठन गरी जिम्मेवारी दिने सम्पूर्ण उपस्थित खानेपानी समिति प्रतिनिधि, संघ संस्था तथा व्यक्तिहरुलाई धन्यवाद दिदै निर्णय गरियो।

प्रस्ताव नं.२. परामर्शदाता तथा साना सहरी खानेपानी तथा सरसफाई आयोजनालाई जानकारी गराउने र समन्वय गर्ने सम्बन्धमा।

निर्णय नं.२ प्रस्ताव नं.२ उपर छलफल गर्दा यस भीमेश्वर नगरपालिका भित्रा खानेपानी तथा सरसफाई लाई व्यवस्थित र स्थायी बनाउन साना सहरी खानेपानी तथा सरसफाई उपभोक्ता समितिबाट व्यवस्थित गर्न साना सहरी खानेपानी तथा सरसफाई परियोजना हेर्दै मैं कार्यक्रम सञ्चालन गरि रहेकोले उक्त परियोजना र परामर्शदातालाई समिति गठन भएको जानकारी गराई आगामी कार्यक्रम सञ्चालन गर्न समन्वय गरी आगामी कार्यक्रम सञ्चालन गर्ने निर्णय गरियो।

प्रस्ताव नं.३. आगामी कार्यक्रम सम्बन्धमा

निर्णय नं.३. प्रस्ताव नं.२ उपर छलफल गर्दा तपशिलमा उल्लेख भएका कार्यक्रमलाई व्यवस्थित रुपमा आगामी कार्यक्रम सञ्चालन गर्ने निर्णय गरियो।

१. निर्माण समिति, बडा र टोलमा परियोजना सम्बन्धी अन्तरक्रिया कार्यक्रम सञ्चालन गर्ने

२. सम्पूर्ण उपभोक्ताको हित हुने गरी साना शहरी खानेपानी तथा सरसफाई ~~उप~~ परियोजना लाई सर्भे गर्न लगाउने

३. सामाजिक सर्भे तथा भौतिक संरचनाको सर्भे र डिजाइन प्रस्तुत गर्ने र अन्तरक्रिया गर्ने सम्बन्धित परियोजनासँग समन्वय गर्ने ।

४. परियोजना सम्बन्धित चेतनामूलक कार्यक्रम सञ्चालन गर्ने

५. विधान लेख्ने र दर्ता गर्ने

६. आयोजना क्षेत्रभन्दा बाहिरका उपभोक्ताको समस्या समाधान गर्न डिभिजन खानेपानी तथा सरसफाई कार्यालय चरिकोटसँग समन्वय गर्ने

७. पानीको मुहान पहिचान गरी सेवा क्षेत्र निर्धारण गर्ने ।

८. यस समितिमा आबद्ध भएका र हुन चाहने संस्थाई समितिको प्रतिनिधित्व गर्न आगामी बैठक मा उपस्थित गराउने र समितिका अध्यक्षहरू लाई आमन्त्रित सदस्यका रूपमा नियमित बोलाउने ।

WATER QUALITY TEST REPORTS

Nepal Environmental & Scientific Services (P) Ltd.
G.P.O. Box: 7301, Thapathali, Kathmandu, Nepal
Phone : +977-1-4244989, 4241001, Fax No.: +977-1-4226028, Email: ness@mos.com.np
http:\\www.nesspltd.com

QS Test Report / Certificate

NS Accreditation No. Pra. 01/053-54

Entry No. : NCL - 91(W) (3) - 08 - 2015 Date Received : 31 - 08 - 2015
Sample : Water (Hatti Chahara) Date Completed : 03 - 09 - 2015
Client : TAEC/ICON Sampled By : Client
Location : Dolakha

S. N.	Parameters	Test Methods	Observed Values	NDWQS, Nepal
1.	pH at 28°C	Electromeric, 4500 - H^+ B,: APHA	7	6.5 - 8.5
2.	Electrical Conductivity, (μS/cm)	Conductivity Meter, 2510 B, APHA	86	1500
3.	Turbidity, (NTU)	Nephelometric, 2130 B, APHA	<1	5
4.	Total Hardness as $CaCO_3$, (mg/L)	EDTA Titrimetric, 2340 C, APHA	46	500
5.	Total Alkalinity as $CaCO_3$, (mg/L)	Titrimetric, 2320 B, APHA	50	-
6.	Chloride, (mg/L)	Argentometric Titration, 4500 - Cl^- B, APHA	1.50	250
7.	Ammonia, (mg/L)	Direct Nesslerization, 4500 - NH_3 C APHA	N. D. (<0.05)	1.5
8.	Nitrate, (mg/L)	UV Spectrophotometric Screening, 4500 - NO_3^- B, APHA	0.59	50
9.	Nitrite, (mg/L)	NEDA, Colorimetric, 4500 - NO_2^- B, APHA	N. D. (<0.02)	-
10.	Calcium, (mg/L)	EDTA Titrimetric, 3500 - Ca B & 3500 - Mg B APHA	10.82	200
11.	Magnesium, (mg/L)		4.62	-
12.	Iron, (mg/L)	Direct Air - Acetylene AAS, 3111 B, APHA	0.24	0.3
13.	Manganese, (mg/L)		N. D. (<0.02)	0.2
14.	Arsenic, (mg/L)	Hydride Generation, AAS, 3114 B: APHA	N. D. (<0.005)	0.05

N. D.: Not Detected

Note:

NDWQS: National Drinking Water Quality Standard - 2063; AAS: Atomic Absorption Spectrophotometer; UV: Ultraviolet; EDTA: Ethyelenediaminetetraacetic acid; NTU: Nephelometric turbidity unit; NEDA: N-1-Naphthyleethylenediamine dihydrochloride; APHA: American Public Health Association.

Remarks: All observed values complied the prescribed NDWQS for drinking water.

(Analyzed By) (Checked By) (Authorized Signature)

Note:
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http:\\www.nesspltd.com

QS Test Report / Certificate

NS Accreditation No. Pra. 01/053-54

Entry No. : NCL - 91(W) (3) - 08 - 2015
Sample : Non Treatment Water
Client : TAEC/ICON
Location : Dolakha

Date Received : 31 - 08 - 2015
Date Completed : 03 - 09 - 2015
Sampled By : Client

S. N.	Parameters	Test Methods	Observed Values	NDWQS, Nepal
1.	pH at 28°C	Electromeric, 4500 - H^+ B,: APHA	7	6.5 - 8.5
2.	Electrical Conductivity, (μS/cm)	Conductivity Meter, 2510 B, APHA	116	1500
3.	Turbidity, (NTU)	Nephelometric, 2130 B, APHA	<1	5
4.	Total Hardness as $CaCO_3$, (mg/L)	EDTA Titrimetric, 2340 C, APHA	63	500
5.	Total Alkalinity as $CaCO_3$, (mg/L)	Titrimetric, 2320 B, APHA	63	-
6.	Chloride, (mg/L)	Argentometric Titration, 4500 - Cl^- B, APHA	0.50	250
7.	Ammonia, (mg/L)	Direct Nesslerization, 4500 - NH_3 C APHA	N. D. (<0.05)	1.5
8.	Nitrate, (mg/L)	UV Spectrophotometric Screening, 4500 - NO_3^- B, APHA	0.52	50
9.	Nitrite, (mg/L)	NEDA, Colorimetric, 4500 - NO_2^- B, APHA	N. D. (<0.02)	-
10.	Calcium, (mg/L)	EDTA Titrimetric, 3500 - Ca B & 3500 - Mg B APHA	12.82	200
11.	Magnesium, (mg/L)		7.53	-
12.	Iron, (mg/L)	Direct Air - Acetylene AAS, 3111 B, APHA	0.05	0.3
13.	Manganese, (mg/L)		N. D. (<0.02)	0.2
14.	Arsenic, (mg/L)	Hydride Generation, AAS, 3114 B: APHA	N. D. (<0.005)	0.05

N. D.: Not Detected

Note:

NDWQS: National Drinking Water Quality Standard - 2063; AAS: Atomic Absorption Spectrophotometer; UV: Ultraviolet; EDTA: Ethyelenediaminetetraacetic acid; NTU: Nephelometric turbidity unit; NEDA: N-1-Naphthyleethylenediamine dihydrochloride; APHA: American Public Health Association.

Remarks: All observed values complied the prescribed NDWQS for drinking water.

(Analyzed By) (Checked By) (Authorized Signature)

Note:

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http:\\www.nesspltd.com

QS Test Report / Certificate

NS Accreditation No. Pra. 01/053-54

Entry No. : NCL – 91(W) (3) - 08 - 2015
Sample : Treatment Water
Client : TAEC/ICON
Location : Dolakha

Date Received : 31 - 08 - 2015
Date Completed : 03 - 09 - 2015
Sampled By : Client

S. N.	Parameters	Test Methods	Observed Values	NDWQS, Nepal
1.	pH at 28°C	Electromeric, 4500 - H^+ B,: APHA	7	6.5 - 8.5
2.	Electrical Conductivity, (μS/cm)	Conductivity Meter, 2510 B, APHA	115	1500
3.	Turbidity, (NTU)	Nephelometric, 2130 B, APHA	<1	5
4.	Total Hardness as $CaCO_3$, (mg/L)	EDTA Titrimetric, 2340 C, APHA	62	500
5.	Total Alkalinity as $CaCO_3$, (mg/L)	Titrimetric, 2320 B, APHA	66	-
6.	Chloride, (mg/L)	Argentometric Titration, 4500 - Cl^- B, APHA	2	250
7.	Ammonia, (mg/L)	Direct Nesslerization, 4500 - NH_3 C APHA	N. D. (<0.05)	1.5
8.	Nitrate, (mg/L)	UV Spectrophotometric Screening, 4500 - NO_3^- B, APHA	0.37	50
9.	Nitrite, (mg/L)	NEDA, Colorimetric, 4500 - NO_2^- B, APHA	N. D. (<0.02)	-
10.	Calcium, (mg/L)	EDTA Titrimetric, 3500 - Ca B &	13.23	200
11.	Magnesium, (mg/L)	3500 - Mg B APHA	7.05	-
12.	Iron, (mg/L)	Direct Air - Acetylene AAS, 3111 B, APHA	0.08	0.3
13.	Manganese, (mg/L)		N. D. (<0.02)	0.2
14.	Arsenic, (mg/L)	Hydride Generation, AAS, 3114 B: APHA	N. D. (<0.005)	0.05

N. D.: Not Detected

Note:

NDWQS: National Drinking Water Quality Standard - 2063; AAS: Atomic Absorption Spectrophotometer; UV: Ultraviolet; EDTA: Ethyelenediaminetetraacetic acid; NTU: Nephelometric turbidity unit; NEDA: N-1-Naphthyleethylenediamine dihydrochloride; APHA: American Public Health Association.

Remarks: All observed values complied the prescribed NDWQS for drinking water.

(Analyzed By) (Checked By) (Authorized Signature)

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NS Lab Accreditation No.: 09-2068/69 Regd. No. 53875/064/065

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(C e n t e r f o r c o m p l e t e s c i e n t i f i c s o l u t i o n)

Nepal Laboratory Accreditation Scheme
Accredited Laboratory
No - 09 - 068/69

Test Report/Certificate

Report No. : 22/2073
Entry No. : AASTHA – 14– 2073
Sample : Surface Water
Client : ICON - TAEC JV
Location : Jhapre, Dolakha

Date received : 10 – 01 – 2073
Date completed : 18 – 01 – 2073
Sampled By : Client

S. N.	Parameters	Method	Observed Values	National Drinking Water Quality Standard
1.	pH at 26°C	4500-H⁺ APHA-AWWA-WEF 2012, 22nd Edition	7.0	6.5 - 8.5
2.	Electrical Conductivity, (µmhos/cm)	2510 B, APHA-AWWA-WEF 2012, 22nd Edition	31	1500
3.	Turbidity, (NTU)	2130 B, APHA-AWWA-WEF 2012, 22nd Edition	2.0	5 (10)
4.	Taste and Odor	-	N. O.	Not Objectionable
5.	Color, (TCU)	2120 C, APHA - AWWA - WEF 2012, 22nd Edition	0.09	500
6.	Total Hardness as $CaCO_3$, (mg/l)	2340 C, APHA-AWWA-WEF 2012, 22nd Edition	20	5(15)
7.	Total Dissolved Solid, (mg/l)	2540 C , APHA - AWWA - WEF 2012, 22nd Edition	19	1000
8.	Total Residual Chlorine, (mg/l)	4500 - Cl B, APHA - AWWA - WEF 2012, 22nd Edition	<0.10	0.1-0.2
9.	Chloride, (mg/l)	4500-Cl- B, APHA-AWWA-WEF 2012, 22nd Edition	<0.50	250
10.	Ammonia, (mg/l)	4500-NH3 D, APHA, AWWA, WPCF, 17th Edition	0.45	1.5
11.	Nitrate, (mg/l)	4500-NO_3-B, APHA-AWWA-WEF 2012, 22nd Edition	0.80	50.0
12.	Aluminum, (mg/l)	3500-Al B, APHA, AWWA, WEF, 22nd Edition	<0.01	0.20
13.	Fluoride, (mg/l)	4500-F- D, APHA - AWWA - WEF 2012, 22nd Edition	0.15	0.5-1.5
14.	Sulfate, (mg/l)	4500-SO_4^{2-} C, APHA - AWWA - WEF 2012, 22nd Edition	4.2	250
15.	Mercury*, (mg/l)	3500-Hg-C, APHA-AWWA-WEF , WPCF, 17th Edition	<0.001	0.001
16.	Calcium, (mg/l)	3500-Ca B, APHA-AWWA-WEF 2012, 22nd Edition	4.8	200
17.	Iron*, (mg/l)	3111 B, APHA - AWWA - WEF 2012, 22nd Edition	0.21	0.30(3)
18.	Manganese*, (mg/l)		<0.05	0.20
19.	Lead*, (mg/l)		<0.01	0.01
20.	Cadmium*, (mg/l)		<0.003	0.003
21.	Chromium*, (mg.l)		<0.05	0.05
22.	Copper*, (mg/l)		<0.05	1.0
23.	Zinc*, (mg/l)		<0.02	3.0
24.	Arsenic, (mg/l)	3500-As B, APHA - AWWA - WEF 2012, 22nd Edition	<0.01	0.05

Remarks: *Water quality meets NDWQS required limit.*

Analyzed By

Checked By

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5. Parameters in * are not accreditated by NBSM.

NS Lab Accreditation No.: 09-2068/69 Regd. No. 53875/064/065

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(Center for complete scientific solution)

Nepal Laboratory Accreditation Scheme
Accredited Laboratory
No - 09 - 068/69

Test Report/Certificate

Report No. : 24/2073
Entry No. : AASTHA – 14– 2073
Sample : Surface Water
Client : ICON - TAEC JV
Location : Hattichhare, Dolakha

Date received : 10 – 01 – 2073
Date completed : 18 – 01 – 2073
Sampled By : Client

S. N.	Parameters	Method	Observed Values	National Drinking Water Quality Standard
1.	pH at 26°C	4500-H^+ APHA-AWWA-WEF 2012, 22nd Edition	7.4	6.5 - 8.5
2.	Electrical Conductivity, (µmhos/cm)	2510 B, APHA-AWWA-WEF 2012, 22nd Edition	162	1500
3.	Turbidity, (NTU)	2130 B, APHA-AWWA-WEF 2012, 22nd Edition	2.1	5 (10)
4.	Taste and Odor	-	N. O.	Not Objectionable
5.	Color, (TCU)	2120 C, APHA - AWWA - WEF 2012, 22nd Edition	0.15	500
6.	Total Hardness as $CaCO_3$, (mg/l)	2340 C, APHA-AWWA-WEF 2012, 22nd Edition	80	5(15)
7.	Total Dissolved Solid, (mg/l)	2540 C , APHA - AWWA - WEF 2012, 22nd Edition	98	1000
8.	Total Residual Chlorine, (mg/l)	4500 - Cl B, APHA - AWWA - WEF 2012, 22nd Edition	<0.10	0.1-0.2
9.	Chloride, (mg/l)	4500-Cl- B, APHA-AWWA-WEF 2012, 22nd Edition	<0.50	250
10.	Ammonia, (mg/l)	4500-NH3 D, APHA, AWWA, WPCF, 17th Edition	0.46	1.5
11.	Nitrate, (mg/l)	4500-NO_3-B, APHA-AWWA-WEF 2012, 22nd Edition	0.89	50.0
12.	Aluminum, (mg/l)	3500-Al B, APHA, AWWA, WEF, 22nd Edition	<0.01	0.20
13.	Fluoride, (mg/l)	4500-F- D, APHA - AWWA - WEF 2012, 22nd Edition	0.51	0.5-1.5
14.	Sulfate, (mg/l)	4500-SO_4^{2-} C, APHA - AWWA - WEF 2012, 22nd Edition	9.7	250
15.	Mercury*, (mg/l)	3500-Hg-C, APHA-AWWA-WEF , WPCF, 17th Edition	<0.001	0.001
16.	Calcium, (mg/l)	3500-Ca B, APHA-AWWA-WEF 2012, 22nd Edition	12.8	200
17.	Iron*, (mg/l)	3111 B, APHA - AWWA - WEF 2012, 22nd Edition	<0.05	0.30(3)
18.	Manganese*, (mg/l)		<0.01	0.20
19.	Lead*, (mg/l)		<0.003	0.01
20.	Cadmium*, (mg/l)		<0.05	0.003
21.	Chromium*, (mg.l)		<0.05	0.05
22.	Copper*, (mg/l)		<0.02	1.0
23.	Zinc*, (mg/l)		<0.01	3.0
24.	Arsenic, (mg/l)	3500-As B, APHA - AWWA - WEF 2012, 22nd Edition	<0.01	0.05

Remarks: *Water quality meets NDWQS required limit.*

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(C e n t e r f o r c o m p l e t e s c i e n t i f i c s o l u t i o n)

Nepal Laboratory Accreditation Scheme — Accredited Laboratory — No - 09 - 068/69

Test Report/Certificate

Report No. : 23/2073
Entry No. : AASTHA – 14– 2073
Sample : Surface Water
Client : ICON - TAEC JV
Location : Odare, Dolakha

Date received : 10 – 01 – 2073
Date completed : 18 – 01 – 2073
Sampled By : Client

S. N.	Parameters	Method	Observed Values	National Drinking Water Quality Standard
1.	pH at 26°C	4500-H^+ APHA-AWWA-WEF 2012, 22nd Edition	7.7	6.5 - 8.5
2.	Electrical Conductivity, (µmhos/cm)	2510 B, APHA-AWWA-WEF 2012, 22nd Edition	272	1500
3.	Turbidity, (NTU)	2130 B, APHA-AWWA-WEF 2012, 22nd Edition	2.1	5 (10)
4.	Taste and Odor	-	N. O.	Not Objectionable
5.	Color, (TCU)	2120 C, APHA - AWWA - WEF 2012, 22nd Edition	0.14	500
6.	Total Hardness as $CaCO_3$, (mg/l)	2340 C, APHA-AWWA-WEF 2012, 22nd Edition	124	5(15)
7.	Total Dissolved Solid, (mg/l)	2540 C , APHA - AWWA - WEF 2012, 22nd Edition	165	1000
8.	Total Residual Chlorine, (mg/l)	4500 - Cl B, APHA - AWWA - WEF 2012, 22nd Edition	<0.10	0.1-0.2
9.	Chloride, (mg/l)	4500-Cl- B, APHA-AWWA-WEF 2012, 22nd Edition	<0.50	250
10.	Ammonia, (mg/l)	4500-NH3 D, APHA, AWWA, WPCF, 17th Edition	0.47	1.5
11.	Nitrate, (mg/l)	4500-NO_3-B, APHA-AWWA-WEF 2012, 22nd Edition	0.84	50.0
12.	Aluminum, (mg/l)	3500-Al B, APHA, AWWA, WEF, 22nd Edition	0.02	0.20
13.	Fluoride, (mg/l)	4500-F- D, APHA - AWWA - WEF 2012, 22nd Edition	0.13	0.5-1.5
14.	Sulfate, (mg/l)	4500-SO_4^{2-} C, APHA - AWWA - WEF 2012, 22nd Edition	12.4	250
15.	Mercury*, (mg/l)	3500-Hg-C, APHA-AWWA-WEF , WPCF, 17th Edition	<0.001	0.001
16.	Calcium, (mg/l)	3500-Ca B, APHA-AWWA-WEF 2012, 22nd Edition	24	200
17.	Iron*, (mg/l)	3111 B, APHA - AWWA - WEF 2012, 22nd Edition	<0.05	0.30(3)
18.	Manganese*, (mg/l)		<0.01	0.20
19.	Lead*, (mg/l)		<0.003	0.01
20.	Cadmium*, (mg/l)		<0.05	0.003
21.	Chromium*, (mg.l)		<0.05	0.05
22.	Copper*, (mg/l)		<0.02	1.0
23.	Zinc*, (mg/l)		<0.01	3.0
24.	Arsenic, (mg/l)	3500-As B, APHA - AWWA - WEF 2012, 22nd Edition	<0.01	0.05

Remarks: *Water quality meets NDWQS required limit.*

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PHOTOGRAPHS

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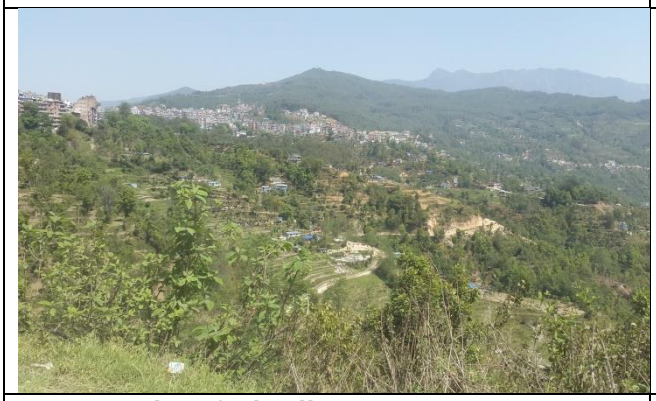
Charikot Bazaar

Site selection was accompanied by public participation



Topography of Charikot

Access Road to the project location

Source 1

Source 2

SPOIL MANAGEMENT PLAN

A. Spoil Management Plan

1. **Purpose and Application:** SMP is to describe how UWSSP 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.

2. **Objectives of SMP:** The objectives of SMP are:
   - To minimize spoil generation where possible
   - Maximize beneficial reuse of spoil from construction works in accordance with spoil management hierarchy
   - Mange onsite spoil handling to minimize environmental impacts on resident and other receivers
   - Minimize any further site contamination of land, water, soil
   - Manage the transportation of spoil with consideration of traffic impacts and transport related emissions

3. 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

4. **Aspects and Potential Impacts**: The key aspects of potential impacts in relation to SMP are listed in Table A8 below:

Table A8: Key Aspects of Potential Impacts

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 water (surface and ground water)
Noise	Associated with spoil handling and haulage and storage
Traffic	Impacts associated with spoil haulage
Land Use	Potential for spoil to be transported to a receivable site that doesn't have permission for storage/disposal
Design specifications	Limitations on opportunities to minimize spoil generation
Sustainability	Limited sites for storage, reuse opportunities

B. Spoil volumes, Characteristics and Minimization

5. **Spoil Volume Calculations.** Estimate the volumes of spoils produced from each of the

construction sites.

6. **Characterization of Spoil.** Based on the type of spoil; characterization is done (sand stone, mix materials, reusable materials.

7. **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

8. **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 and there should 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.

C. Storage and Stock Piling

9. **Stockpiling**. Spoils shall be stockpiled at locations at least 300 m away from water courses and covered.

10. **Transportation and Haulage Route.** Based on the above, the contractor will prepare a transport and route plan, and submit it to the DSMC for their review and approval.

D. Summary of Key Issues and Remedial Actions

11. Summary of follow up time-bound actions to be taken within a set timeframe.

RESULTS OF THE ENVIRONMENTAL AUDIT OF WATER TREATMENT PLANTS

Subproject name	Details of the WTPs to be rehabilitated	Required environmental clearances per Government of Nepal laws and regulations	Status of monitoring of raw and treated water (per Government of Nepal and WHO guideline values)	Sludge management (if sludge is being generated)	Management of backwash and/or filter media washings	Operation and maintenance (roles and responsibilities, availability of O&M manual, environmental monitoring being conducted)
Charikot Water Supply Project	The existing WTP to be rehabilitated is referred as WTP-E. Its design capacity is 6.6 lps. It includes Settling Basin and Slow Sand Filter. It is located in the land owned by the concerned WUSC within the community forest.	Site Management and Clearance for demolishing boundary wall of WTP and clearing of all the grasses in its premises.	Raw water taken from the concerned sources and the tap water meets both NDWQS and WHO guidelines. However, currently, tap water is not treated as the existing WTP is not functioning.	No Sludge is generated.	The existing WTP is not functioning. Hence, there is no filter media washings carried out by the concerned authority. The rehabilitation of this existing WTP involves clearing of all filter media (sand) from SSF and disposal at a suitable place.	Charikot WUSC is the operator of the existing system. The WUSC has assigned three water supply technicians for managing water distribution, maintenance and meter reading of the whole system. Two staffs are also deployed.
		No Objection Letter (Document) provided by the concerned community forest to the concerned WUSC.				·The WUSC does not maintain a separate account for operation of water supply system making it difficult to conduct financial analysis;
		Compliance with EPA, EPR, NEPAP, Forest Act, Local Self				• The WUSC does not have the inventory of existing assets. The existing facilities are in

Subproject name	Details of the WTPs to be rehabilitated	Required environmental clearances per Government of Nepal laws and regulations	Status of monitoring of raw and treated water (per Government of Nepal and WHO guideline values)	Sludge management (if sludge is being generated)	Management of backwash and/or filter media washings	Operation and maintenance (roles and responsibilities, availability of O&M manual, environmental monitoring being conducted)
		Governance Act, Labor Act etc.				need of repair/rehabilitation but the operator is unable to do it due to limited financial resources.
						IEE field visit shows that there is no environmental monitoring done during operation and maintenance as the existing WTP is not functioning at all.

EPA = Environment Protection Act, EPR = Environment Protection Rules, NDWQS = National Drinking Water Quality Standards, O&M = operation and maintenance, WHO = World Health organization, WTP = water treatment plant, WUSC = water users' and sanitation committee.