Draft Initial Environmental Examination

Project Number: 35173-013
July 2016

NEP: Third Small Towns Water Supply and Sanitation Sector Project – for Birendranagar, Chitwan District

Prepared by Third Small Towns Water Supply and Sanitation Sector Project, Department of Water Supply and Sewerage, Ministry of Water Supply and Sanitation, Government of Nepal for the Asian Development Bank.

Government of Nepal
Ministry of Water Supply and Sanitation
Department of Water Supply and Sewerage
Third Small Towns Water Supply & Sanitation Sector Project
Project Management Office
Panipokhari, Maharajgunj, Kathmandu

Initial Environmental Examination (IEE)
Of
Birendranagar Water Supply and Sanitation Project
Chitwan District

July, 2016

SUBMITTED BY: **TAEC Consultant Pvt. Ltd. / Integrated Consultants Nepal Pvt. Ltd. JV**

SUBMITTED TO: **Project Management Office, Third Small Towns Water Supply and Sanitation Sector Project, Department of Water Supply and Sewerage, Ministry of Water Supply and Sanitation, Government of Nepal**

ABBREVIATIONS

ADB	Asian Development Bank
AP	Affected Person
C-EMP	Contractor's Environmental Management Plan
DI	Ductile Iron
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
EO	Environmental Officer
ES	Environmental Specialist
ESA	Environmental Safeguard Assistant
ESE	Environmental Safeguard Expert
GI	Galvanized Iron
GoN	Government of Nepal
GRM	Grievance Redress Mechanism
HHs	Households
HDPE	High Density Polyethylene
ICG	Implementation Core Group
IEE	Initial Environmental Examination
MoPE	Ministry of Population and Environment
MoWSS	Ministry of Water Supply and Sanitation
NDWQS	National Drinking Water Quality Standard
NPR	Nepalese Rupees
PMO	Project Management Office
RPMO	Regional Project Management Office
ROW	Right of way
REA	Rapid environmental assessment
STWSSSP	Small Towns' Water Supply and Sanitation Sector Project
SPS	Safeguard Policy Statement
SDG	Sustainable Development Goal
2ndSTWSSSP	Second Small Towns' Water Supply and Sanitation Sector Project
TSTWSSSP	Third Small Towns' Water Supply and Sanitation Sector project

ToR	Terms of Reference
USD	United States Dollar
VDC	Village Development Committee
WTP	Water Treatment Plant
WHO	World Health Organization
WSSDO	Water Supply and Sanitation Divisional Office
WUSC	Water Users' and Sanitation Committee

WEIGHTS AND MEASURES

C	Celsius/centigrade
dBA	decibel audible
Ha	hectare/s
Km	kilometer/s
Kph	kilometer/s per hour
m	meter/s
m^3	cubic meter/s
amsl	Above mean sea level
mg/l	milligram/s per liter
mm	millimeter/s

NOTES

This Initial Environmental Examination (draft) is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff and may be preliminary in nature. The draft IEE and its environmental management plans will be updated during project implementation.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

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EXECUTIVE SUMMARY

1. The Third Small Towns Water Supply and Sanitation Sector Project (TSTWSSSP) will support the Government of Nepal's 15-year Development Plan for Small Towns. The project will improve water supply and sanitation service delivery in small-scale urban and semi-urban centers across Nepal over a period of five years (2015- 2020).

2. The Birendranagar water supply and Sanitation Town Project is located in Rapti Municipality, which is situated in Chitwan district of the Central Development Region of Nepal. The municipality is on the East West Highway. The project area is about 30 km away from Bharatpur; the district headquarter of Chitwan, and about 150 km from Kathmandu.

3. The service area of the proposed project covers ward numbers 6, 9 10 & 11 of Rapti Municipality & ward no 15 of Khairehani Municipality. The proposed service area covers complete ward area of 10 of the Rapti Municipality, all partial ward area of other wards (6, 11 ward no. of the Rapti Municipality and ward no 15 of Khairahani Municipality).

4. There is one piped water gravity supply system constructed by the Water Supply and Sanitation Division Office (WSSDO) Chitwan in 2000 AD. Amrit Khanepani System is located in ward No 9 of the Rapti Municipality, which is a surface water system. This sub-project system served very few household (about 18.2 % of total HHs) of the upper portion of the proposed service area of the town. The only elevated areas of the ward no 9 and 11 of the Rapti municipality are served by this system. The coverage during the dry season has been even less than the wet seasons. Therefore, we can conclude that the proposed area does not have a good water supply system which can be upgraded and incorporated in the proposed system.

5. Apart from the Amrit Khanepani System, there are no other water supply systems in the project area. The existing system does not cover the whole area (partial ward area of ward No 1 to 5 of Birendranagar only). There is a demand from other parts of the Municipality for supply of regular and potable water to the consumers. 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 service area throughout the year. The overall sanitary condition of the Project Area is found to be reasonably satisfactory.

6. The majority of the people depend on agriculture as their source of income, followed closely by those depending on the business and service sectors of the economy. The community has good ethnic diversity, with people from various ethnic groups living together. This IEE report is based on the basis of the approved ToR of this project by the Ministry of Water Supply and Sanitation, which is attached as Annex I of this report.

7. **Categorization**: Birendranagar subproject is classified as Environment Category B as per the SPS- 2009 as no significant impacts are envisioned. Initial Environmental Examination (IEE) as per EPR-1997 of Schedule-1 has been prepared and assesses the environmental impacts and provides mitigation and monitoring measures to ensure no significant impacts as a result of the subproject.

8. **Subproject Scope:** The subproject is formulated under TSTWSSSP to improve water supply and sanitation service delivery in ward numbers 6, 9 10 & 11 of Rapti Municipality and ward no 15 of Khairehani Municipality. Investments under this subproject includes boreholes with pumps, treatment units, over head RCC resevoirs, valve boxes, construction of transmission mains, overhead tank, distribution main and household connections.

9. **Implementation Arrangements**: The Ministry of Water Supply and Sanitation is the executing agency. The Department of Water Supply and Sewerage (DWSS) is the implementing agency. Implementing activities will be overseen by a separate Project Management Office (PMO) which will be established in DWSS head office in Kathmandu and two Regional Project Management Offices (RPMOs) in the eastern and western region. A team of technical, administrative, and financial officials including safeguard specialists will be provided at the PMO to implement, manage and monitor project implementation activities. The RPMO will be staffed by qualified and experienced officers and will be responsible for the day-to-day activities of project implementation in the field, and will be under the direct administrative control of the PMO. Consultant teams are responsible for subproject planning and management and assuring technical quality of design and construction; and designing the infrastructure and supervising construction; and safeguards preparation.

10. **Description of the Environment**: The subproject components are located in Rapti and Khairehani Municipality. The subproject components will be located in WUSC sites, public road right-of-way (ROW). There are no protected areas, wetlands, mangroves, or estuaries in or near the subproject locations.

11. **Environment Management**: An environmental management plan (EMP) is included as part of this IEE, which includes i) mitigation measures for environmental impacts during implementation, ii) an environmental monitoring program, and the responsible entities for mitigating, monitoring, and reporting, iii) public consultation and information disclosure, and iv) a grievance redress mechanism. A number of impacts and their significance have already been reduced by amending the designs. The EMP will be included in civil work bidding and contract documents.

12. Locations and sitting of the proposed infrastructure were considered to further reduce impacts. The concepts considered in design of 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 reduce acquisition of land; v) locating pipelines at least 10 meters away from latrines, septic tanks and main drains to avoid contamination; vi) locating Tubewells at least 30 m upstream from sanitation facilities, vii) locating household and public latrines and septic tanks at least 30 meters downstream from the nearest drinking water source; viii) piloting controlled disposal of septage in accordance to WHO standards to reduce the likelihood of uncontrolled disposal as currently practiced; ix) ensuring all planning and design interventions and decisions are made in consultation with local communities and reflecting inputs from public consultation and disclosure for site selection.

13. During the construction phase, impacts mainly arise from the need to dispose of moderate quantities of waste soil; and from the disturbance of residents, businesses, and traffic. These are common impacts of construction in urban areas, and there are well developed methods for their mitigation. These are common temporary impacts of construction and will be minimized by using best construction methods. Traffic management will be necessary during pipe laying on busy roads.

14. During operation, the delivery of unsafe water is a crucial concern that can be mitigated with good operation and maintenance, prompt action on leaks and quality monitoring of supplied water. The operation and maintenance will be carried out timely during this phase.

15. The Mitigation measures have been proposed for adverse environmental impacts. The IEE will suggest mitigation of adverse impacts during constructrion phase and operation phases.

16. **EMP:** To ensure that the recommended mitigation and monitoring actions are duly implemented, monitored, assessed, evaluated and disseminated to the stakeholders for feedback and improvement, the Project's Environmental Management Office will be

established manned by the qualified environmental experts, whose sole responsibility will be to monitor the implementation of the environmental mitigation measures and direct project supervising engineers through project management office for needed action and coordination. The total estimated EMP cost for the project is NRs. 19,140,000.

17. **Consultation, Disclosure, and Grievance Redress Mechanism**: Public consultations were done in the preparation of the project and IEE. On-going consultations will be carried throughout the project implementation period. A grievance redress mechanism is described to ensure any public grievances are addressed quickly.

18. **Monitoring and Reporting**: The PMO, RPMO and DSMC will be responsible for environmental monitoring. The RPMO with support from DSMC will submit monthly monitoring reports to PMO. The 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.

19. **Conclusions and Recommendations**: Birendranagar water supply and sanitation project will bring a series of benefits to the local people. However, there are some risks in the commencement of the project on time and sustainability of the project which requires to be identified and measures taken to mitigate them. But the analysis shows that project benefits outweigh the risks and these potential risks can be overcome through proper planning, coordination and management. Therefore the proposed subproject is unlikely to cause significant adverse impacts. Based on the findings of IEE, there are no significant adverse impacts and the classification of the subproject as Category “B” is confirmed. No further special study or detailed Environmental Impact Assessment (EIA) needs to be undertaken.

I INTRODUCTION

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

a. Name of the Proposal

20. The Name of the Proposal is Birendranagar Water Supply and Sanitation Project

b. Name and Address of the Proponent

21. The Project proponent, Third Small Town Water Supply and Sanitation Sector Project (TSTWSSSP) of the Government of Nepal, Department of Water Supply and Sewerage (DWSS), Ministry of Water Supply and Sanitation (MoWSS), is responsible for the preparation of the IEE report.

c. 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 and Sanitation
Government of Nepal

Address of the Proponent:

Panipokari, Kathmandu
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Fax: 977 1 4413280
E-mail: info@stwsssp.gov.np
Website: www.sstwsssp.gov.np

d. Consultant Preparing the Report

22. TAEC Consultant P. Ltd. Joint Venture with Integrated Consultants Nepal Pvt. Ltd. is responsible in preparing this IEE report.

B. Background

23. In 2000, the Government of Nepal (GoN) endorsed the 15-year Development Plan for Small Towns Water Supply and Sanitation in order to improve health and economic and environmental living conditions of people in small towns in Nepal. The Plan adopts a community managed demand responsive approach, where the community is involved in all aspects of planning and implementation of its town's project. In support of GoN's endeavor, the Asian Development Bank (ADB) funded the Small Towns' Water Supply and Sanitation Sector Project (STWSSSP) in 2001-2008. Twenty-nine (29) small towns of about 570,000 people benefitted from the improved water supply and sanitation services delivered under the Project. The positive impacts of the STWSSSP led the GoN to embark on the Second Small Towns' Water Supply and

Sanitation Sector Project (2ndSTWSSSP), also financed by ADB and which benefitted another twenty-one (21) small towns. Following these two projects, the Third Small Towns' Water Supply and Sanitation Sector Project is currently being prepared to further support GoN's continuing efforts to improve water supply and sanitation service delivery in small towns in Nepal. The Project will follow the government's 15-year Development Plan, as updated in 2009, to develop the water and sanitation sector for small towns.

C. Project Area Description

Fig 1: Map of project area

24. The project area municipality is in the inner terai region with altitudes ranging between 285 to 315 m above mean sea level (amsl). The climate is essentially warm temperate or lower tropical. The temperature ranges from 3.4º to 40.8º Celsius. As in other Terai towns, it is very cold in winter and very hot in summer. The average annual rainfall is about 1170 mm.

25. The municipality is along the East-West Highway. The project area is about 30 km away from Bharatpur; the districts headquarter of Chitwan, and about 150 km from Kathmandu. There are regular flights from Kathmandu to Bharatpur, the nearest available airports. The municipality is along the East-West Highway (Bharatpur-Hetauda Section). The municipality is also linked with Malekhu on the Prithvi Highway (Naubise-Pokhara Highway) by the Chepang Highway.

D. Purpose of the IEE

26. The IEE was conducted to ensure the environmental sustainability of the Subproject, to integrate environmental considerations into the Subproject preparation process, and provide for environmental management during Subproject implementation. ADB and GoN require all projects to undergo environmental assessment. All projects funded by the ADB must comply with the Safeguard Policy Statement (SPS) 2009 to ensure that projects are environmentally sound, are

designed to operate in compliance with applicable regulatory requirements, and are not likely to cause significant environmental, health, or safety hazards. The rapid environmental assessment using ADB's REA Checklist has indicated that the Subproject is a Category B undertaking, requiring an IEE. On the GoN side, the statutory requirement that has to be adhered to is the Environment Protection Act (1997), and Environment Protection Rules (1997) and as amended in 1999 and 2007). Based on EPR Schedule 1, the Subproject is within the threshold of activities under the water supply and sanitation sector that will require IEE. This IEE fulfils the policy requirements of both the ADB and the GoN

27. The IEE Report primarily: (i) provides information on the Subproject and its environmental requirements; (ii) provides the necessary baseline conditions of the physical, ecological, physical cultural and socio-economic environments and/or resources in and surrounding the Subproject's area of influence; (ii) identifies and assesses potential impacts arising from the implementation of the Subproject on these environments and/or resources; (iii) recommends measures to avoid, mitigate, and compensate for the adverse impacts; (iv) presents information on stakeholder consultations and participation during Subproject preparation (v) recommends a mechanism to address grievances on the environmental performance of the Subproject; and (vi) provides an environmental management plan.

28. Relevant reports/documents, consultations with communities and relevant are included in report and reference to relevant government policies, laws and regulations and mainly the Terms of References (ToR) approved by MoWSS and Detailed Technical Design reports have been referred to this IEE.

E. Need for the Subproject

29. Although the existing water system in Birendranagar has been functioning well, the reliability and quality of services availed by the consumers is very low and services only in a small part of the town. The proposed area does not get regular piped water supply and majority of the households have to resort to hand pumps, In this scenario, when most of water supplied is poor quality and most of the households within the service area cannot avail proper drinking water services, the consumers in Birendranagar feel the need for a reliable and sustainable system. In light of this situation and desire for better and improved services, the consumers of Birendranagar organized themselves to approach the Small Towns Water Supply and Sanitation Sector Project to assist them. The Consultants have been assigned by the Project to help the beneficiaries to identify, develop and implement the most optimum water system for Birendranagar.

30. There are a few surface drains to drain street run-off and the municipalities do not have systematic collection, conveyance and disposal of solid waste from the town area. However, most of the households have septic tanks or pour-flush latrines in the urbanized areas of the

town. There are 66 pit latrines, 686 ventilated pit latrines, 1083 water seal/pour flush and 34 cisterns flush within the project area.

31. As a result, there is a significant demand of water from institutional and commercial users. Shortage of water is a major constraint to further growth. The existing system has design, construction, operation and maintenance deficiencies and requires upgrading and rehabilitation to meet the growing demand and to make drinking water available to the people of the service area throughout the year.

F. Relevancy of the Project

32. The proposed water supply and sanitation project is need to be studied from the environmental point of view as per EPA 1996 and EPR 1997, 2054 BS (Amendments 1999 and 2007). The Proposed water supply and Sanitation Project is intended to serve drinking water to complete area of ward no. 10 of Rapti Municipality and partial areas of ward no. 6, 9 & 11 of Rapti Municipality and ward no. 15 of Khairehani Municipality. The proposed project shall be using ground water sources to benefit a design population of about 22,100. (Design Year 2037).

33. As the proposed project falls within the definitions provided in the EPR 1997(Amendments 1999 and 2007) Annex 1 (G) for drinking water projects; only an IEE should be done. The regulation stated in Annex 1 (H) shall only be applicable, if the proposal does not fall under categories (A) through (H) of Annex 3.

Table I-1: Criteria for Requirement of IEE and/or EIA for Drinking Water Supply Projects as per Annex 1 and Schedule G and Annex 3 Schedule H of Environment Protection Regulation 1997 Amendment 2007

S.N.	Condition described in the Act and Regulations	IEE Required as per the Regulation Annex 1 G	EIA Required as per the Regulation Annex 3 H	Conditions in the Project
1	River Control (Training)	Up to 1 Kilometer	Over 1 Kilometer	Within the Limit
2	Channeling water from one watershed to another	Applicable	Applicable	NA
3	Rain water collection and use of spewing wetland	Up to 200 hectares	More than 200 hectares	NA
4	Supply of water in dry season from surface water with a safe yield of	Up to 1 cusec and utilizing up to 50% of the available quantity	More than 1 cusec and utilizing the total available quantity	Within the Limit
5	Ground water Recharge	Up to 50% of total aquifer	More than 50% of aquifer	NA
6	Water Treatment	Up to 25 liter per sec	More than 25 liter per sec	Within the Limit
7	Construction of tunnel for Channeling drinking	Tunnel constructed		Not constructed

	water			
8	Water Resource Development which displaces people permanent residents	25 to 100 people	Over 100 people	NA
9	Settlement of people upstream of water source	Settlement of up to 500 people	Settlement of above 500 people	NA
10	Supply of water to a population of	5,000 to 50,000	Over 50,000	NA
11	***Connection of New Source to supply water to existing water supply system for a population of***	***10,000 – 100,000***	***More than 100,000***	***The current population of the project is 11,053 in 2015 and the design population is 22,100 in 2037***
12	Operation of a drinking water supply system with inclusion of sewage disposal system with sewage treatment system	Applicable		NA
13	Extraction of ground water from sources which are located at point and non-point sources of biological and chemical pollution and/or their influenced areas	NA	Extracted	No non point and point sources of pollution is present in the vicinity of the water source
14	Operation of water supply project included in a multipurpose project utilizing a source of 25 liter per sec water. (Construction of Multiple Purpose Reservoir Required)	NA	Applicable	This is not a multipurpose project and is solely for water supply.

G. Overview of the Subproject

34. The Subproject will improve the water supply system of 5 Wards among 12 wards of Birendranagar Municipality. The Birendranagar sub-project is based on groundwater pumping with overhead RCC Tanks for distribution. The three DMA/ subsystem are also inter-linked and

water from one DMA/SUB system can be supplied to another DMA/Sub system in case of maintenance and other unforeseen events.

35. The major sub-components of the sub-project with their characteristic features are described in the sections below.

Table I-2: Population to be Served & Total Water Demand

Ward No.	Population in Year (AD)					Demand liters in Year (AD)				
	2017	2022	2027	2032	2037	2017	2022	2027	2032	2037
9 RA	3,411	4,028	4,761	5,633	6,672	431,491	509,542	602,266	712,574	844,008
10 RA	3,955	4,643	5,454	6,409	7,537	500,307	587,339	689,931	810,738	953,430
11 RA	1,708	1,952	2,231	2,551	2,918	216,062	246,928	282,221	322,701	369,127
6 RA	2,098	2,473	2,919	3,449	4,080	265,397	312,834	369,253	436,298	516,120
15 KH	588	653	725	804	893	74,382	82,604	91,712	101,706	112,964
Total	11,760	13,749	16,090	18,846	22,100	1,487,639	1,739,247	2,035,383	2,384,017	2,795,649

36. The entire service area has been divided primarily into 3 DMA. Area north-west of Khurkhure Chowk and East- West Highway has been considered as DMA-1, area north-east of Khurkhure Chowk and East- West Highway has been considered as DMA-2 and entire project area south of East-west Highway has been considered as DMA-3.

37. Three set of boreholes and 450 cum capacity OHT are proposed for the entire sub-project. The capacity of reservoir has been determined by the recommended consumption pattern and proposed pumping hours with possible design yield of Tubewell.

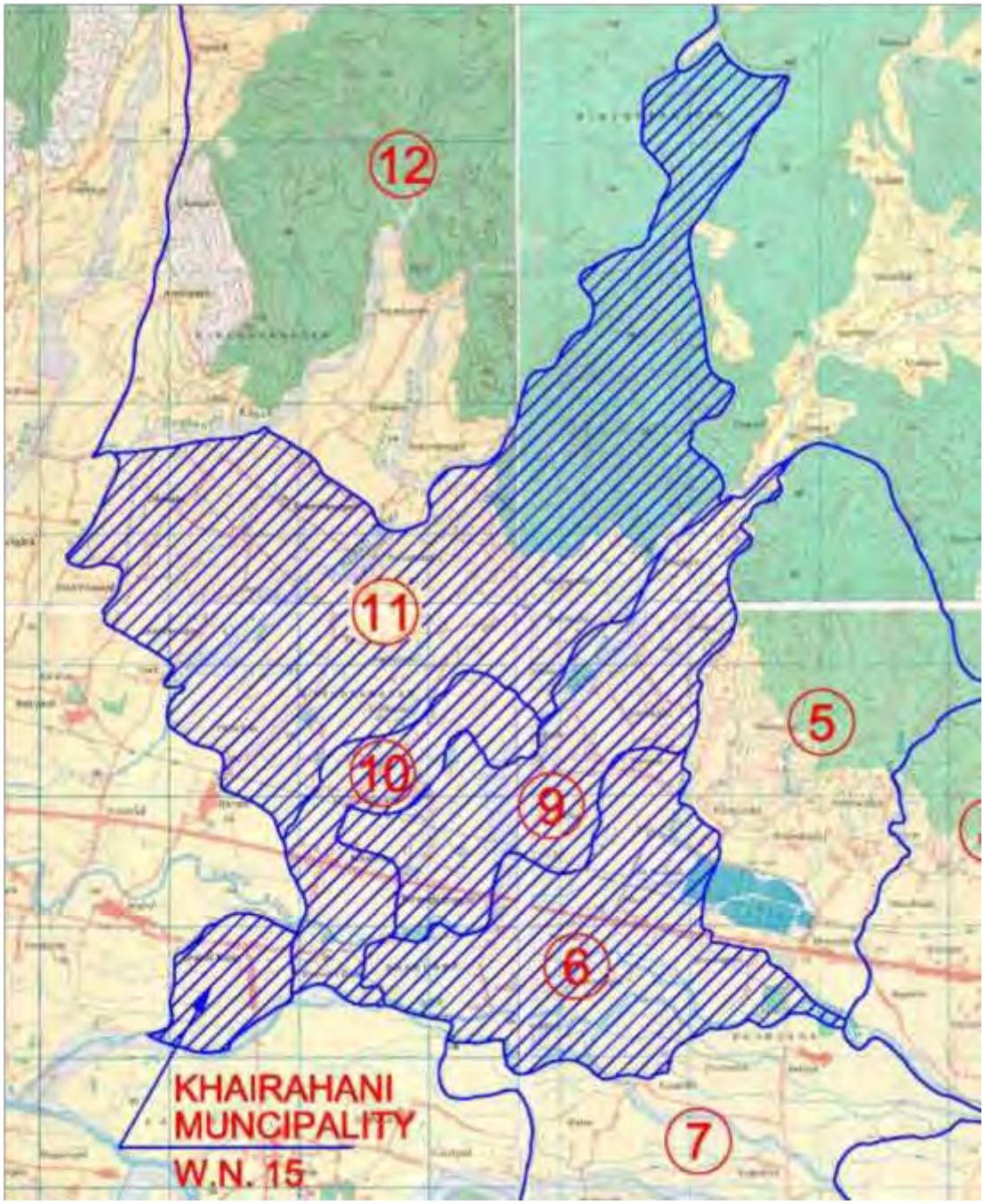


Figure 1-1: Proposed Service Area

38. The estimated capital cost for the water supply components is NRs 302,658,472.78 including 15% contingency and 13% VAT. The annual O&M cost for the proposed system ranges from NRs 5,614,594 in 2017 to NRs 9,992,655 in 2036.

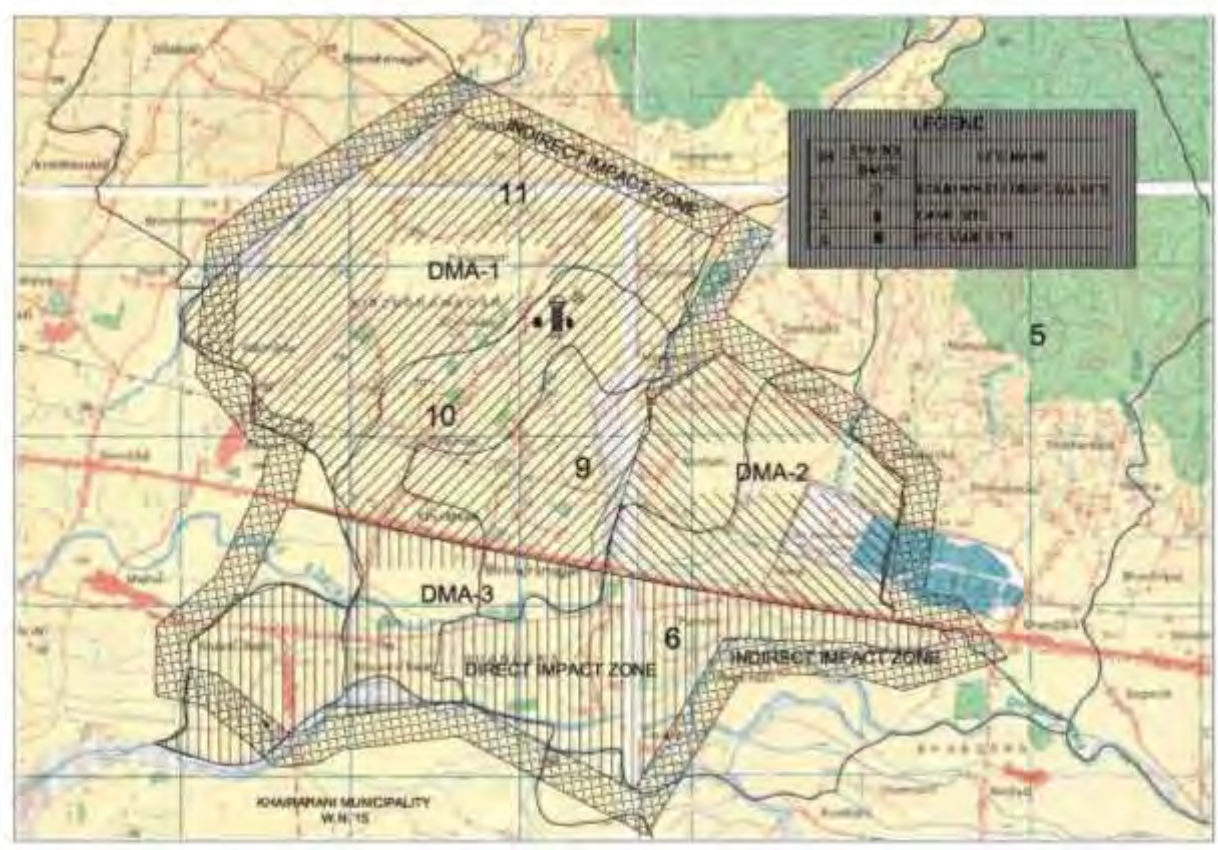


Figure I-2: Layout showing OHT and other sites of the project area

39. The Project Management Office (PMO) of the Department of Water Supply and Sewerage (DWSS) is the proponent of the proposed Birendranagar Water Supply and Sanitation Subproject. Implementation period will be two years, including operation and maintenance.

H. Methodology Adopted for the Study

40. 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. It reviewed the relevant documents on water supply and sanitation in the country, PPTA report and the feasibility report. Similarly, the reports on hydrology, meteorology, geology and others related to the environment were also reviewed.

41. 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 of different sectors and conducted meetings, brainstorming sessions, field examinations, and data gathering and processing for the purpose. The team also made walk through surveys of the project area to identify the environment structure and potential areas which need to be taken into account.

42. A checklist was prepared and the findings and mitigation measures required, where necessary, have been described. The major parameters of concern were identified and their significance evaluated.

43. The consultant has addressed environmental aspects by furnishing information on Physical, Biological, Socio-economic and Cultural Environments.

Physical Environment Assessment

44. Existing environment constraints and potential impacts in the project area were studied through field surveys, complemented by secondary information from reports and interviews with some government officials, schools and representatives of the local bodies.

Biological Environmental Assessment

45. The information on the biological environment was gathered through site visits, filed surveys of the project site and surrounding areas. The methods used for the collection of biological information are as follows:

- Collection of ethno-botanical information on socio-economically important plant species through consultation with local informants.
- Ethno-zoological data have been obtained by conducting interviews and discussion with local informants.
- Information on local uses of aquatic biota, fish spawning sites, migration patterns, weedy aquatic plants etc. were obtained holding interviews/discussions with local informants.

Socio-economic and Cultural Environment Assessment

46. Social assessment has attempted to determine the social implications in terms of assumed positive and negative impacts. Primary data for the Initial Social Assessment, which is an integral part of the Initial Environment Examination (IEE), were obtained mainly through Focus Group Discussions with communities. Additional data were collected from general documents on the districts and household survey questionnaires.

I. Team Members for IEE Study

The following experts were mobilized to complete the IEE study of Birendranagar Water Supply & Sanitation Project (Table I-2).

Table I-2: Study Team for IEE Study of the Project

S.N.	Name of Expert	Designation	Expertise field
1	Sahash Nath Adhikari	Team Leader	Environmentalist/GIS Expert/EIA Expert
2	Prahlad Devkota	Researcher	Civil Engineer
4	Yogesh Shakya	Researcher	Environmentalist/Forestry Expert
5	Dhurba Pokharel	Researcher	Zoology Expert
6	Kabita Poudel	Researcher	Botany Expert
7	Roshan Subedi	Researcher	Socioeconomic Expert
8	Gautam Prasad Khanal	Researcher	Geology Expert
9	Rubi Koju Shrestha	Researcher	Data Analyst

II POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

47. Comprehensive review of existing national laws, policies, acts, regulations, standards and guidelines have been reviewed while conducting this IEE study. Review of these documents is necessary to ensure that the project is implemented with minimal negative social and environmental impacts. The Project is subject to the environmental safeguard requirements of both ADB and the Government of Nepal. Major documents reviewed during this IEE study relevant to the proposed project are listed below:

A. ADB Policy

48. All projects funded by the ADB must comply with the Safeguard Policy Statement (SPS) 2009 to ensure that projects funded under ADB loan are environmentally sound, are designed to operate in compliance with applicable regulatory requirements, and are not likely to cause significant environmental, health, or safety hazards. With respect to the environment, the SPS 2009 is underpinned by the ADB Operations Manual, Bank Policy (OM Section F1/OP, 2010). The policy promotes international good practice as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines.1
ADB's Environmental Safeguards policy principles are defined in SPS (2009), Safeguard Requirements as per Table II-2: and the IEE is intended to meet these requirements.

Table II-2: SPS 2009 Safeguard Requirements

SPS 2009 - Safeguard Requirements	Remarks
Use a screening process for each proposed project, as early as possible, to determine the appropriate extent and type of environmental assessment (EA) so that appropriate studies are undertaken commensurate with the significance of potential impacts and risks.	REA has been undertaken, indicating that Subproject is **NOT**: (i) environmentally critical; and (ii) adjacent to or within environmentally sensitive/critical area. The extent of adverse impacts is expected to be local, site-specific, confined within main and secondary influence areas. Significant adverse impacts during construction will be temporary & short-term, can be mitigated without difficulty. There is no adverse impact during operation. Hence, IEE is sufficient.
Conduct EA to identify potential direct, indirect, cumulative, & induced impacts and risks to physical, biological, socioeconomic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), and physical cultural resources in the context of the project's area of influence.	IEE has been undertaken to meet this requirement. (Section VI). No transboundary& global impacts, including climate change.

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

SPS 2009 - Safeguard Requirements	Remarks
Assess potential transboundary global impacts, including climate change.	
Examine alternatives to the project's location, design, technology, and components and their potential environmental and social impacts and document the rationale for selecting the particular alternative proposed. Also consider the no project alternative.	Analysis of alternatives is presented in Section III.
Avoid, and where avoidance is not possible, minimize, mitigate, &/or offset adverse impacts and enhance positive impacts by means of environmental planning & management. Prepare an EMP that includes the proposed mitigation measures, environmental monitoring and reporting requirements, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators.	An EMP has been prepared to address this requirement. Section IX
Carry out meaningful consultation with affected people &facilitate their informed participation. Ensure women's participation. Involve stakeholders, including affected people & concerned NGOs, early in the project preparation process & ensure that their views & concerns are made known to & understood by decision makers and taken into account. Continue consultations with stakeholders throughout project implementation as necessary to address issues related to EA. Establish a GRM to receive & facilitate resolution of affected people's concerns & grievances on project's environmental performance.	Key informant and random interviews have been conducted. . A grievance redress mechanism for the resolution of valid Project-related social and environmental issues/concerns is presented in Section VIII.
Disclose a draft EA (including the EMP) in a timely manner, before project appraisal, in an accessible place & in a form & language(s) understandable to affected people & other stakeholders. Disclose the final EA, & its updates if any, to affected people & other stakeholders.	The draft IEE will be disclosed on ADB's website prior to Project appraisal. The GoN has approved the IEE Report. Copies of both SPS-compliant IEE and GoN-approved IEE will be made available at the offices of the PMO, ICG and WUSC for public consultation.
Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclose monitoring reports.	EMP implementation, reporting and disclosure of monitoring reports are in this IEE.
Do not implement project activities in areas of critical habitats, unless (i) there are no measurable adverse impacts on the critical habitat that could impair its ability to function, (ii) there is no reduction in the population of any recognized endangered or critically endangered	The subproject does not encroach into areas of critical habitats. No tree will be cut. However, ground cover and low shrubs in the subproject footprint and some work easement will have to be removed for the transmission main. Although in due time, ground cover is expected to naturally

SPS 2009 - Safeguard Requirements	Remarks
species, and (iii) any lesser impacts are mitigated. If a project is located within a legally protected area, implement additional programs to promote and enhance the conservation aims of the protected area. In an area of natural habitats, there must be no significant conversion or degradation, unless (i) alternatives are not available, (ii) the overall benefits from the project substantially outweigh the environmental costs, and (iii) any conversion or degradation is appropriately mitigated. Use a precautionary approach to the use, development, and management of renewable natural resources.	grow over the backfilled affected area, EMP recommends seeding of the re-surfaced area to accelerated re-growth.
SPS 2009 - Safeguard Requirements 1	**Remarks**
Apply pollution prevention and control technologies and practices consistent with international good practices as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines. Adopt cleaner production processes and good energy efficiency practices. Avoid pollution, or, when avoidance is not possible, minimize or control the intensity or load of pollutant emissions and discharges, including direct and indirect greenhouse gases emissions, waste generation, and release of hazardous materials from their production, transportation, handling, and storage. Avoid the use of hazardous materials subject to international bans or phase-outs. Purchase, use, and manage pesticides based on integrated pest management approaches and reduce reliance on synthetic chemical pesticides.	This requirement is only minimally applicable to the Subproject in the aspect of waste generation, e.g., effluent from septic tanks and generated sludge and sludge disposal from water supply and sanitation structures. The Subproject will not involve hazardous materials subject to international bans/phase outs.
Provide workers with safe and healthy working conditions and prevent accidents, injuries, and disease. Establish preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks to the health and safety of local communities.	EMP provides measures to mitigate health and safety hazards during construction and operation.
Conserve physical cultural resources and avoid destroying or damaging them by using field-based surveys that employ qualified and experienced experts during environmental assessment. Provide for the use of "chance find" procedures that include a pre-approved management and conservation approach for materials that may be discovered during project implementation.	The Subproject will not affect any physical cultural resource. The EMP recommends the measure/s to mitigate adverse impact on PCRs in case of chance find.

B. National Laws, Acts & Regulations, Plan & Policies ; Standards and Guidelines

49. Most of the national law, acts, policies, and standards of the Government of Nepal (GoN) are in favor of environmentally sound economic development and growth. The relevant law, Acts and Regulations; Plan & Policies; and guidelines that have been an integral part of the project and have been reviewed during the preparation of the IEE report.

2.1 Law

Constitution of Nepal, 2072

50. State Policies, under the Constitution of Nepal promulgated in 2072 (2015), stress for the followings in Clause 51 (Chha) (5), (6) and (7) related to conservation and sustainable use of natural resource.

(5) Conservation and sustainable use of forest, wildlife, birds, plants, and biodiversity by reducing damage/threat from industrial and physical development to environment through raising public awareness about the clean environment.

(6) Retain forest areas where necessary for maintaining environmental balance.

(7) Undertake appropriate measures to eradicate or to mitigate adverse environmental impacts that have or could have on nature, environment, and biodiversity.

Interim Constitution of Nepal, 2007 (2063 BS)

51. The interim constitution of Nepal realized environmental protection as the policy of the state. Clause (4) of Article (35) of the constitution states that 'The State shall, while mobilizing the natural resources and heritage of the country that might be useful and beneficial to the interest of the nation, pursue a policy of giving priority to the local community'. The Clause (5) states that 'The State shall make necessary arrangements to maintain the natural environment. The State shall give priority to special protection of the environment, and rare wildlife, and prevent further damage due to physical development activities, by increasing awareness of the general public about environmental cleanliness. Provision shall be made for the protection of the forest, vegetation and biodiversity, their sustainable use and for equitable distribution of the benefits derived from them'.

2.2 Acts and Regulations

Environmental Protection Act (EPA), 1997 & Environmental Protection Regulations (EPR), 1999 (and amendments)

52. EPA and EPR have several provisions to institutionalize environmental consideration in development projects. Section (5) of EPA stipulates that 'a proponent who is desirous of implementing any proposal shall have to submit such a proposal, accompanied by the report on Initial Environmental Examination or Environmental Impact Assessment of the proposal, to the concerned agency for the approval of such a proposal. The EPR elaborates provisions to prepare and submit the scoping report, Terms of Reference (TOR), and IEE/EIA report for approval and includes public consultation processes. As per the EPR, the Environmental Assessment report, in general, should include detail information on impacts and environmental protection measures, including implementation plan, monitoring and evaluation and environmental auditing. Public consultation is a pre-requisite in all the proposed projects.

Local Self Governance Act, 1999 & Local Self Governance Regulations, 2000

53. The Act empowers the local bodies for the conservation of soil, forest and other natural resources and implements environmental conservation activities. It also describes about the user group formation to implement the programs in the local areas. The Regulation has provisions for Village Development Committee (VDC), District Development Committee (DDCs) and municipality to coordinate and implement development projects/programs and to provide approval or clearance of the proposed project.

Water Resources Act (1992) and Water Resources Regulations (1993)

54. The Water Resources Act (1992) is the umbrella act that regulates water resources management of the country. The act has declared water use by priority and gives the state the power of water ownership. The act also provides with a system of establishing water user groups/associations and a system of water licensing. Most importantly, the act prohibits pollution of any water resources of the country.

55. Meanwhile, the Water Resources Regulations (1993) is an umbrella regulation governing water resources management of the country. This regulation sets out procedures to register Water Users Groups and to obtain licenses. This regulation establishes the District Water Resource Committee, sets out the rights and obligations of Water User Associations and license holders, and deals with the acquisition of house and land compensation.

Drinking Water Regulations (1998)

56. The Drinking Water Regulations of 1998 has set out standards for the quality of drinking water that needs to be maintained. The water supplier should maintain the standards set forth in Section 18 of the Water Supply Act. Similarly, the Regulation also states that the supplier of water should not construct project structures or perform any other activities that pollute the source of water. No adverse impacts on the environment should occur due to construction or other project implementation activities.

Nepal Water Supply Corporation Act, 1989 (and amendments) & Water Supply Management Board Act, 2006 & Water Supply Tariff Fixation Commission Act, 2006

57. The Nepal Water Supply Corporation (NWSC) Act, 1989 establishes the NWSC as a public corporation responsible for providing clean drinking water and sewerage services to the urban public. The scope of work of the Corporation has been determined by HMG by notification in the Gazette. This Act establishes the right of people to drinking water and sanitation and imposes duty on the state to provide safe drinking water and sanitation for its citizens.

58. The NWSC Act along with Water Supply Management Board Act and Water Supply Tariff Fixation Commission Act facilitate the improved management of water and sanitation services. They establish the legal basis for private sector management of schemes and independent fee setting and regulation applicable to all water supply schemes in the country.

Water Tax Act, 1966

59. The Water Tax Act of 1996 and its subsequent amendments provide with a regulatory mechanism through which the water users are obliged to pay for the drinking water they receive from government installed drinking water taps. Under this act, if the water users default in paying the required tax, they are required to pay additional fees. The distribution of water can be discontinued in the households defaulting in paying required taxes for a prolonged period.

Solid Waste Management Act, 2011

60. According to the Solid Waste Management Act, 2011 the responsibility to manage or cause to manage solid waste shall rest with the Local Body. Also, the responsibility for processing and management of hazardous waste, medical waste, chemical waste or industrial waste under the prescribed standards shall rest with the person or institution that has generated the solid waste. If any industry or medical institution requests for the management of solid waste remained after processing of hazardous waste, medical waste, chemical waste and industrial waste or other solid waste, or for using a Sanitary Landfill Site constructed by the Local Body, the Local Body may manage the solid waste or allow the institution to use the Sanitary Landfill Site by levying fees as determined by the Local Body.

61. The Act also provides that individuals and entities have the duty to reduce the amount of solid waste generated while carrying out work or business. On top of the institutions responsible for the management of solid waste and the duty of the project implementers to reduce solid waste, the act also provides provisions on the segregation, discharge, transportation of solid waste as well the Local Body's responsibility to designate a solid waste disposal site. The act also asks for the Local Bodies to promote reduce, reuse and recycle of solid waste by coordinating with concerned parties implementing the project.

Land Acquisition Act, 1977 & Land Acquisition Rules, 1969

62. The Land Acquisition Act and the Rules are the two main legal instruments that specify procedural matters of land acquisition and compensation. Under these, the Government is allowed to acquire any private land paying reasonable compensation to the affected party for any public purposes or for operation of any development project initiated by government institutions and the water resources laying and originating within such acquired area is spontaneously acquired under this process.

Forest Act, 1992 and Forest Regulations, 1993

63. Forests are an essential component for a healthy environment and this has been recognized in the Forest Act and Forest Regulations. The act makes it a requirement that every step be taken to ensure a healthy forest environment and conservation of the existing forests. The state has the capacity to providing land for project implementation provided that no adverse impacts on the environment occur. The state can also designate a forest as "protected" if the forest land is of social, cultural or environmental importance. The government can provide parts of any type of forest for the implementation of national priority plan with the assurance that it does not adversely affect the environment. No activities can be performed on a protected forest without compensating the government of the adverse impacts that the project may cause. The Regulation further elaborates legal measures for the conservation of forests and wild animals.

Labor Act, 1992

64. The Labor Act, 1992 is primarily concerned with the occupational health and safety of the laborers of a project. The act asks for the project developers to provide the laborers with necessary safety gears while working around potentially hazardous areas and equipments. The act also instructs various arrangements to be made in order to remove and dispose wastes (fumes, dust, vapor, etc.) from a project site without affecting the health and well being of the laborers.

Child Labor Prohibition and Regulation Act 2001 A.D.

65. This Act prohibits children from engaging in construction and any other work. Clause 3 of the Act in its subsequent sub-clauses state that no child under the age of 14 shall be employed in any work as a laborer. Similarly, it also states that no child shall be employed in any risky business or work referred to in the Schedule. Moreover, no child shall be engaged in works as a laborer against their will, or by temptation, fear and other means.

2.3 Plan and Policies

National Policy on Rural Drinking Water Supply and Sanitation, 2004

66. The National Policy on Rural Drinking Water Supply and Sanitation provides guidance on water and sanitation service provision in rural areas using community led participatory approaches. The policy mentions that every measure will be taken to reduce environmental impacts while carrying out water supply projects. The policy also requires that participants of gender, caste, and disadvantaged groups be made essential to all decision making process of any water supply projects with special emphasis on their meaningful participation. Environmental and Social impacts two of the major components that shall be included in measuring the achievements mentioned in the sectoral strategy relating to benefit monitoring and impact evaluation of water supply and sanitation projects.

The Thirteenth Plan (2013/14- 2015/16)

67. The major objective of the Thirteenth Plan of Nepal is to provide basic services of drinking water and sanitation to all people of the country. In its drinking water and sanitation strategy, the Thirteenth Plan mentions that environmentally friendly and climate adaptive measures will be adapted by using local resources in the construction of drinking water and sanitation structures. The plan also mentions that drinking water services will be expanded to the rural areas of the country based on their cost bearing capacities. Traditional sources of drinking water will also be preserved.

2.4 Standards and Guidelines

National EIA Guidelines, 1993

68. The Seventh Plan (1985-1990) stressed the need for an Environmental Impact Assessments (EIA) for major projects to be implemented in the country. Although a few major hydropower, irrigation, drinking water, and road projects had conducted EIAs, the studies were not a mandatory requirement of the government. The main reason was that there was no documentation on systematically including environmental considerations in development project. The National EIA Guidelines, 1993 is a result of reemphasis of EIA made in The Eighth Plan

(1990-1995). The guidelines includes the objectives, methods of project screening to conduct IEE or EIA as needed, scoping, identification and mitigation of impacts, review of IEE and EIA reports, environmental impact monitoring, evaluation, auditing, and community participation during IEE and EIA preparation.

National Drinking Water Quality Standards (NDWQS) and Directives, 2005

69. The NDWQS and directives provides with the details of the water quality standards to be applied to all water supply schemes. These set out the water quality parameters, which the water suppliers should adhere to. The directives also ensures that the water sampling, testing and analysis procedures used to certify that the drinking water supplied or to be supplied conforms to the NDWQS and also sets the monitoring and surveillance procedures to certify that the quality of supplied water conforms to the standards.

Water Resource Strategy, 2002

70. Provides a systematic framework for water resource development and identifies action plans to avoid and resolve conflicts and achieve water related development objectives. It has identified the need to integrate and coordinate all the uses of natural resources within the catchment basis and has laid emphasis on the development and management of water resources in a holistic, systematic manner, relying on integrated water resources management.

C. IEE Approval Process of Nepal

71. The Environmental Protection Rules (EPR) defines for the preparation, review, and approval of the IEE report. The process applicable to the Subproject is summarized in Table II-3 below. The key environmental quality standards applied in the GoN IEE (as well as in the ADB IEE) are listed in Table II-4 and their details featured as Annex 2-B.

Table II-3: The GoN IEE Report Preparation, Review, Approval and Implementation Process

Steps in the Process	Remarks
Proponent refers to EPR Schedules 1 & 2 for the required environmental assessment (IEE or EIA) to carry out.	Subproject requires an IEE.
If proposed project requires an IEE, Proponent prepares an IEE schedule of work/ToR using the format prescribed in Schedule 3 of the EPR and submit this to the CSA for approval.	Subproject has secured an approved ToR.
Proponent carries out IEE according to the approved work schedule/ToR and prepares an IEE Report following the format prescribed in EPR Schedule 5 and incorporating stakeholders' feedback applying the consultation procedure specified in the EPR.	Subproject carried out the IEE and prepared the IEE Report accordingly.

Steps in the Process	Remarks
Proponent submits 15 copies of the IEE Report along with the project proposal and recommendation of the concerned VDC or Municipality to the CSA.	Subproject submitted documents accordingly for review and approval.
CSA conducts review and grants approval of IEE Report.	Subproject's IEE Report has been approved, without having
➢ If review reveals project implementation to have no substantial adverse impact on the environment, CSA grants approval within 21 days from receipt of report.	To undertake EIA.
➢ If review reveals the necessity to carry out an EIA, Proponent conducts an EIA following the prescribed EIA process.	
Proponent implements approved IEE Report and any terms and conditions given with the approval.	Subproject has not started implementation.
CSA monitors and evaluates impact of project implementation. When necessary, issue directives to the Proponent to institute environmental protection measures.	Subproject has not started implementation.
MoSTE conducts environmental audit after two years of project commissioning/operation.	Subproject has not started implementation.

CSA Concerned Sector Agency
EPR Environment Protection Rules, 2054 (1997), with amendments in 1999 and 2007
MoPE Ministry of Population and Environment
VDC Village Development Committee

Table II-4: Relevant Environmental Quality Standards

Particular	National Standard	International Standard
Ambient air quality	National Ambient Air Quality Standards, for Nepal, 2003	WHO Air Quality Guidelines, Global Update, 2005
Emission standard for diesel generator discharge to ambient Air	Emission standard for diesel generator	EPR-15, 1997
Noise	National Noise Standard Guidelines, 2012	WHO Guideline Values on Noise Level
Drinking water quality	National Drinking Water Quality Standards, 2006	WHO Guidelines for Drinking-water Quality, Fourth Edition, 2011

* For surface and ground water quality monitoring, the National Drinking Water Quality Standard shall be applied since these resources are used for drinking.

III ANALYSIS OF ALTERNATIVES

A. With- and Without-Subproject Alternatives

72. The project area is a major junction and booming market place on the East-west Highway. The town is facing increased problems to water supply. The overall sanitary condition of the project area is reasonably satisfactory.

73. **Without-subproject' or 'do-nothing' alternative**: Doing nothing about these challenges would be allowing the subproject municipality to further develop as "under-serviced", put the health of its residents and the general public at more risks, and worsen its living environment. This would impede: (i) further social and economic development project municipality and (ii) Nepal's delivery of its commitment to SDG 6th to increase the proportion of population with sustainable access to safe drinking water and basic sanitation.

74. **With subproject alternative**: With the Subproject, 1,922 households in the municipality will have convenient access to reliable and adequate safe and potable water supply and easy access to sanitation at public place so that it helps to improve health and sanitation. As a result, good hygiene and sanitation practices will be promoted; there will be reduced health and safety risks. Overall, with subproject alternative will bring about enhanced 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.

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

B. Alternatives Relative to Planning and Design

76. The proposed system is very small and does not have any alternative for a comparative study. Hence, no alternative system analysis has been carried out.The major component of a ground water based water supply system consists typically of boreholes with pumps, treatment unit, over head RCC reservoir and distribution system. It was assessed that the proposed water supply system with adequate treatment will have very small negative impact on the environment. However, there will be substantial improvement in personal hygiene thereby increasing the quality of life and community health. The WUSC has finalized the required site of land for OHT,

reservoir and treatment plant. All water supply components will be constructed on the land owned by WUSC. Apart from this, the project will not have any resettlement, relocation or compensation issue.

IV DESCRIPTION OF SUBPROJECT

A. Subproject Site

77. Birendranagar town subproject is one of the subprojects proposed under TSTWSSSP. Birendranagar town is partially served by the existing water supply system. The existing water supply system, constructed by the Water Supply and Sanitation Division Office in 2000 AD, is one piped water gravity supply system with an old reservoir of 200 cum and new RCC reservoir of 60 cum capacity and a network of 2500 m of transmission providing an intermittent supply (4 hours daily) through 1057 private household connections. The source of water for the existing system is spring boreholes of 250/200 mm diameter, 89 meters in depth and fitted with submersible pumps of 4 HP. The system comprises of two spring sources with an yield of about 4.63 lps. Only a partial area of wards No 1 to 5 of Birendranagar VDC is served by this Amrit Khanepani system. This system mainly covers large settlements of ward no 5 of Birendranagar VDC.

78. The major source of water for the proposed Birendranagar Town Water Supply and Sanitation Sub-project shall be groundwater. The initial assessment also indicated that the general depths of the wells (Size 250/150 mm) will be 120-130 meters with screen length varying from 26 – 30 meters with yield of 20 – 25 liters per second. The expected DTW will be within these ranges.

79. The proposed service area of the project consists of wards wards 6, 9 and 10 of the newly established Rapti municipality and ward 15 of Khairahani municipality having a total population of about 11,053 with 1,922 households according to the socio-economic profile survey. The service area delineation has been done in consultation with WUSC, WSSDO and other stakeholders. The service area was finalized in the presence of various stakeholders as described in the following sections considering location, topography, terrain, settlement pattern and adequacy of sources.

Figure IV-1: The Subproject Area

B. The Subproject

80. In order to manage none -revenue water (NRW) in the proposed system, the total system has been divided primarily into 3 DMA. Area north-west of Khurkhure Chowk and East-West Highway has been considered as DMA-1, area north-east of Khurkhure Chowk and East-West Highway has been considered as DMA-2 and entire project area south of East-west Highway has been considered as DMA-3.

81. The boreholes shall discharge 22 to 30 lps, which shall be pumped using 42 HP submersible pumps. A submersible pump will be placed at around 60 m below ground level with an expected yield of 20-22 lps. The boreholes shall be used alternatively to avoid unnecessary wear and tear. The different subproject structures will consist of:

- Tubewell
- Pumps and Pumping System
- Electrical Facilities
- Treatment Facilities
- Reservoir
- Distribution Main
- House Connections
- System Appurtenances
- Guard Quarter and Boundary Wall
- Repair of Existing Storage Tank and Other Assembly
- DMA Establishment

1. Tubewell

82. Secondary geo-hydrological information reveals that the drilling depth varies from 100 to over 130 meters in Chitwan District. However, based on the results of a recently installed borehole in the neighboring area, the total depth of Tubewells is about 120 to 130 meters. The boreholes shall be used alternatively to avoid unnecessary wear and tear, excessive drawdown and reliability. The details of the Tubewell and boreholes are given below.

- Screen diameter of 250 mm diameter required for this depth and discharge according to IS 8110: 2000 has been used

  As the lithological information is not very good in previously developed Tubewells of neighboring areas, stainless steel screen of about 24 m with at least 22% opening area has been proposed in order to draw at least 20 lps from one well of around 150 m depth. Details are given below:

Table IV-1 : List of items used for porposed water supply project

Description of Items	
Proposed depth of Borehole (m)	~150
Required No. of Tube well	3
Diameter of ERW Housing/Casing Pipe (mm)	250
Length of Steel Screen (m)	~24
Pump Capacity in each DTW (HP)	~32 to 37
Transformer Capacity (KVA)	150

2. Pump

83. Submersible pumps with the required capacity to serve the design year demand have been recommended.For ease in replacement, maintenance and repair submersible pumps of same capacity of 42 HP for all boreholes shall be installed. The pumps will be connected to the control board by a flat submersible cable. Each borehole shall have pumps installed and one pump will be provided as a standby.

3. Electrical Facilities

84. OHT and a 11 kV transmission line are located inside the same premises with a distance of 25-30m away from OHT.

85. The Transformer is used to stepdown the 11 kV voltage to 415/230 V. The three-phase, 50 Hertz, oil-immersed, natural –cooled transformers suitable for outdoor installation are proposed. The capacity of the transformer is of 125 kVA.

4. Reservoir

86. One RCC overhead tank, having 450 cum capacity, shall be constructed for the entire sub-project. The base of the reservoir tank is proposed at an elevation of at least 20 meters above the ground. This will ensure adequate pressure in the system. The capacity of the reservoir has been determined by the recommended consumption pattern and proposed pumping hours with the possible design yield of the Tubewell. The Consultants also recommend that appropriate geo-technical investigation be carried out during the detailed design/construction phase at the reservoir location to determine the soil properties.

5. Water Treatment Facility

87. The primary function of WTP is to produce treated water that is reliable, safe and economical. WTP is an avoidable component of the sub-project, especially when high quality water is desired. The treatment of ground water differs from surface water. The process design of the treatment plant includes detailed calculations about the numbers, size and shapes of various units, hydaulic levels to be maintained in these units and a general layout of the plant,

along with locations of all supporting units such as the electrical substation, store, laboratory and guard house.

6. Water Quality and Treatment System

88. Water quality assessment has been done at three levels – one by visual observation of the water being consumed and through socio-technical surveys; secondly conducting simple bacteriological tests (Coliform P/A Test Vial)[1] which has been developed by ENPHO to determine the presence of Coliform bacteria at the water source and water use points and thirdly, water samples were obtained from water use points and sources to test for various physical and chemical parameters. The results of the Coliform P/A Test Vial shown that the samples collected are bacterially polluted.

89. Only a few samples taken from household hand pumps gave positive result indicating bacteriological (Coliform) contamination. This is generally due to unhygienic conditions at the hand pump location, i.e. lack of drainage and proper sealing of the hand pump area by concrete platforms. Besides the P/A tests for determining the presence of bacteria, samples were collected from major three locations, 1-Spring Source of Amrit Khanepani System, 2- Deep Tubewell of Amrit System and 3-One Hand Pumps at Ward no 1.

Table IV-2 : Water Quality Test of the existing sources

Parameters	Unit	Samples				NDWQS Guide Line
		Existing spring source of Amrit Khanepani	Deep tube well of Amrit Khanepani	User's Hand Pumps at Ward #1	Test Bore Well	
pH (26ºC)	-	7	7.1	6.9	6.7	6.5-8.5
Electrical Conductivity	uS/cm	171	327	480	331	1500
Turbidity	NTU	<1	2	<1	0.3	5
Total Hardness	mg/l as CaCo3	88	167	255	124	500
Total Alkalinity	mg/l as CaCo3	89	171	242		-
Chloride	mg/l	3.50	5.50	10	29	250
Ammonia	mg/l	0.05	<0.05	0.05	<0.2	1.5
Nitrate	mg/l	4.13	5.54	8.49	44	50
Nitrite	mg/l	<0.02	<0.02	<0.02		-
Calcium	mg/l	24.05	52.90	75.35	58	200
Magnesium (Mg)	mg/l	6.80	8.50	16.30		-
Iron (Fe)	mg/l	0.11	0.14	0.11	<0.2	0.3 s
Manganese	mg/l	<0.02	<0.02	<0.02	<0.2	0.2
Arsenic (As)	mg/l	<0.005	<0.005	<0.005	<0.01	0.05

1 This on-site bacteriological test is based on the principle developed by Manja et. al in 1982. The test is based on the readily observable formation of black precipitate iron sulfide in the test bottle, as a result of the reaction of H_2S with iron.

90. All other parameters of water quality of sampled sources are within the permitted value by NDWQS. It is recommended that a few samples from the test wells be tested the detailed design phase.

91. Water is not considered fit for drinking from a bacteriological point of view from the analysis of water samples taken from the wells. All other parameters of water quality of sampled well with physical and chemical aspects are within the permitted value by NDWQS. Presently chlorine dosing with pressure filters has been proposed. The result of water quality from the test well will determine the exact need of WTP type and size. Therefore, a provisional cost of the mechanical WTP has been estimated. The water treatment unit shall treat the water such that the quality of water supplied is in accordance with the NDWQS / WHO drinking water guidelines. Disinfection will be carried out by the addition of bleaching powder. Bleaching powder is to be dosed from a chlorine dosing tank.

92. Birendranagar Town Water Supply and Sanitation Sector Project have been conceptualized as a piped, system based on ground water as the source with an overhead tank for distribution. The system has been formulated for a reliable continuous 24 hours supply in adequate quantity and quality to the consumers of the service area.

93. The project area has toilets in almost each and every households. There is no need for private toilets but gradual upgrading will be required for pit latrines. Neither community toilets nor institutional toilets are required presently. Solid waste management including collection, conveyance and disposal is being done by the Municipality. Both Rapti Municipality and WUSC have not shown interest for need for sanitation facilities. The main parts of Birendranagar VDC, along the highway and main streets, do have a drainage system but is not planned properly and covers only a small portion of the project area. The project area possesses a lot of rivers and rivulets which could be used to drain the water out of the project area.With the rise in settlements, inundation and drainage will be a big concern. So to avoid such problems that would hinder the economic development of the settlement, there is an urgent need to have a proper and planned drainage system in the project area.

94. The salient feature of the project is given below:

Table IV-3: Salient feature of the project

S.N.	Items	Description
1	Name of Project	Birendranagar Town Water Supply & Sanitation Project
2	Type	Pumping (Lifting)
3	Study Level	Detail Design
4	Location Area	
	Region	Central Development Region
	Zone	Narayani
	District	Chitwan
	VDC/Municipality	Rapti Municipality and Khairehani Municipality
	Ward	Complete area of Ward No. 10 of Rapti Municipality and partial area of ward no 6, 9, 11 of Rapti Municipality and ward no. 15 of Khairehani Municipality
5	Available Facilities	
	Road	On the East-West Highway
	Supply Water System	Hand pumps and few HHs with WUSC operated system
	Electricity	Available
	Communication	Available
	Health Services	Available
	Banking Facilities	Available
6	Source Characteristics	
	Source Name	Deep Tubewell
	Source Type	Ground Water
	Source Location	Within Service Area
	Safe Yield (lps)	20-25lps
7	Type of Structures	
	(a) Bore Hole Drilling	3 Sets
	(b) Pumps, Electricity line, Transformer and Generator	Pumps-4 (with1stand by pump), Electricity line-11kV, Transformer-1(125kVA and Generator-1 (1-125KVA)
	(c) Overhead Tank (Nos.-Capacity m^3)	Proposed 1-450
	(d) Ground Reservoir	-
	(e) Valve Chamber (Bricks/RCC)	32/15
	(f) Office Cum GH	1
	(g) Generator House	1
	(h) Household Connection	1922

S.N.	Items	Description
	(i) Fire Hydrant	6
	Total Length of pipe:	
	Distribution Network (meter)	63,103
	Pipe Used (in m)	
	DI	5,080
	PE	57,253
	GI	770
8	Social Status	
	Present Population (2015)	11,053
	Base Year PZopulation (2017)	13,777
	Design Year Population (2037)	22,100
	Weighted Growth Rate %	3.2
9	Total Cost of WS Scheme (Inclusive of all) NRs.	302,658,472.78
10	Cost Sharing Arrangement	
	GON Component (70 %)	211,860,931
	TDF Loan (25 %)	75,664,618
	WUSC's Contribution for upfront (Cash 5 %)	15,132,924
11	Tariff	
	Average Household	562
	Low Income Household	390
	Poor Household	251
12	Environment	
	ADB Category	B, Only IEE necessary
	IEE finding	No significant adverse impact.
13	Per Capita Cost for W/S component	
	Per Capita Cost (for base year pop.)	25,729.70
	Per Capita Cost (for design year pop.)	25,729.70

Source: Detailed Engineering Design Report of Birendranagar Water Supply and Sanitation Subproject, 2015

C. The IEE Study Area

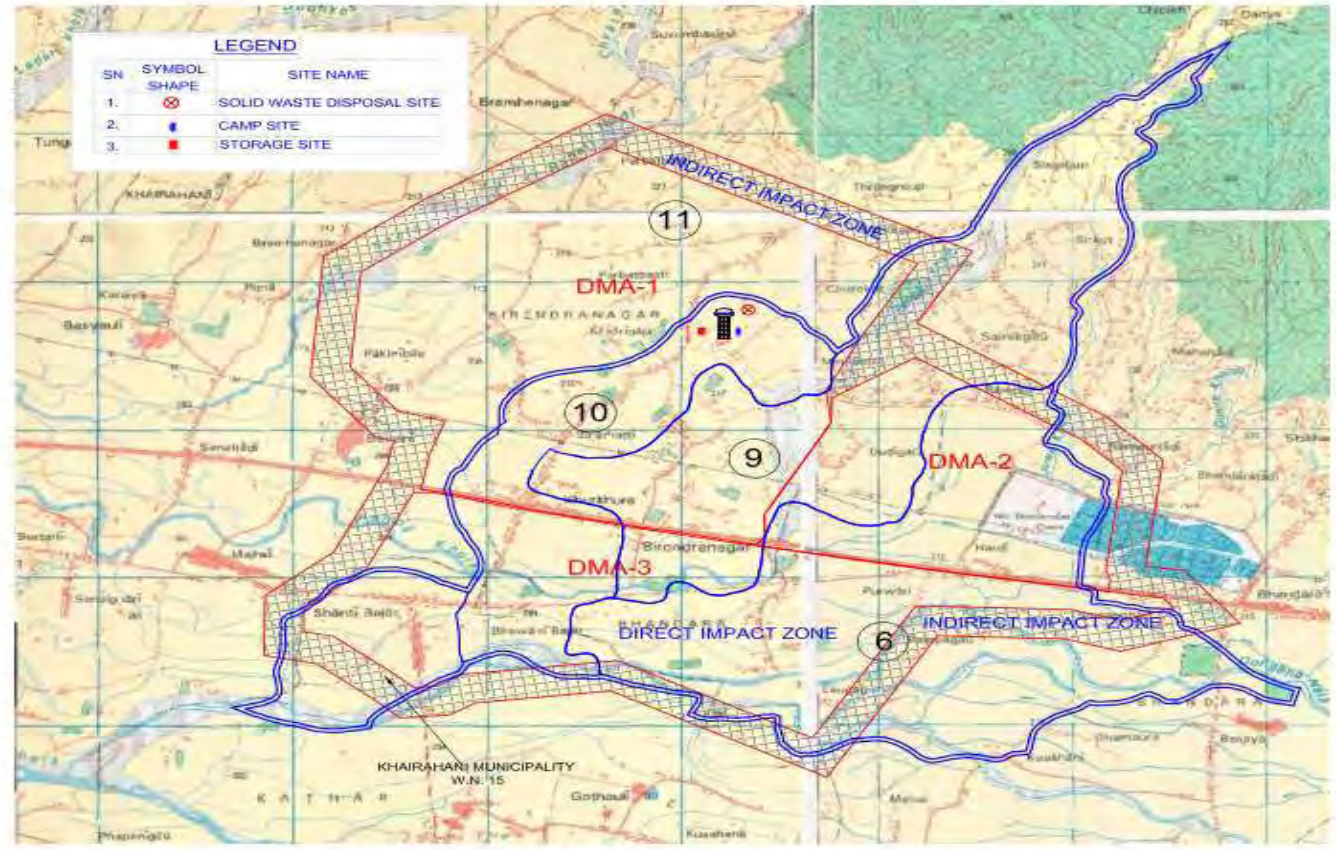


Figure IV-2: Subproject Layout within the Service Area

95. The IEE study area covers the environment that will potentially be affected by the installation of transmission mains and distribution pipes and construction/installation of Tubewells, treatment unit, ground reservoir tanks, pumps and appurtenances such as office building, laboratory unit, guard house and generator house. All these project components are located in the Direct Impact Zone (DIZ) considering the environmental as well as socio-economic impacts The delineated service area covers all urbanizing areas of the Municipality. The areas covered are wards 6, 9 10 & 11 of the newly established Rapti Municipality and ward 15 of Khairahani Municipality and ward 10 of Rapti Municipality. The study area is also referred to as Sub project's "area of influence", covering component sites, i.e., foot prints as shown in Figure IV-2 and areas within 200 m from their edges is Indirect Impact Zone (IIZ) where environmental and socio economic impacts will be less.

D. Environmental Category and Requirements

96. Other Approval/Clearance/Permit Requirements: The Subproject has acquired the following: (i) approval to use the river water resource from the District Office; (ii) A recommendation letter from the construction of the project from Local bodies (Rapti Municipality and Khairehani Municipality).

V DESCRIPTION OF THE ENVIRONMENT

A. Physical and Chemical Environment and Resources

i. Landforms and Topography

97. The project lies between 27º35'20" N to 27º36'42" N latitude and 84º35'47"E to 84º39'41"E longitude. The municipality lies along the East-West Highway (Bharatpur-Hetauda Section). The Municipality is also linked with Malekhu on the Prithvi Highway (Naubise-Pokhara Highway) by Chepang Highway. Topographically, the subproject area Birendranagar lies in the inner Terai region at an average elevation is 285-315 m above mean sea level.

ii. Geology and Soils

98. The project area lies in the inner terai and is underlain by tertiary sedimentary rocks of the Siwalik Group which bounds on the Midland metamorphic rocks along the east west trending Main Boundary thrust running about 8 km north of the bazaar. The bedrock is well exposed along both banks of the Sapta Gandaki River. The bedrock consists of banded sandstone and mud stone formations and massive pebbly sandstones. The other geological unit is alluvial terrace deposit, which is developing at various locations. It consists of thick conglomerates and breccias. The topsoil is mainly composed of silty soil and the thickness often varies from 1m or less containing organic materials. Sand and gravel deposits fill the present river channel. Sand is generally fine. At some places residual soils and decomposed rocks are also observed.

iii. Climate

99. The climate of Birendranagar is a tropical with average yearly minimum and maximum temperatures being 15^0C and 34^0C respectively. Average annual rainfall of the project area is about 2000 mm per year. July is the wettest and November is the driest month in the year.

iv. Surface and Groundwater

100. Rapti Municipality is bounded by Lothar river in the east, Rapti river in the south, Khairahani Municipality in the west and Korak VDC in the north.

v. Air quality

101. There are no industries in project area. Air pollution is caused by fugitive dust from vehicle movements particularly over unpaved roads and other unpaved grounds, construction activities, and wind action on unpaved exposed surfaces. Gas emissions come from household cooking, open burning, and moving vehicles. Emissions from these sources are scattered/ spread apart both in terms of locations and timing.

vi. Acoustic environment

102. The sources of noise in the Project area are the construction activities and vehicle movement. The anthropogenic noise is confined to a few clustered settlements and in market places.

vii. Water Quality

103. Water samples were obtained from groundwater sources to test for various physical and chemical parameters. The water quality of some sources is presented in Table V-1.

Table V-1: Water Quality of Different Water Sources of Birendranagar, Chitwan

Parameters	Unit	Samples			NDWQS
		Existing spring source of Amrit Khanepani	Deep Tubewell of A. Khanepani	User's Hand Pumps at Ward #1	
pH (26^{o}C)	-	7	7.1	6.9	6.5-8.5
Electrical Conductivity	uS/cm	171	327	480	1500
Turbidity	NTU	<1	2	<1	5
Total Hardness	mg/l as CaCo3	88	167	255	500
Total Alkalinity	mg/l as CaCo3	89	171	242	-
Chloride	mg/l	3.50	5.50	10	250
Ammonia	mg/l	0.05	<0.05	0.05	1.5
Nitrate	mg/l	4.13	5.54	8.49	50
Nitrite	mg/l	<0.02	<0.02	<0.02	-
Calcium	mg/l	24.05	52.90	75.35	200
Magnesium (Mg)	mg/l	6.80	8.50	16.30	-
Iron (Fe)	mg/l	0.11	0.14	0.11	0.3 s
Manganese	mg/l	<0.02	<0.02	<0.02	0.2
Arsenic (As)	mg/l	<0.005	<0.005	<0.005	0.05

104. Water quality results for the source water appears to be good with no major quality problems and the parameters being within the NDWQS.

B. Ecological Environment and Resources

i. Flora

105. The Project area is located on the East-West Highway. The Churia hill area is situated at the south side of the project area. The common flora species within the project area is shown in Table V-2.

Table V-2: Flora species within the project area

Common Name	Scientific Name
Sal	*Shorea robusta*
Khair	*Acacia catechu*
Indian laurel	*Terminalia tomentosa or T. alata*
karma or haldu	*Adina cordifolia*
Jaamun	*Syzygium cumini*
Sisau	*Dalbergia sissoo*
Seto siris	*Albizzia procera*
Bakaino	*Melia azedarach*
Teak	*Tectona grandis*
Bael	*Aegle marmelos*
Bot dhangero	*Lagerstroemia parviflora*

Source: IEE Field Study, 2015

106. Non-timber forest products (NTFP) available in the project area include bamboo and cane, fruits and herbs like Amala, Harro, Barro, Neem, Bayar, Aamp (mango), Amba (guava), Hadebayar (wild berry), Bakaino (Indian lilac). Other important products available in the project area are Simal (silk cotton tree), Pipal and Bains (weeping willow). Bamboo is fairly available in the area, especially in private lands.

ii. Fauna

107. Some of the mammals reported to be present in the nearby forests are listed in the table below. There are no protected, endangered or extinct species in the project area.

Table V-3: Mammals in the Forest Area

Common Name	***Scientific Name***
Tiger	*Panthora Tigris*
Rhesus monkey	*Macaca mulatta*
Jungle cat	*Felis chaus*
Chamero	*Cynopterus sphinx*
Fishing cat	*Felis viverrina*
Common mongoose	*Herpestes edwardsi*
Jackal	*Canis aureus*
Indian Fox	*Vulpes bengalensis*
Squirrel	*Fanambulus sps*
Flying squirrel	*Petaurista*
Jungle rat	*Bandicota indica*
Hare	*Lepus nigrcollis*

Source: IEE Field Study, 2015

Table V-4: Birds reported in the forest areas

Common Name	***Scientific Name***
Cuckoos	*Cuculus sp.*
Jungle crow	*Corvus macrorhychos*
Green Wood Pecker	*Picus squamatus*
Kalij pheasants	*Lophura leucomelana*
Spotted dove	*Streptopelia chinensis*
Indian moor hen	*Gallunila chloropus*
Duck	*Anal acuta*
Blossom headed parakeet	*Psittacula cyanocephala*
Rose ringed parakeet	*Psittacula krameri*
Red whiskered bulbul	*Pycnonulus jocosus*
Gray headed fly catcher	*Cullcicappa ceylonensis*
Red jungle fowl	*Gallus gallus*

Source: IEE Field Study, 2015

Table V-5: Some reptiles and amphibians observed in the project area

Common Name	Scientific Name
Cobra	*Najanaja*
Common Karait	*Bungaruscaeruleus*
Garden lizard	*Calotesversicular*
Common lizard	*Hemidactylusbrookii*
Common toad	*Bufomelanostictus*
Stream frog	*Ranacyanophylectis*

Source: IEE Field Study, 2015

Table V-6: Common fishes found in the project area

Common Name	Scientific Name
Rawa	*Cirrhinussps.*
Rohu	*Labeorohita*
Andha bam	*Amphipnoscuchia*
Bam	*Mastacembelussps.*
Garahi	*Chaunapunctatus*

Source: IEE Field Study, 2015

108. Protected Area. The Subproject will not encroach into, or be in close proximity to any protected area.

C. Physical Cultural Resources

109. The Subproject will not encroach into, or be in close proximity to any physical cultural resource.

D. Socio-Economic Environment and Resources

i. Settlement Pattern

110. The settlement pattern in the project area is mixed with dense linear settlement along the main road and scattered cluster settlements in other areas. The settlement pattern is changing more towards an urban pattern with markets emerging along the main roads and settlements concentrating around the market area.

ii. Population and household

111. The service area of the proposed project covers ward numbers 6, 9 10 & 11 of Rapti Municipality in addition to ward no 15 of Khairehani Municipality. The present day area of the Municipality has gone through a long process of development and change. The Municipality was established on 18th September 2015 AD by merging three existing VDC Birendranagar, Piple and Bhandara.

Table V-7: Population of the Concern Ward of Project Town

Mun. Ward No.	Ward no of Former VDC	Former VDC	Former W. Area (Ha)	Census 2001			Census 2011			G. Rate (2001-11)
				HHs	Pop.	P. Densities (PPHA)	HHs	Pop.	P. Densities (PPHA)	
9 RA	1	BN	183.47	500	2,677	14.6	616	2,850	15.5	0.63
	2		167.65	368	1,970	11.8	591	2,636	15.7	2.96
10 RA	3		89.32	265	1,411	15.8	375	1,673	18.7	1.72
	4		87.56	194	1,110	12.7	277	1,261	14.4	1.28
11 RA	5		720.67	225	1,084	1.5	274	1,233	1.7	1.3
	6		105.7	116	680	6.4	165	787	7.5	1.47
6 RA	2	BH	221.15	269	1,605	7.3	435	2,003	9.1	2.24
	3		204.57	128	810	4	135	705	3.5	-1.38
15 KH	1	KA	77.55	132	791	10.2	158	818	10.6	0.34
	Total		1,858.64	2,197	12,138	6.5	3,026	13,966	7.5	1.41

Source: CBS 2001 and 2011

112. The growth of the project area population stands out quite impressive upon the analysis of the growth scenario. The population growth rate of project area is 1.41%. As per socio-economic survey, 2015. The total population of the project area was about 11,053 in the year 2015 and increased to 13,777 in the year 2017 with an annual growth rate of about 3.2% in 2015 to 2037 AD.

Table V-8: Population Projection of service area to design period 2037

Municipality Ward No.	Former		HH as per survey 2015	Pop as per Survey 2015	G. Rate in % (2015-37)	Population in				
	W. No.	VDC				2017	2022	2027	2032	2037
9 RA	1	BN	127	667	2.1	695	771	855	949	1054
	2		413	2526	3.7	2716	3257	3906	4684	5618
10 RA	3		325	1871	3.7	2012	2412	2893	3469	4161
	4		328	1839	2.8	1943	2231	2561	2940	3376
11 RA	5		45	218	2.1	227	252	279	310	344
	6		245	1402	2.8	1481	1700	1952	2241	2574
6 RA	2	BH	256	1515	3.7	1629	1953	2342	2809	3369
	3		80	450	2.1	469	520	577	640	711
15 KH	1	KA	103	565	2.1	588	653	725	804	893
	Total		1922	11053	3.2	13777	15771	18117	20878	22100

Source: Socio-economic survey, 2015

iii. Health

113. There is one health post and five health clinics and private clinics in the project town which provide health services to the needy.

iv. Education

114. The overall literacy rate is 92.7% according to the socio-economic survey, 2015. About 8.3% are still illiterate and only 16.1% have graduated or above graduate level. The summary of the educational institutions has been presented below:

Table V-9: Status of educational institutions

S. No.	Educational Institution	Primary School	Sec. School	Higher Sec. School	Campus	Training Centre	Total
1	Private		6				6
2	Community	5					5
3	Government			1	1	1	3
Total		5	6	1	1	1	14

Source: Social Survey, 2015

115. The socio-economic survey 2015 shows that there are 12 educational institutions in the project area. The total number of students enrolled in these schools/campuses is 3252. The number of teachers and staff are180 and 39 respectively with the total people in educational establishments to be 3413. Most of these educational institutions i.e. 68% are located in Ward no 9 of the Rapti Municipality, the core area of the municipality. Two training centers are operating in the service area.

v. Sanitation

116. The overall sanitary condition of the Project Area is found to be reasonably satisfactory. Although Chitwan district has been declared ODF yet 2.76% HHs does not have proper latrines or they use neighbor's facilities. However, 97.24% HHs has toilets in the project area. Out of all latrine users 3.43 % HHs has pit latrines: 35.69% HHs has Ventilated pit latrines; 56.35% HHs has Water seal/ pour flush latrines and only1.77% has Cistern Flush latrines. The socio-economic survey (2015) reported that none of the HHs practice open defecation in project area and majority of HHs i.e. 58.12% have water-borne private toilets. The following table shows that 97.24% have one or other type of toilets.

Table V-10: Toilet coverage (HHs)

Ward No. / Municipality	Total No of Surveyed HH	Type of Toilet in Use				
		Pit Latrine	Ventilated Pit Latrine	Water Seal/ Pour Flush	Cistern Flush	NA
6 RA	336	0	13	312	3	8
9 RA	540	32	327	155	4	22
10 RA	653	9	98	511	26	9
11 RA	290	16	213	48	1	12
6 KH	103	9	35	57	0	2
Total	1922	66	686	1083	34	53
%of HHs	100%	3.43%	35.69%	56.35%	1.77%	2.76%

Source: Socio-economic survey, 2015

117. 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 periphery.

118. There is no public toilet within the project area. The typical sanitation system, used in the project area, consists of a septic tank which is not sealed at the bottom. Water infiltrates into the soil from the bottom of the septic tank. Soak pits are not used.

vi. Solid Waste Management

119. Since the town does not have a systematic system of collection of solid waste, the waste is either buried in the backyard itself or is separated and treated accordingly. The organic wastes are either fed to the cattle or are composted. Other wastes are buried. The waste is thrown on streets or highways from the houses, by people with smaller land holdings. With the growth of settlements along the highway and along the main streets, the problem of solid waste and its management will exacerbate in the future if not dealt with.

vii. Infrastructure Facilities

120. Infrastructure facilities in the project area are relatively better. The infrastructure facilities available in the project area are summarized and described as follows:

i. Existing Water Supply

- There is one piped water gravity supply system constructed by the Water Supply and Sanitation Division Office (WSSDO) Chitwan during 2000 AD. Located in ward No 9 of Rapti Municipality (ward No. 1 of former Birendranagar VDC) used surface water. The system is also referred to as Amirit Khanepani System. The system comprises of two spring sources.

ii. Communication

- There is a regular service of landline phones and mobile phone services in the project area.

iii. Electricity

- The Nepal Electricity Authority (NEA) has provided electricity for household consumption through its national grid.

iv. Transportation

- The project area is about 30 km far from Bharatpur; the districts headquarter of Chitwan, and about 150 km from Kathmandu. There are regular flights from Kathmandu to Bharatpur, the nearest available airports.

v. Educational Institutions

- There are several schools and campuses in the Project area.

vi. Other institutions

There are several government and non-government offices including private institutions in the project area.

VI ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

121. Any development project brings in positive and negative environmental and social impacts. Planners, engineers and social advocates thus need to work together in order to maximize the positive impacts of the project while at the same time ensure minimization of adverse impacts. A project should only go forward if its beneficial impacts outweigh the adverse impacts that it poses. The beneficial and adverse impacts of the project is summarized below:

A. Beneficial Impacts

122. Major beneficial impacts during the development of the project will be in terms of employment generation of the locals and opportunities for local business to earn more income. Besides, the project area's people will have the benefit of having a clean drinking water system which will have a massive positive impact on the health and sanitation of the village population. This will lead in enhancing the livelihood of the general population of the area. Details of the beneficial impacts during the construction and operation phase are given below.

I. Construction Phase

i. Employment generation

123. One of the major beneficial impacts of the proposed project is the generation of direct employment opportunities to the locals of the project area. As this is a technical project, it will require inputs from various skilled and unskilled technicians and laborers. The marginalized and poor population of the village (dalits and women) should be given priority so that their livelihood is enhanced. Job trainings will also be provided to this population so that they can use such trainings in the future to earn their livelihood. *The impact is direct in nature, low in magnitude, local in extent and short term in duration.*

ii. Skills transfer and development

124. Not only will the project construction provide employment opportunities for the locals of the area, it will also provide an avenue for various levels of skills transfer and development. Qualified technicians will train the locals during the construction phase. Locals will be able to receive trainings on water tank construction, methods to lay pipes, and stabilization of slopes where and when needed among many others. Trainings should be provided before the initiation of the project and budget allocated for such trainings in the detailed project plan. *The impact is direct in nature, low in magnitude, local to regional in extent and short term in duration.*

iii. Enhancement of local trade and economy

125. The initiation of the project is expected to enhance the local economy as it will provide opportunities for the locals of the area to establish small tea shops and canteens for the project

workforce. Businesses in the project area will have an opportunity to network with the outside workforce which may, in the long run, provide an opportunity for such businesses to expand to places outside of their current connections. ***The impact is indirect in nature, low in magnitude, local to regional in extent & long term in duration.***

II. Operation Phase

126. Major beneficial impacts of the proposed water supply project during the operational phase are improved health and sanitation, increased economic opportunities and increased involvement of youth, women and marginalized population in the overall development process of the project area. The major beneficial impacts of the project during the operation phase are described in more detail in the sections below.

i. Improved Health and Sanitation

127. Lack of proper water supply results in deteriorating sanitary conditions. Deteriorating sanitary condition is the main reason for increased danger of water borne communicable diseases. At present, the project area mostly depends on water from the Amrit Khanepani System, different private owned tubewells in and around the project area to fulfill their need for drinking and cleaning water needs. Existing sources of water supply have high chances of contamination & there is high demand for the drinking water. After the completion of the project, there will be tapped water in every household of the area and the volume of water will be abundant. This will highly improve the health and sanitation situation of the project area. Regular monitoring and maintenance of water supply will have to be done in order to keep the benefits of water supply system sustainable. The authority of regular monitoring and maintenance of the water supply system will be given to individual water user groups in the village. ***The impact is direct in nature, high in magnitude, local in extent and long term in duration.***

ii. Increased economic opportunities

128. Improved health and sanitation will result in improved living conditions of the locals. Improvement of living conditions of the locals will in turn give rise to increased economic opportunities. Scarcity of water has been the main reason for many people from the village migrating to cities for employment opportunities on either permanent or seasonal basis. With the start of an improved water supply system in the village and improved living conditions, programs will be launched in order to get the seasonally migrating youth back to their community. With more youth coming to back to the village, there will be opportunities for new businesses to open. Land value of the village will also increase which will aid in lifting the economic status of the locals of the project area. Increase in economic opportunities in the village is a direct, long-term

impact which is of very low to low in magnitude. ***The impact is indirect in nature, high in magnitude, local in extent and long term in duration.***

iii. Increased participation of women, youth and marginalized community in the development process

129. Women of the community are mainly responsible for getting water to do household chores. They invest almost two hours a day just to fetch water from the rivers, streams, springs and water sprouts. This has lead to a situation where women of the village are not able to actively participate in various local level activities. Many youth and marginalized people of the village have migrated or seasonally migrate to cities for employment. Lack of youth in the village along with the women in the community not being able to actively participate in local level activities has almost stalled the development process. With the operation of a water supply system in the village, women will have more time to participate in village activities. Youth and marginalized population who have migrated elsewhere will return. This will help in starting the development of the village which currently is almost stalled. An efficient mechanism should be put in place so that women, youth and the marginalized are included in local activities as well as the decision making process. ***The impact is direct in nature, low in magnitude, site specific in extent and long term in duration.***

B. Adverse Impacts

130. Impacts/Issues/Concerns and Mitigation Measures during Design Phase

The impacts/Issues/Concerns & Mitigation Measures during design phase is illustrated in Table VI-1.

Table VI-1: Impacts & 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	PMO,RPMO & 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 & DSMC
Construction of reservoirs in high earthquake zone	Cracking of structure leading to facility failure and hazard to public	• Design all reservoirs and structures under the project to for appropriate seismic resistance	PMO,RPMO & DSMC
Location of pipes and photographs of sites and existing utilities prior to construction, particularly in heritage areas	False claims from people; water quality changes due to construction. Interference with other utilities and photo record of existing character of heritage areas to avoid impacts to heritage structures during construction	• Place water pipes away from existing 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 period	PMO,RPMO & DSMC /Contractor

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsibility
		including preparation of Archaeological Impact Assessment, or other agreed document by DOA if required .	
Inadequate protection of intake structures	The water from intake will flow & may cause soil erosion.	• Intake well has adequate land for perimeter fencing	PMO,RPMO & DSMC
Sludge disposal	Inadequate disposal of sludge from reservoirs and treatment plant will cause nuisances to affected properties.	• Design of sludge disposal sites should be made at designated sites approved by the municipalities..	PMO,RPMO & DSMC

131. Impacts/Issues/Concerns and Mitigation Measures during Pre-Construction Phase

The possible impacts & their mitigation measures of the project during preconstruction phase are described in Table VI-2

Table VI-2: Possible Impacts & their Mitigation Measures of the project during preconstruction phase

Field	Environmental Impacts	Mitigation Measures
1. Prior to Construction Activities		
Consents, permits, clearances, no objection certificate (NOC), etc.	➢ Failure to obtain necessary consents, permits, NoCs, etc can result to design revisions and /or stoppage of works	➢ Obtain all of the necessary consents, permits, clearance, NOCs, etc. prior to start of civil works. ➢ Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs, etc. ➢ Include in detailed design drawings and documents all conditions and provisions if necessary
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 activities ➢ Require construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services. ➢ Require contractors to prepare spoil management plan (see Annex 2-E for outline).

Field	Environmental Impacts	Mitigation Measures
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 from inadequate design of facilities for receiving, storing and handling of CI & other chemicals	➢ During the detailed engineering design stage, water samples from deep Tubewell & shallow well were tested. Tests revealed iron content and coliforms as beyond standards limits. This information has guided design of water treatment and depth of well. However verification on the yield through borehole tests need to be carried out and confirmed before award of contract. ➢ Design proposes basic treatment using lime dosing, pressure filter and disinfection using Ca (CIO)2 and provisions for lab unit and kits. This IEE proposes "hands on" training by a licensed & accredited laboratory for the first two years of operation under the Water Safety Plan included in the subproject design & continuing training thereafter. ➢ Intake well has adequate land for perimeter fencing to keep animals away from grazing nearby. Appropriate casing of Tubewells including the installation of screens. Intake well to be located at least30m upstream from sanitation facilities. Where this cannot be maintained; (i) septic tanks will need to be sealed (water tight) and emptied as per the design requirements; (ii) Tubewells to be cased appropriately and installation of a screen; and (iii) a test pit should be established and water quality monitoring should be conducted regularly (at least once every quarter). Disinfection of the Tubewell should be conducted prior to commissioning and after repairs ➢ Design has included a "housed" dosing unit with appropriate ventilation, bonding and training for staff in handling as per material, safety data sheets (MSDS).
Sanitation (Toilets and septage disposal)	➢ Contamination of drinking water source and other environmental receptors from household and community toilets ➢ Risk to public and environmental health due to inappropriate sitting and design of septage disposal pit	➢ The design of toilets includes septic tanks that are designed as per national standards and codes to allow for maximum retention of septage. This includes ensuring septic tanks are sealed and water tight. Toilets will be established at least 30m downstream of the drinking water source. ➢ The septage disposal pit (similar to sludge drying bed technology) is to be designed and constructed in accordance to international best practice and acceptable standards (e,g US EPA standards etc). This includes; (i) locating disposal pits at least 300m away from the nearest dwelling, and 30 m downstream of the

Field	Environmental Impacts	Mitigation Measures
		drinking water source; (ii) pits are to be only established in relatively flat land with no more than 8% slope; and (iii) site selected for establishment of pits should not be where food crops are grown. ➢ The sanitation condition will be maintained to deter flies, mosquitos, and other vectors for breeding, free from odor and aesthetically pleasing. ➢ A proper septage management shall be developed and followed.
Construction work camps, sockpiling, storage & disposal areas	➢ Disruption to traffic flow and sensitive receptors	➢ Determine locations prior to award of construction contracts
Waste generation	➢ Generation of solid waste, wastewater from labor camp and other construction waste may cause pollution	➢ Mechanism of safe disposal such as ➢ Construction waste will be developed in the project site before the actual commencement of work ➢ Prohibition of unwanted littering and discharge of waste. ➢ ➢ Proper management of solid waste will be done using pits for waste disposal
Sources of materials	➢ Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution	➢ Prepare list of approved quarry sites and sources of materials
EMP Implementation Training	➢ Irreversible impact to the environment, workers, and community	➢ DRTAC Environmental Safeguard Specialist, Project Engineer, EMP Monitors and contractors should undergo EMP implementation including spoils management for construction works; standard operating procedures (SOP) for construction works as it is a method of identifying a work process and breaking it into the specific step by step procedure needed to successfully execute the process right from the beginning and result to greater quality via conforming to proven steps therefore, the written SOP provide instruction for less experience workers and benefits to the contractor is it serves as a benchmark for all workers on how a work process is to be

Field	Environmental Impacts	Mitigation Measures
		completed ; health & safety (H&S), core labor Act (1992), applicable environmental laws, etc.

I. *Construction Phase*

a) Physical & Chemical Environment

i. Topography landforms, geology and soils and/or river morphology and hydrology

132. Significant amount of sand, gravel or crushed stone will be required for this subproject. Extraction of natural aggregate materials may cause localized changes in topography and landforms (if on land) or river morphology and hydrology (if in river). ***The impact is indirect in nature, medium in magnitude, site-specific in extent and short term in duration.***

ii. Water quality

133. Trenching and excavation, run-off from stockpiled materials will result to silt-laden runoff during rainfall which may cause siltation and reduction in the quality of adjacent water bodies of nearby areas. ***The impact is indirect in nature, low in magnitude, site-specific in extent and short term in duration.***

iii. Air quality

134. Conducting works in the dry season and moving large quantities of materials may create dust and increase in the concentration of vehicle-related pollutants (such as carbon monoxide, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons) which will affect people who live and work near the sites. ***The impact is indirect in nature, low in magnitude, site-specific in extent and short term in duration.***

iv. Acoustic environment

135. Construction activities will be on settlements along and near schools, and areas with small-scale businesses. Temporary increase in noise level and vibrations may be caused by excavation equipment, and the transportation of equipment materials, and people.

However, the proposed subproject will follow existing ROW alignment and impact is short-term, site specific and within a relatively small area. ***The impact is indirect in nature, low in magnitude, site-specific in extent and short term in duration.***

v. Water Pollution due to leakage of fuel & lubricants

136. Leakage of fuel & lubricants from construction equipment & vehicles & paints spillage could pose a threat to river & ground water quality in & around the project area. *The impact is indirect in nature, medium in magnitude, site-specific in extent and medium term in duration*.

b) Bilogical Environment

i. Impacts on biodiversity

137. The proposed project will have less or no impacts on biodiversity. The parts of the project area where construction activities will take place do not lie within the forest area. The project components require a very small area of land for implementation; environmental impacts on the vegetation & natural eco-system is less. However, some of the topsoil & vegetation will be lost during pipe laying works. The minimization of vegetation clearing and careful cutting of ground vegetation will be done. The impact is indirect in nature, low in magnitude, site-specific in extent and short term in duration.

ii. Impacts on fauna

138. No impacts on wildlife are expected. Major structures will be built on relatively clear land which are not inhibited any wildlife. Heavy vehicles willnot be running that may disturb the wildlife of the area. The impact on animals is a direct impact. *The impact is indirect in nature, low in magnitude, site-specific in extent and short term in duration.*

c) Socioeconomic & Cultural Environment

i. Impact to Local Residents

139. The construction related activities that generate dust, noise and impede access will disturb the local residents. *The impact is indirect in nature, low in magnitude, local in extent and short term in duration.*

ii. Problems from Outside Work Force

140. Haphazard disposal of solid waste and improper sanitary conditions generated by the construction workers may cause pollution of surrounding environment and affect the health of local people.

141. Similarly, social problems will arise due to irresponsible behavior of the work force such as gambling, alcoholism and disrespect to local people and their culture. *The impact is direct in nature, medium in magnitude, site-specific in extent and short term in duration.*

iii. Occupational Health and Safety

142. During the construction work, the laborers involved in the construction activities may be exposed to different level of health risks and prone to accidents. The magnitude of the impact is moderate. *The impact is indirect in nature, medium in magnitude, site-specific in extent and short term in duration.*

iv. Community health and safety hazards

143. Overall, communities will be exposed to cross-cutting threats from construction's impacts on air and water quality, ambient noise level; mobility of people/goods/services; accesses to properties/economic activities/social services; service disruptions; and potential fire and explosion, among others. Communicable and transmittable diseases may potentially be brought into the community by construction workers. *The impact is indirect in nature, low in magnitude, local in extent and short term in duration.*

v. Other existing amenities for community welfare

144. Although construction of subproject components involves quite simple techniques of civil works, the invasive nature of excavation and the subproject sites being in built-up areas of the town will result impact to sensitive receptors such as residents, businesses, and the communities.

145. Excavation may also damage existing infrastructure (such as water distribution pipes, electricity poles etc.) located alongside the roads. The impacts are negative but short-term, site specific within a relatively small area and reversible using mitigation measures. *The impact is indirect in nature, low in magnitude, local in extent and short term in duration.*

vi. Existing provisions for pedestrians and other forms of transport

146. Road closure is not anticipated. Hauling of construction materials and operation of equipment onsite can cause traffic problems. However, the proposed subproject will follow existing ROW alignment. *The impact is indirect in nature, low in magnitude, site-specific in extent and short term in duration.*

vii. Impact on Private land & loss of standing crops

147. The project won't acquire any private land and property during the construction phase of the project so there are no issues on loss of standing crops. The Birendranagar Water Supply already owns enough land in ward no. 1, 2 & 9 and so there is no need to acquire any other private lands for the project.

viii. Impact on Historical, Cultural, and Archaeological Sites

148. There are no archaeological, paleontological, or architectural sites of heritage significance listed by local and/ or national authority and/or internationally (UNESCO) within or adjacent to the subproject sites

C. Mitigation Measures for Construction Phase

149. The above mentioned impacts & their mitigation measures of the project during construction phase for Physical, Biological & Socioeconomic & Cultural Environment & other possible environmental impacts of the project are described in Table VI-3.

Table VI-3: Possible above mentioned Impacts & their Mitigation Measures of the project during construction & operation phase

Field	Impacts	Mitigations Measures
I. During Construction Activities		
A. Physical Characteristics		
Topography landforms, geology and soils and/or river morphology and hydrology	Extraction of natural aggregate materials may cause localized changes in topography and landforms (if on land) or river morphology and hydrology (if on river).	- Contractor's should be required to first utilize readily available sources with environmental clearance and license to and that still have a high ratio of extraction capacity over loss of natural state. - Borrow areas and quarries (if these are being opened up exclusively for the subproject) must comply with environmental requirements, as applicable. No activity will be allowed until formal agreement is signed between PIU, landowner and contractor. - Coordinate with MoPE, DDC, and local authorities regarding restrictions in quarrying from rivers & establishment of crusher. - As much as possible, alternative source should be identified.
Erosion Hazards	Potential erosion may occur when moderately to highly sloping terrains are disturbed for the installation of transmission mains and distribution pipes.	- Soil erosion will be minimized by taking precautionary measures such as; excavated soil will be reused and proper backfilling of the trenches will be done and the excavated soil will be placed properly against erosion. Temporary diversions and sign boards for pedestrians will be provided. -
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.	- Prepare and implement a spoils management plan. - Prioritize re-use of excess spoils and materials in construction activities. If spoils will be disposed, consult with district development committee on designated disposal areas. - All earthworks must be conducted during dry season to maximum extent possible to avoid the difficult working conditions that prevail during monsoon season such as problems from runoff. - Location for stock yards for construction materials shall be identified at least 300m away from water courses. Place storage areas for fuels and lubricants away from any drainage leading to water bodies - Take all precautions to minimize the wastage of water in the construction activities - Take all precautions to prevent entering of waste water

Field	Impacts	Mitigations Measures
		into streams, watercourses, or irrigation system. Install temporary silt traps or sediment basins along the drainage leading to the water bodies. - Ensure diverting storm water flow during construction shall not lead to inundation and other nuisances in low lying areas. - While working across or close to any water body, the flow of water must not be obstructed. Ensure no construction materials like earth, stone, or appendage are disposed of in a manner that may block the flow of water of any watercourse and cross drainage channels. - Monitor water quality according to the environmental management plan.
Air quality	Conducting works at dry season and moving large quantity of materials may create dusts and increase in concentration of vehicle-related pollutants (such as carbon, monoxide, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons) which will affect people who live and work near the sites.	- Water dry exposed surfaces and stockpiles of aggregates at least twice daily, or as necessary. - If re-surfacing of distributed roads cannot be done immediately, spread of crushed gravel over backfilled surfaces - Hoarding active work sites in populated areas - Require trucks delivering aggregates and cement to have tarpaulin cover and maintain a minimum of 2" free board - Limit speed of construction vehicles in access roads and worksites to maximum of 30kph. - Use of vehicles complying with NVMES, 2069 enforcement and green sticker standards and prohibition of open burning of solid waste within the project area - Ensure use of equipment complying with applicable emission standards to control anthropogenic air pollution - Arrangements to control dust through provision of DSMC screens, water sprinklers etc.
Acoustic environment	Construction activities will be on settlements along and near schools, and areas with small-scale businesses. Temporary increase in noise level and vibrations may be caused by excavation equipment, and the transportation of equipment materials, and people. However, the proposed subproject will follow existing ROW alignment and impact is short-term, site specific and within a relatively small area.	- Involve the community in planning the work program so that any particularly noisy or otherwise invasive activities can be scheduled to avoid sensitive times. - Plan activities in consultation with local administration (Chief district office), local police/traffic office so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance. - Restrict noisy activities to daytime. Overtime work should avoid using noisy/high noise generating equipment. - Minimize drop heights when loading and unloading coarse aggregates. - Spread out schedule of materials, spoil & waste transport - Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach; - Utilize modern vehicles and machinery with the requisite adaptations to limit noise and exhaust emissions, and ensure that these are maintained to manufactures' specifications at all times. - All vehicles and equipment used in construction shall be fitted with exhaust silencers. Use silent type generators (if required) - Monitor noise levels. Maintain maximum sound levels not exceeding 80 decibels (dBA) when measured at a distance of 10m or more from the vehicle/s. - If it is not practicable to reduce noise levels to or below noise exposure limits, the contractor must post warning signs in the noise hazard areas. Workers in a posted noise hazard area must wear hearing protection. - Identify any building at risk from vibration damage and

Field	Impacts	Mitigations Measures
		avoiding any use of pneumatic drills or heavy vehicles in the vicinity. Complete work in these areas quickly.
Water Pollution due to leakage of fuel & lubricants	Leakage of fuel & lubricants from construction equipments & vehicles & paints spillage could pose a threat to river & ground water quality in & around the project area.	- Strict instructions will be given to the workers not to spill the chemicals and petrolems products used during the construction into surface land and nearby streams. This procedure shall be in-cluded in the terms of contract between the proponent and the contractor.
B. Biological Characteristics		
Impacts on Biodiversity	The proposed project will have less or no impacts on biodiversity. The project components require a very small area of land for implementation; environmental impacts on the vegetation & natural eco-system don't seem to be significant. However, some of the topsoil & vegetation will be lost during pipe laying works.	- Haphazard site clearing, parking and movement of construction vehicles and equipment, stockpiling, and Illegal harvesting of nearby community forest resources as fuel for cooking by workers will result in unnecessary loss of vegetation beyond Subproject footprints. - The proposed water supply project won't require to construct any project structures within the area of Community Forests area and also there is no tree felling will be required to construct project structures. - During construction disturbances will occur. Some of the mitigation measures include: (i) installing clear signage and markers to direct traffic movement in sites; (ii) designating stockpiling areas; (iii) re-vegetating disturbed slopes and grounds, as applicable; and providing alternative fuel to workers for cooking. Hunting and poaching by workers will be strictly prohibited.
Impacts on fauna	No major impacts on animals area expected	- No heavy vehicles will be made available to run on the road that may disturb the wildlife of the area - Horn prohibited sign will be placed in nearby wildlife inhibited area
C. Socioeconomic Characteristics		
Impact to Local Residents	The construction related activities that generate dust, noise and impede access will disturb the local residents	- To minimize the disturbances, construction work will be conducted as quickly as possible. - The local residents will be consulted and informed about the disturbances in advance. - Temporary diversions and signboards will be provided for the pedestrians. -
Problem from Outside Work Force	Haphazard disposal of solid waste and improper sanitary conditions generated by the construction workers may cause pollution of surrounding environment and affect the health of local people .Similarly, social problems will arise due to irresponsible behavior of the work force such as gambling, alcoholism and disrespect to local people and their culture.	- A mechanism for the safe disposal of waste will be developed in the project site and a labor camp will be constructed before the actual commencement of work and unwanted littering and discharge of waste will be prohibited. - The contractor should give proper instructions to the workers for them to act responsibly and prohibit activities such as alcohol uptake and gambling in the work site. - local people should be given more chance to work - (whenever available) in the project which helps to minimize the chances of cultural discrepancy and conflict due to increased labor from outside.
Occupation Health & Safety	During the construction work, the laborers involved in the construction activities may be exposed to different level of health risks and are prone to accidents	- A site health and safety plan will be prepared encouraging use of safety measures such as mask, helmet, hand gloves and rubber boots. - The laborers will be insured for their health and safety. - Workers working at a certain height above the ground especially during the construction will be provided with safety gears.

Field	Impacts	Mitigations Measures
		- Personal Protective Equipment (PPE) as required. First aid box will be kept at a proper and easily accessible place. - The child labour will be totally prohibited from all the constructional activities. - There will be no discrimination in wage for male and female workers in the project
Community Health & Safety Hazards	Overall, communities will be exposed to cross-cutting threats from construction's impacts on air and water quality, ambient noise level; Communicable and transmittable diseases may potentially be brought into the community by construction workers.	- Contractor's will maintain adequate lighting, temporary fence, reflectorized barriers and signage at active work sites; - Contractor's preparedness in emergency response; - GRM will be formed & implementation of the GRM will be made mandatory
Other existing amenities for community welfare	Although construction of subproject components involves quite simple techniques of civil works, the invasive nature of excavation and the subproject sites being in built-up areas of town where there are a variety of human activities, will result impact to the sensitive receptors such as residents, businesses, and the communities. Excavation may also damage existing infrastructure (such as water distribution pipes, electricity pylons, etc.) located alongside the roads. The impacts are negative but short-term, site specific within a relatively small area and reversible by mitigation measures.	- Obtain details from nature and location of all existing infrastructure, and plan excavation carefully to avoid any such sites to maximum extent possible; - Integrate construction the various infrastructure subprojects to be conducted in town (roads, water supply, etc.) so that different infrastructure is located on opposite sides of the road where feasible and roads and inhabitants are not subjected to repeated disturbance by construction in the same area at different times for different purposes. - Consult with local community/district development committee/local administration to inform them of the nature, duration and likely effects of the construction work, and to identify any local concerns so that these can be addressed. - Existing infrastructure (such as water distribution pipes, electricity pylons, etc.) shall be relocated before construction starts at the subproject sites. - Prior permission shall be obtained from respective local authority for use of water for construction. Use of water for construction works shall not disturb local water users. - If construction work is expected to disrupt users of community shall be served 7 days in advance and again 1 day prior to start of construction. - Ensure any damage to properties and utilities will be restored or compensated to pre work conditions.
Existing provisions for pedestrians and other forms of transport	Road closure is not anticipated. Hauling of construction materials and operation of equipment onsite can cause traffic problems. However, the proposed subproject will follow existing ROW alignment. The impacts are negative but short-term, site specific within a relatively small area and reversible by mitigation measures.	- Ensure appropriate transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites. - Maintain safe passage for vehicles and pedestrians throughout the construction period. - Schedule truck deliveries of construction materials during periods of low traffic volume. - Erect and maintain barricades including signs, markings, flags and flagmen informing, diversions and alternative routes when required. - Notify affected sensitive receptors by providing sign boards informing nature and duration of construction activities and contact numbers for concern/complaints. - Leave spaces for access between mounds of soil. - Provide walkways and metal sheets where required to maintain access across for people and vehicles. - Increase workforce in front of critical areas such as

Field	Impacts	Mitigations Measures
		institution, place of worship, business establishment, hospitals, and schools. - Consult business and institutions regarding operating hours and factoring this in work schedules. Ensure there is provision of alternate access to businesses and institutions during construction activities, so that there is no closure of these shops or any loss of clientage. - Ensure any damage to properties and utilities will be restored or compensated to pre-work conditions.
Impact on private Land & Loss of standing crops	The project won't acquire any private land & property during construction phase of the project so there is no issues for loss of standing crops. The Birendranagar Water Supply had already owned enough land in ward no. 1, 2 & 9 thus no need to acquire any other private lands for ther project.	
D. Historical, Cultural, and Archaeological Characteristics		
Impacts on Historical, Cultural & Archaeological Sites	There are no scheduled or unscheduled archaeological, paleontological, or architectural sites of heritage significance listed by local and/ or national authority and/or internationally (UNESCO) within or adjacent to subproject sites.	- Stop work immediately to allow further investigation if any finds are suspected.
- E. Others		
Submission of EMP implementation Report	Unsatisfactory compliance to EMP	- Appointment of environment supervisor to ensure EMP implementation - Timely submission of monitoring reports including pictures.
Post Construction Activities	Damage due to debris, spoils, excess construction materials	- Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and - All excavated roads shall be reinstated to original condition. - All disrupted utilities should be restored - All affected structures rehabilitated /compensated - The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up. - All hardened surfaces within the construction camp area shall be ripped, all imported materials removed reinstraining to orginal conditionThe contractor must arrange the cancellation of all temporary services. - Request PMO/PIU to report in writing that worksites and camps have been vacated and restored to pre-project conditions before acceptance of work.
Environmental legislation compliance	Lack of awareness amongst project managers and WUSC in operating systems as per required legislation and IEE requirements	- Capacity strengthening of the WUSC and continuing capacity strengthening of Project staff; and ensuring compliance with NDWQS, applicable conditions in IEE approvals and license for use of water resource.
Drinking water supply system	Delivery of unsafe Water	- The operations and maintenance plan and training for staff will cover; (i) competent/cautions handling and storage of calcium Hypochlorite and qualified persons to implement/oversee disinfection and treatment; (ii) providing safe storage for chemicals; (iii) ensure capacity of WUSC to implement quick response to hazardous substance/waste spills; (iv) implement SPS-complaint EMP and a water safety plan; and (v) monitor water quality.
	Excessive algal growth in	- The water tanks are designed to be closed. In addition;

Field	Impacts	Mitigations Measures
	reservoirs.	(i) maintenance of chlorine residual in the system at all times including the cleaning of reservoirs as per the O&M schedule.
Mishandling of chlorine	Excessive exposure to chlorine, hypochlorous acid, and hypochlorite ion and intake of a small quantity of bleach generally results in irritation of the oesophagus, a burning sensation in the mouth and throat, and spontaneous vomiting.	- All disinfection chemicals require proper storage and handling practices: ii) providing safe storage for chemicals; iii) ensure that the person is hired, with knowledge of chlorine use for disinfection process during operation iv)Ensure use of PPE while using chemicals; v) Use of chlorine guideline as per WHO (Annex 7)
Sanitation facilities (toilets and septage disposal site)	Contamination to land or water ways due to overflow of septic tanks and/or uncontrolled dumping of septage	- The subproject incorporates a pilot for controlled disposal of septage. This is to reduce the likelihood of uncontrolled septage disposal to land and local water ways (nallas) which is currently practiced. 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 on the above to further reduce the likelihood of septic tank overflows and uncontrolled dumping of septage .

II. *Operation Phase*

Risk of contaminated water in the distribution system/Delivery of unsafe water

150. There is risk of contamination of water to be distributed to the user threatening the health of the whole population consuming the water where as contamination may occur due to: (i) accidental human error in chemical dosing; (ii) leaks in the system; (iii) inadequate maintenance and housekeeping thereby threatening the health of the whole population consuming the water.

D. Mitigation Measures for Operation Phase

Risk of contaminated water in the distribution system/Delivery of unsafe water

151. The risks of contaminated water in the distribution system will be mitigated by developing water safety plan; ensuring cautious handling and storage of chemicals and assigned persons to implement disinfection and providing safe storage for chemicals Regular water quality monitoring of water in the distribution system will be carried out.

152. Spoil Management Plan (SMP): Spoil will be managed properly during the construction period of the project. The sample SMP is enclosed in Annex 2-E of this document.

E. Indirect, Induced and Cumulative Impacts

1. During Construction

Indirect and Induced Impacts:

153. The volume of vehicle movements that will be generated from the simultaneous construction at subproject component sites will create traffic jams in narrow access roads and slow down mobility of people, good and services, particularly in the bazaar areas. A greater number of people will be exposed to safety hazards from the constricted road space. Coupled with disruption of economic activities and social services from extended interrupted power supply due to relocation of power poles and/or likely accidental damages, production outputs will suffer some slowdown. Severe dust on rice plants and other crops in the vicinity of subproject footprints would have some effect on the crops' yields. Apart from the applicable mitigation measures from among those mentioned for direct impacts, proper coordination with the relevant ward authorities, social service institutions and businesses should enable further mitigation of indirect and induced the impacts.

Cumulative Impacts:

154. There are no known ongoing or proposed developments in Birendranagar as well as planned extension of the subproject as yet. Hence, 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, intakes /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, for collection chamber and water treatment plant and RVT and intake unit/ancillaries is six months.

155. Assuming all components are started simultaneously or almost simultaneously, without mitigation, cumulative impacts will be "significant" in magnitude during the peak construction eriod (for the first four months of the construction period). After this, the magnitude of cumulative impacts will lessen to "moderate" 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.

156. 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:

- Civil works must be well planned, strategized and completed promptly;

- The contractor should implement the C-EMP fully and key institutions should act their roles in EMP implementation effectively;
- There must be adequate consultations with stakeholders, including bus operators, and local authorities and coordination, particularly regarding expected cumulative impacts. Bus operations should temporarily adjust to the circumstances to relieve some road space limitations and for public safety and convenience;

157. The grievance redress mechanism 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

158. Stakeholder consultation and participation was an essential process in project preparation. The process in engaging stakeholders and affected people involved key informant interviews, on-site discussions with WUSC, and random field interviews of stakeholders. Table VII-1 lists the persons consulted during the IEE Study.

Table VII-1: Lists of People and Institutions Consulted

	Name	Organization/Address
1	Mr Rajendra Prasad Barlakoti	President, Birendranagar WUSC
2	Mr. Ram Chandra Pathak	Vice President, Birendranagar WUSC
3	Mrs. Srijana Kharel	Secretary, Birendranagar WUSC
4	Mr. Kumar Sunuwar	Member, Birendranagar WUSC
5	Miss Bijal Shrestha	Staff, Birendranagar WUSC
6	Mrs. Sashi Mahato	Member, Birendranagar WUSC
7	Mr. Ranjit Sedai	Rapti-5, Chitwan (User Group)
8	Mr Ishwar Babu Tripathi	Rapti-5, Chitwan (User Group)
9	Mr. Kamal Sedai	Rapti-5, Chitwan (User Group)
10	Mr. Tarak Shahi	Rapti-6, Chitwan (User Group)
11	Miss Rachana Subedi	Rapti-6, Chitwan (User Group)
12	Mr. Bhola Chaudhary	Rapti-6, Chitwan (User Group)
13	Mr. Gagan Gautam	Rapti-9, Chitwan (User Group)
14	Mr. Suresh Regmi	Rapti-9, Chitwan (User Group)
15	Mr. Ram Prasad Poudel	Rapti-9, Chitwan (User Group)
16	Mr. Sagar Pun	Rapti-12, Chitwan (User Group)
17	Mrs. Maya sapkota	Rapti-12, Chitwan (User Group)
18	Mr. Shovakar Devkota	Rapti-12, Chitwan (User Group)
19	Mr. Chandra Mani Koirala	Khairahani-15, Chitwan (User Group)
20	Mr. Keshav Panthi	Khairahani-15, Chitwan (User Group)

159. During the IEE preparation, consultations were undertaken in compliance with GoN's EPR.

160. Stakeholder consultations will continue throughout the implementation of the subprojects and operation. All stakeholders must be invited and encouraged to participate in community consultations. To facilitate the engagement of stakeholders, the PMO and ICG will maintain good communication and collaboration with WUSC and the Municipality. PMO, ICG, Contractors and/or WUSC will be open to the public to contact on matters concerning the progress of the subprojects, adverse impacts, mitigation measures and environmental monitoring and grievances. Future stakeholder consultations will be as follows:

- During the construction stage , if there would be a major change in design/alignment/location, the PMO and ICG will hold at least one public consultation meeting early on in the construction period to solicit perceived impacts, issues, concerns and recommendations from affected communities;
- Prior to construction, the PMO and ICG will conduct an intensive information, education and communication (IEC) campaign to ensure sufficient level of awareness/information among the affected communities regarding the upcoming construction, its anticipated impacts, the grievance redress mechanism, contact details and location of the PMO and ICG, and status of compliance with the Government's environmental safeguard requirements, among others, are attained/provided. Billboards about the subproject, implementation schedule and contact details of the executing agency, PMO-ES, ICG-ESA and Contractors will have been set up at strategic locations within the subprojects' main areas of influence. The grievance redress procedure and details will have been posted at the offices of the ICG, WUSC and Municipality;
- During construction, regular random interviews will be conducted by the ICG-ESA every month to monitor environmental concerns of subproject communities;
- During operation, periodic random interviews will be conducted by the ICG and WUSC to monitor the environmental concerns of subproject communities;
- 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.

161. The GoN-approved IEE Report (in English), will be available at the offices of the 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 TSTWSSSP website.

VIII GRIEVANCE REDRESS MECHANISM

A. Purpose of the Grievance Redress Mechanism

162. The Project-specific grievance redress mechanism (GRM) is meant for persons seeking satisfactory resolution to their complaints on the social and environmental performance of the subprojects under the 3STWSSP. The mechanism, developed in consultation with key stakeholders, will ensure that: (i) the basic rights and interests of every person adversely affected by the social and environmental performance of a Subproject are protected; and (ii) their concerns are effectively and timely addressed.

B. Proposed Set-Up

163. The MoWSS, as the Project executing agency, will establish the GRM and its support system, including setting up the Grievance Redress Committee (GRC) at the subproject level. The GRC will comprise of the: (i) Chief of the WSSDO; (ii) members of the WUSC; (iii) two representatives of affected persons, a male and a female; (iv) a member of IP community, preferably female; (v) a representative of a non-government organization or community-based organization actively involved in IP development/other backward communities in the area, if any; (vi) local government representatives, i.e., Municipality and DDC; (vii) DSMC social safeguard expert; and (viii) DSMC environmental safeguard expert (ESE). The environmental safeguard assistant (ESA) of the ICG will oversee the implementation/observance of the mechanism for environmental complaints at the subproject level. He/she will be technically advised, supported and trained by DRTAC's environmental specialist and the DSMC ESE. PMO's Environmental Officer will oversee the implementation/observance of the GRM in all subprojects. Representatives of affected persons (APs), civil society and eminent citizens will be invited as observers during GRC meetings. Contractors and WUSCs (as Operators) will be required to designate their respective counterpart GRM staff.

164. The GRM will accommodate both informally- and formally-lodged, but Project-related, valid grievances. Informally-lodged grievances are those received by the Contractors during construction or WUSCs during operation. Formally lodged grievances are those received at the ICG office. The ICG, GRC and PMO maintain records of all grievances, informally- and formally-lodged, valid and invalid, and appealed. The ICG will immediately inform the PMO, as necessary, particularly when an appeal is made by an AP in court. PMO will in turn immediately inform the ADB of the same. The observance/implementation of the GRM will be reported by the: (i) ICG/ESA in the subproject's monthly progress reports, semi-annual subproject

environmental monitoring report (EMR) during construction and annual subproject EMR during operation; and (ii) PMO EO in the Project's monthly progress report, semi-annual Project EMR during construction and annual Project EMR during operation.

165. Sufficient support system, including well GRM-oriented staff of Contractors and WUSCs, communication/documentation/recording and reporting system, funds, posters declaring contact details and displayed at strategic locations, among others, will be in place to sustain the effective implementation of the mechanism.

C. Access to the Mechanism

166. Any person who has environmental concerns/issues pertaining to the subprojects during detailed design, construction and operation phases will have access to the mechanism free of charge. The PMO EO and ICG ESA will ensure that:

- The public, especially the residents and regular passers-by, in the main areas of influence of the subprojects, are aware of their rights to access, and will have access to the GRM free of administrative and legal charges; and
- The GRM is fully disclosed prior to Notice to Proceed for construction is given: (a) in public consultations and social/community preparations, (b) through posters displayed in the offices of the ICG, VDCs, DDC and at strategic places within the main areas of influence of subprojects (posters to include names and contact details of the EO of the PMO and ESA of the ICG).

D. GRM Steps and Timeframe

167. Informal Approach: Informally, APs can lodge complaints directly to the Contractor during construction or Operator (WUSC) during operation. Contractor/Operator will document and screen the complaint immediately. If screening reveals the complaint as Project-related and valid, the Contractor/Operator will act on the complaint within three days from receipt of complaint. Otherwise, the Contractor/Operator will direct the AP with non-Project-related and/or invalid complaint to the ICG. The Contractor/Operator will secure a confirmation of completion of action from the AP. For at least a week after confirmation of completion, the ICG will monitor the effectiveness of the action/resolution taken. After which, ICG will secure a written confirmation of satisfaction from the AP. The Contractor/Operator shall report to the ICG all complaints received, eligible or ineligible, actions agreed on and taken and confirmation of completed action.

168. Formal Approach: If a complaint is eligible but is not acted on within three days from the receipt of the complaint, or if AP is not satisfied with the resolution undertaken by the Contractor/Operator, he/she can access the formal mechanism, as follows: (Figure VIII-1)

169. First Level: The access point will be the ICG. The steps are detailed below.(Figure VIII-2)

Step 1 Lodging a Complaint (Day 1)

AP lodges complaint with the ICG, verbally or in writing.ICG documents/registers lodged complaint, makes sure these are duly referenced and provides AP with a copy of the referenced complaint.

Step 2 Screening of Complaint (Day1)

ESA screens the complaint if it is Project-related and valid and informs the AP immediately of the screening results. An AP with complaint screened as non-Project-related and/or invalid will be advised that he/she may raise complaint to the second level of the GRM, and ICG will forward the complaint to the GRC.

Step 3 Investigations, Discussion and Agreement (Day 1)

ICG, together with the Contractor/Operator and AP, will investigate and discuss the complaint at the site. Agreement on actions and measures and time involved will be made with the AP. Agreement will be properly documented and filed; ICG, AP, Contractor/Operator will have copies.

Step 4 Implementing the Agreed Action

- If the required action is minor, i.e. not requiring further investigation and would be quick and easy to implement, the Contractor/Operator will immediately implement the agreed action. (Day 2/Day 3)
- If required action is major, i.e., requiring further investigation and/or procurement of supplies/parts,the Contractor/Operator will: (i) immediately provide the most suitable interim measure to reduce the magnitude of the impact (Day 2/Day 3); and (ii) start work on the major action within 5 days from discussion (or not later than Day 8 since receipt of complaint).
- AP will be advised by the ICG that his/her complaint may be raised to the second level of the GRM, if he/she so prefers when: (i) minor action is not implemented within 2 days from discussion; (ii) interim measure prior to major action is not implemented within 2 days from discussion; or (iii) major action is not started within 5 days from discussion.

Step 5 Confirmation of Completed Action
Contractor/Operator will secure a written confirmation of completed action from the AP and furnish the ICG a copy.

Step 6 Confirmation of Satisfaction (1 week after confirmation of completed action)
The ICG will monitor the effectiveness of the resolution for at least a week after receipt of confirmation of completed action from the Contractor/Operator. After which, ICG will secure a written confirmation of satisfaction from the AP.

170. Second Level: The AP will be notified by the ICG when complaint is forwarded to the GRC. The GRC will call for a hearing, if necessary, where AP can present his or her concerns or issues. The GRC will suggest corrective action/measure at the field level and assign clear responsibilities for implementing its decision within 7 days of receipt of complaint by GRC. If GRC decision is not acceptable to the AP, if the suggested corrective action/measure is not started within 7 days, the matter/AP will be referred to the third level.

171. Third Level:The ICG will refer AP and its unresolved complaint or major issues to the PMO EO, who will act within 15 days.

172. Fourth Level:For extremely major issues that will go beyond the third level, these will be referred to the project steering committee (PSC), to be resolved within 30 days. Environmental complaints (other than those that will involve the legal system) are expected to be mainly resolved at the second level, and to a lesser extent at the third level.

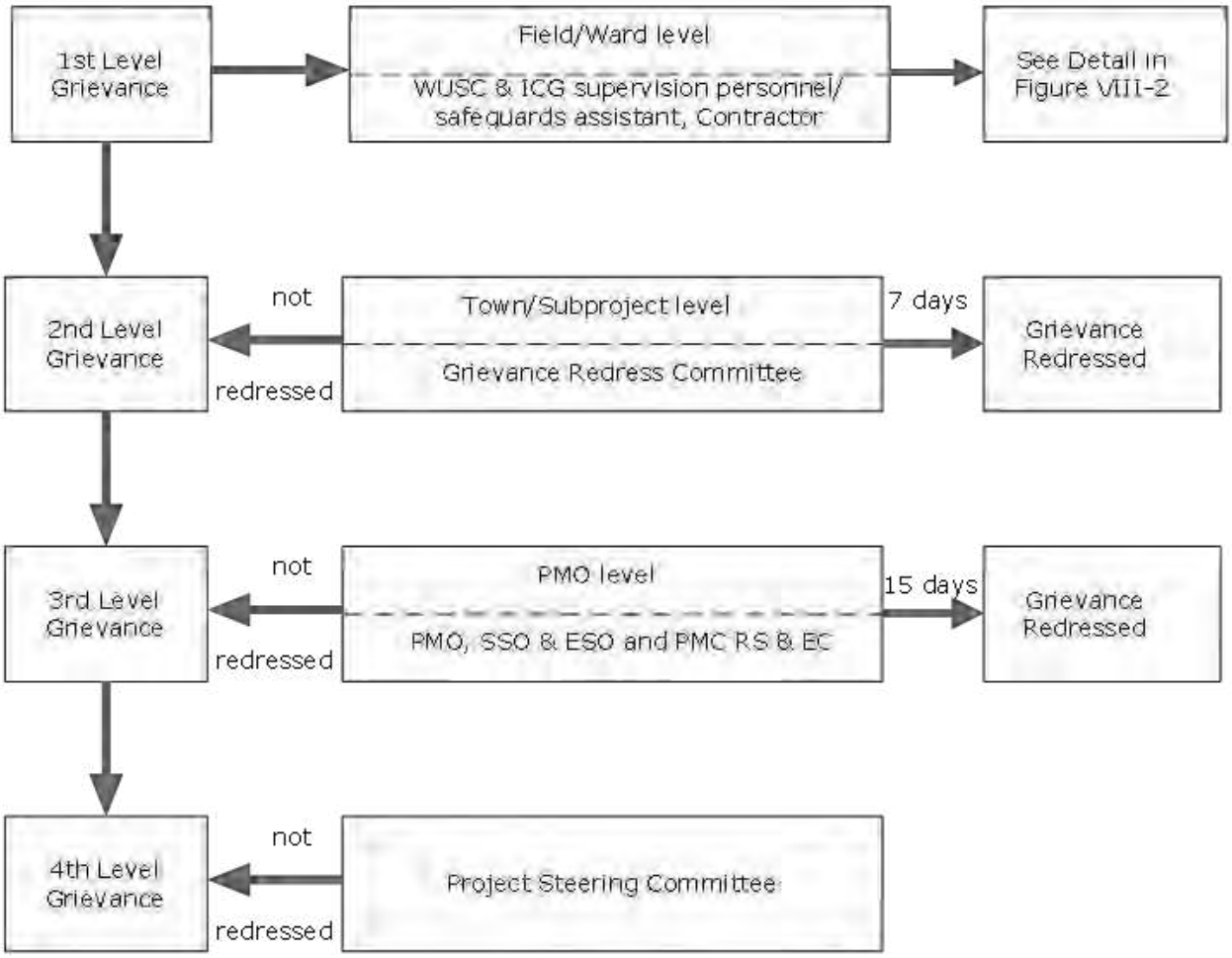
173. Despite the GRM, an AP will have access to the country's legal system at any stage. Accessing the country's legal system can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM. In the event that the established GRM is not in a position to resolve the issue, the affected person also can use the ADB Accountability Mechanism (AM) through directly contacting (in writing) the Complaint Receiving Officer (CRO) at ADB headquarters or the ADB Nepal Resident Mission. The complaint can be submitted in the country's language. The ADB Accountability Mechanism information will be included in the PID to be distributed to the affected communities, as part of the GRM.

174. Record keeping and disclosures: The PMO, GRC, ICG will keep records of all lodged and documented/referenced complaints, actions/resolutions taken, AP's written confirmations of completed action and satisfaction, complaints raised to higher levels and lessons learned. The number of grievances recorded and resolved and the outcomes will be displayed at the offices of

WSSDO, ICG, Town LGU, PMO and WUSC and reported in the monthly progress reports, semi-annual EMR during construction and annual EMR during operation, submitted to ADB.

175. Periodic review and documentation of lessons learned: The PMO EO will do periodic review of the effectiveness of the GRM in each town and record information on the effectiveness of the mechanism, especially on the project's ability to prevent and address complaints.

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



ES- Environmental Specialist

ESO- Environmental Safeguards Officer

ICG- Implementation Core Group

PMC- Project Management Consultant

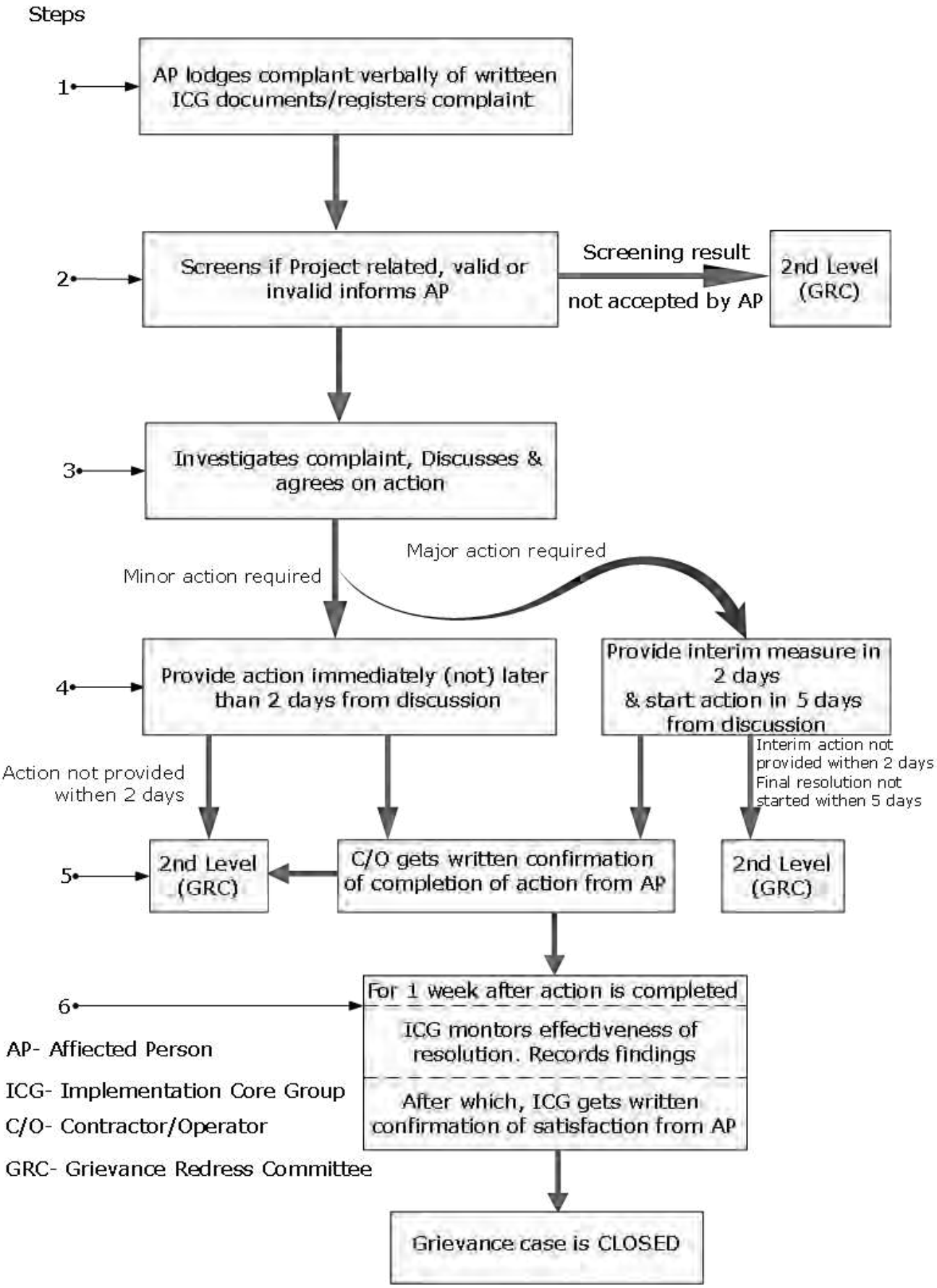
PMO- Project Management Office

RS- Resettelment Specialist

SSO- Social Safeguard Officer

WUSC- Water Users and Sanitation Committee

Figure VIII-2: GRM First Level



IX ENVIRONMENTAL MANAGEMENT PLAN

176. The purpose of the environmental management plan (EMP) as per Table IX-1: is to ensure that the activities are undertaken in a responsible, non-detrimental manner with the objectives of: (i) providing a proactive, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on-site; (ii) guiding and controlling the implementation of findings and recommendations of the environmental assignment conducted for the project; (iii) detailing specific actions deemed necessary to assist in mitigating the environmental impact of the project; and (iv) ensuring that safety recommendations are complied with.

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

A. Institutional Arrangement

178. Executing and implementing agencies:The Ministry of Water Supply and Sanitation (MoWSS) will be the executing agency with responsibility of subproject execution agency with responsibility of subproject execution delegated to the Department of Water Supply and Sewerage (DWSS). The Water Supply and Sanitation Division/Sub-division Office (WSSDOs) are the subproject implementing agencies. Water User's and Sanitation Committees of participating towns are the implementing agencies.

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

Prior to construction:

- The MoWSS will deputize a qualified staff to act as the Environmental Safeguard Officer of the Project management office (PMO).
- The MoWSS will establish the grievance redress mechanism, including setting up the Grievance Redress Committee.
- The Water Supply and Environmental Division of the MoWSS will be responsible for reviewing and approval of the IEE Report.

- The DWSS will review the IEE Report prepared by the Design, Supervision and Management ConsultantTeam's Environmental Safeguard Expert (DSMC-ESE) prior to forwarding this to MoWSS.
- The DWSS will prepare the ToRs for the Environmental Safeguard Specialist that will engage to support the PMO and for the Environmental Safeguard Specialists of the two Design, Supervision and Management Consultants that will be appointed to prepare the subprojects.

During construction and operation:

B. Safeguard Implementation Arrangement

180. Project Management Office (PMO): The safeguard officers (environmental safeguard officer and social safeguard officer) of the PMO will receive support from safeguards experts (environmental and social) of the DRTAC as specified below:

(i) Confirm existing IEEs/EMPs are updated based on detailed designs and that new IEEs/EMPs are prepared in accordance with the EARF and government rules;
(ii) Confirm whether EMPs are included in bidding documents and civil works contracts;
(iii) Provide oversight on environmental management aspects of subprojects and ensure EMPs are implemented by regional project management offices (Eastern RPMO and Western RPMO) and contractors;
(iv) Establish a system to monitor environmental safeguards of the project including monitoring the indicators set out in the monitoring plan of the EMP;
(v) 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;
(vi) Supervise and provide guidance to the RPMOs to properly carry out the environmental monitoring and assessments as per the EARF;
(vii) Review, monitor and evaluate the effectiveness with which the EMPs are implemented, and recommended necessary corrective actions to be taken as necessary;
(viii) Consolidate monthly environmental monitoring reports from RPMOs and submit semi-annual monitoring reports to ADB;
(ix) Ensure timely disclosure of final IEEs/EMPs in project locations and in a form accessible to the public; and
(x) Address any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs.

181. **Regional Project Management Offices (Eastern and Western RPMOs):**The regional DWSS engineers and social development officers of the RPMOs will receive support from; (i) the PMO safeguards officers (environmental and social); and (ii) the safeguards specialists (environmental and social), the social mobilizers and environmental management plan (EMP) monitors of the design, supervision and management consultant (DSMC) teams as specified below:

(i) Prepare new IEEs/EMPs in accordance with the EARF and government rules;
(ii) Include EMPs in bidding documents and civil works contracts;
(iii) Comply with all government rules and regulations;
(iv) Take necessary action for obtaining rights of way;
(v) Oversee implementation of EMPs including environmental monitoring by contractors;
(vi) Take corrective actions when necessary to ensure no environmental impacts;
(vii) Submit monthly environmental monitoring reports to PMO, and;
(viii) Address any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs.

182. Civil Works Contracts and Contractors: EMPs are to be included in bidding and contract documents and verified by the PMO and RPMOSs. The contractor will be required to designate an environment 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 government will ensure that bidding and contract documents include specific provision requiring contractors to comply with all; (i) applicable labor laws and core labor standards on (a) prohibition of child labor as define in national legislation for construction and maintenance activities, (b) equal pay for equal work of equal value regardless of gender, ethnicity or caste (c) elimination of forced labor; and (ii) the requirement to disseminate information on sexually transmitted diseases including HIV/AIDS to employees and local communities surrounding the project site.

183. Capacity Building: The 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 in accordance with both ADB and government requirements as specified below:

(i) Sensitization;
(ii) Introduction to environment and environmental consideration 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 prior to deployment to work sites.

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

Prior to construction

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

During construction

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

During operation

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

185. Licensed and accredited laboratory: It is recommended that a licensed and accredited laboratory be engaged to conduct water quality monitoring in the first few years of operation and to train the WUSC on the same. The laboratory 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 the WUSC.

Environmental Management Plan (EMP)

Table IX-1: Environmental Management Plan Matrix

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
1. Prior to Construction Activities					
Consents, permits, clearances, no objection certificate (NOC), etc.	Failure to obtain necessary consents, permits, NoCs, etc can result to design revisions and /or stoppage of works	- Obtain all of the necessary consents, permits, clearance, NOCs, etc. prior to start of civil works. - Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs, etc. - Include in detailed design drawings and documents all conditions and provisions if necessary	PMO, RPMOS,& DSMC	Incorporated in final design and communicated to contractors	Prior to 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 activities - Require construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services. - Require contractors to prepare spoils management plan (see Annex 2-E for outline).	DSMC, RPMOS	List of affected utilities and operators; Bid document to include requirement for a contingency plan for service interruptions (example provision of water if disruption is more than 24 hours), spoil management plan (see Annex 2-E for outline).	During detailed design phase Review of spoils management plan: Twice (once after first draft and once before final approval)

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
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 from inadequate design of facilities for receiving, storing and handling of Cl & other chemicals	- During the detailed engineering design stage, water samples from deep Tubewell & shallow well were tested. Tests revealed iron content and coliforms as beyond standards limits. This information has guided design of water treatment and depth of well. However verification on the yield through borehole tests need to be carried out and confirmed before award of contract. - Design proposes basic treatment using lime dosing, pressure filter and disinfection using Ca (ClO)2 and provisions for lab unit and kits. This IEE proposes "hands on" training by a licensed & accredited laboratory for the first two years of operation under the Water Safety Plan included in the subproject design & continuing training thereafter. - Intake well has adequate land for perimeter fencing to keep animals away from grazing nearby. Appropriate casing of Tubewells including the installation of screens. Intake well to be located at least30m upstream from sanitation facilities. Where this cannot be	PMO, RPMOS & 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
		maintained; (i) septic tanks will need to be sealed (water tight) and emptied as per the design requirements; (ii) Tubewells to be cased appropriately and installation of a screen; and (iii) a test pit should be established and water quality monitoring should be conducted regularly (at least once every quarter). Disinfection of the Tubewell should be conducted prior to commissioning and after repairs - Design has included a "housed" dosing unit with appropriate ventilation, bonding and training for staff in handling as per material, safety data sheets (MSDS).			
Sanitation (Toilets and septage disposal)	Contamination of drinking water source and other environmental receptors from household and community toilets Risk to public and environmental health due to inappropriate sitting and design of septage disposal pit	- The design of toilets includes septic tanks that are designed as per national standards and codes to allow for maximum retention of septage. This includes ensuring septic tanks are sealed and water tight. Toilets will be established at least 30m downstream of the drinking water source. - The septage disposal pit (similar to sludge drying bed technology) is to be designed and constructed in accordance to	PMO, RPMOS, & 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
		international best practice and acceptable standards (e,g US EPA standards etc). This includes; (i) locating disposal pits at least 300m away from the nearest dwelling, and 30 m downstream of the drinking water source; (ii) pits are to be only established in relatively flat land with no more than 8% slope; and (iii) site selected for establishment of pits should not be where food crops are grown. - The sanitation condition will be maintained to deter flies, mosquitos, and other vectors for breeding, free from odor and aesthetically pleasing. - A proper septage management shall be developed and followed.			
Construction work camps, stockpile areas, storage areas, and disposal areas	Disruption to traffic flow and sensitive receptors	- Determine locations prior to 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	- Mechanism of safe disposal such as - Construction waste will be developed in the project site before the actual	Contractor	Contractor records. visual inspection	Visual inspection by RPMOS & DSMC-ESS on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		commencement of work - Prohibition of unwanted littering and discharge of waste. - - Proper management of solid waste will be done using pits for waste disposal			
Sources of materials	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and 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 discussion with detailed design engineers and PIUs suitability of sources and permit for additional quarry sites if necessary.
EMP Implementation Training	Irreversible impact to the environment, workers, and community	- Project manager and contractors should undergo EMP implementation including spoils management for construction works; standard operating procedures (SOP) for construction works as it is a method of identifying a work process and breaking it into the specific step by step procedure needed to successfully execute the process right from the beginning and result to greater quality via conforming to proven steps therefore, the written SOP provide instruction for less experience workers and benefits to the contractor is it serves as a benchmark for all workers on how a work process is to be completed	PMO, RPMOs and DSMC. Contractor's Environmental Supervisor	Record of completion (safeguards Compliance Orientation) Contractor records for EMP implementation at worksites	During detailed design phase prior to mobilization of workers to site

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		; health & safety (H&S), core labor Act (1992), applicable environmental laws, etc.			
2. During Construction Activities					
A. Physical Characteristics					
Topography landforms, geology and soils and/or river morphology and hydrology	Extraction of natural aggregate materials may cause localized changes in topography and landforms (if on land) or river morphology and hydrology (if on river).	- Contractor's should be required to first utilize readily available sources with environmental clearance and license to and that still have a high ratio of extraction capacity over loss of natural state. - Borrow areas and quarries (if these are being opened up exclusively for the subproject) must comply with environmental requirements, as applicable. No activity will be allowed until formal agreement is signed between PIU, landowner and contractor. - Coordinate with MoPE, DDC, and local authorities regarding restrictions in quarrying from rivers. As much as possible, alternative source should be identified.	Contractor	Records of sources of materials	Monthly by RPMOS
Erosion Hazards	Potential erosion may occur when moderately to highly sloping terrains are disturbed for the installation of transmission mains and distribution	- Soil erosion will be minimized by taking precautionary measures such as; excavated soil will be reused and proper	Contractor	Potential area of soil erosion ; transmission mains and distribution pipelines core area	Visual inspection by RPMOS and DSMC-ESS during construction phase on weekly basis Frequency and sampling sites

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	pipes.	backfilling of the trenches will be done and the excavated soil will be placed properly against erosion. Temporary diversions and sign boards for pedestrians will be provided.			to be finalized during detailed construction phase
Water quality	Potential erosion may occur when moderately to highly sloping terrains are disturbed for the installation of transmission mains and distribution pipes.	- Prepare and implement a spoils management plan. - Prioritize re-use of excess spoils and materials in construction activities. If spoils will be disposed, consult with district development committee on designated disposal areas. - All earthworks must be conducted during dry season to maximum extent possible to avoid the difficult working conditions that prevail during monsoon season such as problems from runoff. - Location for stock yards for construction materials shall be identified at least 300m away from water courses. Place storage areas for fuels and lubricants away from any drainage leading to water bodies - Take all precautions to minimize the wastage of water in the construction	Contractor	Areas for stockpiles 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 stage and final location of subprojects components

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		activities - Take all precautions to prevent entering of waste water into streams, watercourses, or irrigation system. Install temporary silt traps or sediment basins along the drainage leading to the water bodies. - Ensure diverting storm water flow during construction shall not lead to inundation and other nuisances in low lying areas. - While working across or close to any water body, the flow of water must not be obstructed. Ensure no construction materials like earth, stone, or appendage are disposed of in a manner that may block the flow of water of any watercourse and cross drainage channels. - Monitor water quality according to the environmental management plan.			
Air quality	Conducting works at dry season and moving large quantity of materials may create dusts and increase in concentration of vehicle-related pollutants (such as carbon, monoxide, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons) which will affect people who live and	- Water dry exposed surfaces and stockpiles of aggregates at least twice daily, or as necessary. - If re-surfacing of distributed roads cannot be done immediately, spread of crushed gravel over backfilled surfaces	Construction Contractor	Location of stockpiles; Number of complaints from sensitive receptors; Heavy equipment and machinery with air pollution control devices; Certification that vehicles are compliant with air quality standards.	Visual inspection by RPMOS & DSMC-ESS on monthly basis Frequency and sampling sites to be finalized during detailed design stage and final location of subproject components

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	work near the sites.	- Hoarding active work sites in populated areas - Require trucks delivering aggregates and cement to have tarpaulin cover and maintain a minimum of 2" free board - Limit speed of construction vehicles in access roads and worksites to maximum of 30kph. - Use of vehicles complying with NVMES, 2069 enforcement and green sticker standards and prohibition of open burning of solid waste within the project area - Ensure use of equipment complying with applicable emission standards to control anthropogenic air pollution - Arrangements to control dust through provision of DSMC screens, water sprinklers etc.			
Acoustic environment	Construction activities will be on settlements along and near schools, and areas with small-scale businesses. Temporary increase in noise level and vibrations may be caused by excavation equipment, and the transportation of equipment materials, and	- Involve the community in planning the work program so that any particularly noisy or otherwise invasive activities can be scheduled to avoid sensitive times. - Plan activities in consultation with local administration (Chief district office), local	Contractor	Number of complaints from sensitive receptors; Use of silencers in noise-producing equipment and sound barriers; Equivalent day and night time noise levels	Visual inspection by RPMOS & DSMC-ESS on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	people. However, the proposed subproject will follow existing ROW alignment and impact is short-term, site specific and within a relatively small area.	police/traffic office so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance. - Restrict noisy activities to daytime. Overtime work should avoid using noisy/high noise generating equipment. - Minimize drop heights when loading and unloading coarse aggregates. - Spread out schedule of materials, spoil & waste transport - Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach; - Utilize modern vehicles and machinery with the requisite adaptations to limit noise and exhaust emissions, and ensure that these are maintained to manufactures' specifications at all times. - All vehicles and equipment used in construction shall be fitted with exhaust silencers. Use silent type generators (if required) - Monitor noise levels. Maintain maximum sound levels not exceeding 80 decibels			

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		(dBA) when measured at a distance of 10m or more from the vehicle/s. - If it is not practicable to reduce noise levels to or below noise exposure limits, the contractor must post warning signs in the noise hazard areas. Workers in a posted noise hazard area must wear hearing protection. - Identify any building at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity. Complete work in these areas quickly.			
Water Pollution due to leakage of fuel & lubricants	Leakage of fuel & lubricants from construction equipments & vehicles & paints spillage could pose a threat to river & ground water quality in & around the project area.	- Strict instructions will be given to the workers not to spill the chemicals and petrolems products used during the construction into surface land and nearby streams. This procedure shall be in-cluded in the terms of contract between the proponent and the contractor	Contactor	Stockpiles storage of fuels and lubricants and vehicles parking area 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 stage and final location of subprojects components
B. Biological Characteristics					
Impacts on Biodiversity	The proposed project will have less or no impacts on biodiversity. The project components require a very small area	- Haphazard site clearing, parking and movement of construction vehicles and equipment, stockpiling, and Illegal harvesting of nearby community forest resources as fuel for cooking by workers	Contractor	PIU and PMO to report in writing the number of trees cut and planted if tree-cutting will be required (to be	Visual inspection by RPMOS & DSMC-ESS on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	of land for implementation; environmental impacts on the vegetation & natural eco-system don't seem to be significant. However, some of the topsoil & vegetation will be lost during pipe laying works.	will result in unnecessary loss of vegetation beyond Subproject footprints. - The proposed water supply project won't require to construct any project structures within the area of Community Forests area and also there is no tree felling will be required to construct project structures. - During construction disturbances will occur. Some of the mitigation measures include: (i) installing clear signage and markers to direct traffic movement in sites; (ii) designating stockpiling areas; (iii) re-vegetating disturbed slopes and grounds, as applicable; and providing alternative fuel to workers for cooking. Hunting and poaching by workers will be strictly prohibited.		determined during detailed design stage) Number of complaints from sensitive receptors on disturbance of vegetation, poaching fishing, etc.	
Impacts on Fauna	No major impacts on animals area expected	- No heavy vehicles will be made available to run on the road that may disturb the wildlife of the area - Horn prohibited sign will be placed in nearby wildlife inhibited area	Contractor	Vehicles running nearby wildlife inhibited area will be monitored; Number of complaints from sensitive receptors on disturbance of poaching fishing, etc.	Visual inspection by RPMOS & DSMC-ESS on monthly basis
C. Socioeconomic Characteristics					
Impact to Local Residents	The construction related activities that generate dust, noise and impede access will disturb the local residents	- To minimize the disturbances, construction work will be conducted as quickly as possible. - The local residents will be consulted and informed about the disturbances in advance. - Temporary diversions and signboards will be provided for the pedestrians.	Construction contractor	Time schedule of construction work; Information related to construction activity to local residents Number of temporary diversions sign, signboards etc.	Visual inspection by RPMOS & DSMC-ESS on weekly basis
Problem from Outside Work Force	Haphazard disposal of solid waste and improper sanitary conditions generated by the construction workers may cause pollution of surrounding environment and affect the health of	- A mechanism for the safe disposal of waste will be developed in the project site and a labor camp will be constructed before the actual commencement of work and unwanted littering and discharge of waste will be prohibited. - The contractor should give proper instructions to the workers for them to act responsibly and	Construction contractor	Disposal sites of the waste will be assessed in the project site; Number of local people versus outside workers in the project area will be regularly monitored	Visual inspection by RPMOS & DSMC-ESS on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	local people .Similarly, social problems will arise due to irresponsible behavior of the work force such as gambling, alcoholism and disrespect to local people and their culture.	prohibit activities such as alcohol uptake and gambling in the work site. - local people should be given more chance to work - (whenever available) in the project which helps to minimize the chances of cultural discrepancy and conflict due to increased labor from outside.			
Occupation Health & Safety	During the construction work, the laborers involved in the construction activities may be exposed to different level of health risks and are prone to accidents	- A site health and safety plan will be prepared encouraging use of safety measures such as mask, helmet, hand gloves and rubber boots. - The laborers will be insured for their health and safety. - Workers working at a certain height above the ground especially during the construction will be provided with safety gears. - Personal Protective Equipment (PPE) as required. First aid box will be kept at a proper and easily accessible place. - The child labour will be totally prohibited from all the constructional activities. - There will be no discrimination in wage for male and female workers in the project	Construction 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 trainings Availability of personal protective equipment at construction site % of moving equipment outfitted with audible back-up alarms Signage for storage and disposal areas Condition of sanitation facilities for workers	Visual inspection by RPMOS (monthly) and DSMC-ESS on weekly basis. Frequency and sampling sites to be finalized during detailed design stage and final location of subproject components
Community Health & Safety Hazards	Overall, communities will be exposed to cross-cutting threats from construction's impacts on air and water quality, ambient noise level; Communicable and transmittable diseases may potentially be brought into the community by construction workers.	- Contractor's will maintain adequate lighting, temporary fence, reflectorized barriers and signage at active work sites; - Contractor's preparedness in emergency response; - GRM will be formed & implementation of the GRM will be made mandatory	Construction contractor	Number of permanent signs, barricades and flagmen on worksites as per Traffic Management Plan (see Annex 2-D for sample); Number of complaints from sensitive receptors; Number of walkways, signs, and metal sheets placed at project location	Visual inspection by RPMOS & DSMC-ESS on weekly basis Frequency and sampling sites to be finalized during detailed design stage and final location of subproject components

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
				Agreement between landowner and contractors in case of using private land as work camps storage areas etc.	
Other existing amenities for community welfare	Although construction of subproject components involves quite simple techniques of civil works, the invasive nature of excavation and the subproject sites being in built-up areas of town where there are a variety of human activities, will result impact to the sensitive receptors such as residents, businesses, and the communities. Excavation may also damage existing infrastructure (such as water distribution pipes, electricity pylons, etc.) located alongside the roads. The impacts are negative but short-term, site specific within a relatively small area and reversible by mitigation measures.	- Obtain details from nature and location of all existing infrastructure, and plan excavation carefully to avoid any such sites to maximum extent possible; - Integrate construction the various infrastructure subprojects to be conducted in town (roads, water supply, etc.) so that different infrastructure is located on opposite sides of the road where feasible and roads and inhabitants are not subjected to repeated disturbance by construction in the same area at different times for different purposes. - Consult with local community/district development committee/local administration to inform them of the nature, duration and likely effects of the construction work, and to identify any local concerns so that these can be addressed. - Existing infrastructure (such as water distribution pipes, electricity pylons, etc.)	Construction contractor	Utilities Contingency Plan Number of complaints from sensitive receptors	Visual inspection by RPMOS & DSMC-ESS on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		shall be relocated before construction starts at the subproject sites. - Prior permission shall be obtained from respective local authority for use of water for construction. Use of water for construction works shall not disturb local water users. - If construction work is expected to disrupt users of community shall be served 7 days in advance and again 1 day prior to start of construction. - Ensure any damage to properties and utilities will be restored or compensated to pre work conditions.			
Existing provisions for pedestrians and other forms of transport	Road closure is not anticipated. Hauling of construction materials and operation of equipment onsite can cause traffic problems. However, the proposed subproject will follow existing ROW alignment. The impacts are negative but short-term, site specific within a relatively small area and reversible by mitigation measures.	- Ensure appropriate transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites. - Maintain safe passage for vehicles and pedestrians throughout the construction period. - Schedule truck deliveries of construction materials during periods of low traffic volume. - Erect and maintain barricades including	Construction Contractor	Traffic route during construction works including number of permanent signs, barricades and flagmen on worksite; Number of complaints from sensitive receptors; Number of signage placed at project location. Number of walkways, signage, and metal sheets placed at project location	Visual inspection by RPMOS & DSMC-ESS on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		signs, markings, flags and flagmen informing, diversions and alternative routes when required. - Notify affected sensitive receptors by providing sign boards informing nature and duration of construction activities and contact numbers for concern/complaints. - Leave spaces for access between mounds of soil. - Provide walkways and metal sheets where required to maintain access across for people and vehicles. - Increase workforce in front of critical areas such as institution, place of worship, business establishment, hospitals, and schools. - Consult business and institutions regarding operating hours and factoring this in work schedules. Ensure there is provision of alternate access to businesses and institutions during construction activities, so that there is no closure of these shops or any loss of clientage. - Ensure any damage to properties and			

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		utilities will be restored or compensated to pre-work conditions.			
Impact on private Land & Loss of standing crops	The project won't acquire any private land & property during construction phase of the project so there is no issues for loss of standing crops.	Impact on private Land & Loss of standing crops The Birendranagar Water Supply owns enough land in ward no. 1, 2 & 9 thus no need to acquire any other private land.			
D. Historical, Cultural, and Archaeological Characteristics					
Physical and cultural heritage	There are no scheduled or unscheduled archaeological, paleontological, or architectural sites of heritage significance listed by local and/ or national authority and/or internationally (UNESCO) within or adjacent to subproject sites.	- Stop work immediately to allow further investigation if any finds 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 environment supervisor to ensure EMP implementation - Timely submission of monitoring reports including pictures.	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 all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and - All excavated roads shall be reinstated to original condition.	Contractor	RPMOS/PMO report in writing that (i) worksite is restored to original conditions; (ii) 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 clean-	Prior to turn-over 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 area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up. - All hardened surfaces within the construction camp area shall be ripped, all imported materials removed reinstraining to orginal conditionThe contractor must arrange the cancellation of all temporary services. - Request PMO/PIU to report in writing that worksites and camps have been vacated and restored to pre-project conditions before acceptance of work.		up is satisfactory.	
Environmental legislation compliance	Lack of awareness amongst project managers and WUSC in operating systems as per required legislation and IEE requirements	- Capacity strengthening of the WUSC and continuing capacity strengthening of Project staff; and ensuring compliance with NDWQS, applicable conditions in IEE approvals and license for use of water resource.	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	- The operations and maintenance plan and training for staff will cover; (i)	PMO, RPMOs, DSMC and WUSC	Water Quality reports WTP records in the log book	During O&M of the system Quarterly monitoring

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		competent/cautions handling and storage of calcium Hypochlorite and qualified persons to implement/oversee disinfection and treatment; (ii) providing safe storage for chemicals; (iii) ensure capacity of WUSC to implement quick response to hazardous substance/waste spills; (iv) implement SPS-complaint EMP and a water safety plan; and (v) monitor water quality.			
	Excessive algal growth in reservoirs.	- The water tanks are designed to be closed. In addition; (i) maintenance of chlorine residual in the system at all times including the cleaning of reservoirs as per the O&M schedule.	WUSC	Water quality results	During O&M of the system. Daily maintenance of chlorine residual, cleaning.
Mishandling of chlorine	Excessive exposure to chlorine, hypochlorous acid, and hypochlorite ion and intake of a small quantity of bleach generally results in irritation of the oesophagus, a burning sensation in the mouth and throat, and spontaneous vomiting.	- All disinfection chemicals require proper storage and handling practices: ii) providing safe storage for chemicals; iii) ensure that the person is hired, with knowledge of chlorine use for disinfection process during operation iv)Ensure use of PPE while using chemicals; v) Use of chlorine guideline as per WHO (Annex 7)	WUSC	Water quality test	
Sanitation facilities (toilets and septage disposal site)	Contamination to land or water ways due to overflow of septic tanks and/or uncontrolled dumping of septage	- The subproject incorporates a pilot for controlled disposal of septage. This is to reduce the likelihood of uncontrolled	WUSC, DSMC, RPMOs and PMO for education campaign	Sanitary inspection reports. Water quality re[orts from test pits near Tubewell sites	During O&M of the system.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		septage disposal to land and local water ways (nallas) which is currently practiced. 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 on the above to further reduce the likelihood of septic tank overflows and uncontrolled dumping of septage .			

C. Environmental Monitoring Program

Environmental monitoring will be done during construction at three levels:

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

186. In addition to regular monitoring onsite (at town level) by the ICG and DSMC-ESS on the EMP implementation of the mitigation measures, monitoring of key environmental parameters is proposed. Table IX-2 presents the indicative environmental monitoring plan for the subproject which includes relevant environmental parameters, with a description of the sampling stations, frequency of monitoring, applicable standards, and responsible agencies. This will be updated during detailed design to ensure EMP and monitoring program is commensurate to the impacts of the subproject.

Table IX-2: Environmental Monitoring Program

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

	Field	Stage	Parameters	• Location	Frequency	Standards	Responsibility
			temperature				
4.	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

D. Institutional Capacity Development Program

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

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

189. The contractors will be required to conduct environmental awareness and orientation of workers prior to deployment to work site. The proposed training project along with the frequency of sessions is presented in Table IX-3. The Environmental Safeguard specialist & EMP Field Monitloring Staffs are responsible for organizaing different training program for Environmental Management.

Table IX-3: Training Program for Environmental Management

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

E. Staffing Requirement and Budget

190. Costs required for implementing the EMP will cover the following activities:

(i) Updating IEE, preparing and submitting reports and public consultation and disclosure;

(ii) Application for environmental clearances; and

(iii) Implementation of EMP, environmental monitoring program and long-term surveys.

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

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

193. The operation phase for mitigation measures are good operating practices to mitigate the environmental impacts of this phase & he responsibility remains to WUSC. All monitoring during the operation and maintenance phase will be conducted by WUSC. The Water Safety Plan, included in each subproject design, will allocate NPR 500,000 annually for operation and maintenance particularly water quality monitoring. If a licensed laboratory will be engaged for the first 2-3 years of operation for training purposes, the cost can be accommodated under the Water Safety Plan.

194. Cost of awareness program & WSP during contract period is NPR 480,000.00 under provisional sum.

195. The indicative costs of EMP implementation are shown in Tables IX-4 and IX-5 (by source of funds).

Table IX-4: Indicative Cost of EMP Implementation

	Particulars	**Stages**	**Unit**	**Total Number**	**Rate (NPR)**	**Cost (NPR)**	**Cost covered by**
A.	**Monitoring Measures**						
1.	Air quality monitoring	- Pre-construction - Construction	Per location	3	150000.00	450,000.00	Civil works contract
2.	Noise levels	- Pre-	Per	3	30000.00	90,000.00	Civil

	Particulars	Stages	Unit	Total Number	Rate (NPR)	Cost (NPR)	Cost covered by
	monitoring	construction - Construction	location				works contract
B.	**Capacity Building**						
1.	(i) Orientation workshop for officials involved in the project implementation on ADB Safeguards Policy Statement, GoN environmental laws and regulations, and environmental assessment process; (ii) induction course contractors, preparing them on EMP implementation and environmental monitoring requirements related to mitigation measures; and taking immediate action to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of implementation; and (iii) lessons learned information sharing	Module 1 – immediately upon engagement of the (provide if DRTAC or DSMC) environmental specialists Module 2 – prior to award of civil works contracts (twice a year for 4 years) Module 3 – prior to 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	Covered under DRTAC or DSMC contract
C.	**Manpower Costs**						
1	PMO Environment Safeguards Officer	Construction phase	1	20	65000.00	1300000.00	Budget covered through DRTAC
2	ICG Environment Safeguard Assistants	Construction phase	2	20	25000.00	1,000,000.00	Budget covered through DSMC

	Particulars	Stages	Unit	Total Number	Rate (NPR)	Cost (NPR)	Cost covered by
3	PMO Environmental Safeguard Specialist	Responsible for environmental safeguards of the project at PMO level	person months (spread over entire project implementation period)	24	350000.00	8,400,000.0	Remuneration and budget for travel covered in the DRTAC contract
4	DSMC Environmental Safeguard Specialist	Responsible for environmental safeguards of the project at ICG level	person months (spread over entire project implementation period)			6,000,000.0	Remuneration and budget for travel covered in the DSMC contract
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 contractor at his own 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	50,000
E.	**Other Costs**						
1.	Public consultations and information disclosure	Information disclosure and consultations during preconstruction and construction phase, including public awareness campaign	As per requirement	Lump sum		350,000	Covered under DSMC contract

	Particulars	Stages	Unit	Total Number	Rate (NPR)	Cost (NPR)	Cost covered by
		through media					
2.	GRM implementation	Costs involved in resolving complaints (meetings, consultations, communication, and reporting/information dissemination)		Lump sum		200,000	PMO cost
3.	Any unanticipated impact due to project implementation	Mitigation of any unanticipated impact arising during construction phase and		Lump sum	Contractor's liability	As per insurance requirement	Civil works contract – contractor's insurance defect liability period
TOTAL						**19,140,000**	

196. However provisional amount of NPR 500,000.00 has been provided to execute all necessary environmental mitigation measures during entire construction period. Cost for tree cutting and uprooting under provisional sum is NPR 500,000.00, if required.

Implementation Schedule

197. Environmental management will be implemented from the detailed design phase through to procurement, construction and operation. Table IX-5 presents the indicative time frame of key EMP activities in relation to subproject implementation schedule.Similarly, IX-6 proposed topics for capacity building / training.

Table IX-5: Environmental Management Implementation Schedule

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

Table IX-6: Proposed Topics for Capacity Building/Training

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

X MONITORING AND REPORTING

198. RPMO will monitor and measure the progress of EMP implementation. The monitoring activities will correspond with the project's risks and impacts, and will be identified in the IEEs for the projects. In addition to recording information on the work and deviation of work components from the original scope PMO, ICGs will undertake site inspections and document review to verify compliance with EMP and progress toward the final outcome.

199. 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. The suggested monitoring report format is in Annex 2-F. Subproject budgets will reflect the costs of monitoring and reporting requirements. For the projects likely to have significant adverse environmental impacts during operation phase, reporting will be continued at bio-annual & annual basis. Monitoring reports will be posted in a location accessible to the public.

200. For subprojects likely to have significant adverse environmental impacts, PMO will retain qualified and experienced 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 the PMO-ESS

201. ADB will review project performance against the MoWSS'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 site visits for projects with adverse environmental or social impacts;
(ii) Conduct supervision missions with detailed review by ADB's safeguard specialists/officers or consultants for projects with significant adverse social or environmental impacts;
(iii) Review the periodic monitoring reports submitted by 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 as appropriate; and
(v) Prepare a project completion report that assesses whether the objective and desired outcomes of the safeguard plans have been achieved, taking into account the baseline conditions and the results of monitoring.

XI CONCLUSION AND RECOMMENDATION

202. The proposed subproject is not an environmentally critical undertaking. The IEE indicates that:

- The proposed subproject, its components, are not within or adjacent to environmentally sensitive areas.
- The extent of adverse impacts is expected to be local, confined within the subprojects' main areas of influence, quarry or burrowing sites, waste disposal sites, and the routes to and from these sites. Except during windy days and heavy rainfall, fugitive dust, fine aggregates, sediments and/or wastes would not be the transported beyond the aforementioned sites. With mitigation measures in place and ensuring that the bulk of earthworks are completed prior to the onset of the rainy season, the potential adverse impacts during construction would be highly/more site-specific.
- The few adverse impacts of high magnitude during construction will be temporary and short-term (i.e. most likely to occur only during peak construction periods). These will not be sufficient to threaten or weaken the surrounding resources. Simple/uncomplicated mitigation measures, basically integral to socially and environmentally responsible construction practices, are commonly used at construction sites and are known to Contractors. Hence, mitigation measures would not be difficult to be implemented.
- 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.
- The proposed subproject will bring about: (i) the benefits of access to reliable supply of safe and potable water; (ii) promotion of good hygiene and sanitation practices and reduced health and safety risks as positive impacts; and (iii) enhanced community health, improved quality of life and safe communities as outcomes.

203. Based on the above findings, the classification of Birendranagar Water Supply and Sanitation Project as Category B is confirmed, and no further special study or detailed EIA needs to be undertaken.

XII LITERATURE REVIEWED

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ANNEXES

ANNEX 1: APPROVED TERMS OF REFERENCE (TOR)

Government of Nepal
Ministry of Water Supply and Sanitation
Department of Water Supply and Sewerage
Third Small Towns Water Supply and Sanitation Project
PROJECT MANAGEMENT OFFICE
Pariyojana Bhawan, Kharibari, Kathmandu

Ref No.: 767/ 072-73

5 April, 2016

To,
Mr.A.M.L Das
Team Leader, ERDSMC
TAEC- ICON JV
Itahari, Sunsari, Phone /Fax-025-588606 /
P.O.Box 2519, Sankhamul, Kathmandu, Nepal
Tel: 01-4781446/4782340, Fax: 01-4781447

Subject: L3157/TSTWSSSP/ Approval of IEE ToR of Birendranagar, Chitwan

Dear Sir

It is our pleasure to inform you that the Terms of Reference (ToR) of Initial Environmental Examination (IEE) of Birendranagar_Chitwan Town has been approved by Ministry. We would like to request you to prepare IEE report as per approved ToR as soon as possible.

sincerely

Rajendra Sapkota
Deputy Project Director

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Receival on
05-04-2016

GOVERNMENT OF NEPAL

Ministry OF Water Supply and Sanitation

Department of Water Supply and Sewerage

Third Small Towns Water Supply & Sanitation Sector Project

Project Management Office

Panipokhari, Maharajgunj, Kathmandu

INITIAL ENVIRONMENTAL EXAMINATION

for

BIRENDRANAGAR WATER SUPPLY AND SANITATION PROJECT

Chitawan District

Government of Nepal
Ministry of Water Supply and Sanitation
Singhadurbar, Kathmandu

TERMS OF REFERENCE (ToR)

March, 2016

Submitted by:

TAEC Consultant P. Ltd. – Integrated Consultants Nepal Pvt. Ltd. JV

Submitted To:

PMO, Third Small Towns Water Supply and Sanitation Sector Project, Department of Water Supply and Sewerage, Ministry of Water Supply and Sanitation, Government of Nepal

List of Figures

List of Acronyms

ADB	Asian Development Bank
CBS	Central Bureau of Statistics
CO	Community Organization
DAG	Disadvantaged Group
DAO	District Administration Office
DD	Detailed Design
DDC	District Development Committee
DL	Distribution Line
DSMC	Design Supervision and Management Consultant
DTW	Deep Tube Well
DUDBC	Department of Urban Development & Building Construction
DWSS	Department of Water Supply & Sewerage
EA	Executing Agency
EMP	Environmental Management Plan
EIRR	Economic Internal Rate of Return
EPR	Environmental Protection Rules
ES	Environmental Safeguards
EIA	Environmental Impact Assessment
FHH	Female Headed Household
FIRR	Financial Internal Rate of Return
GESI	Gender Equality & Social Inclusion
GI	Galvanized Iron
GoN	Government of Nepal
HDPE	High Density Polyethylene Pipe
IA	Implementing Agency
IEC	Information, Education & Communication
IEE	Initial Environmental Examination
LB	Local Body
LG	Local Government
LSGA	Local Self Governance Act 2056 (1999)
MoF	Ministry of Finance
MoFALD	Ministry of Federal Affairs and Local Development
MoPE	Ministry of Population and Environment
MoWSS	Ministry of Water Supply and Sanitation
NDWQS	National Drinking Water Quality Standard
NGO	Non-Governmental Organization
NPC	National Planning Commission
NPR	Nepalese Rupee
NRB	Nepal Rastra Bank
NRW	Non-revenue Water
O&M	Operation & Maintenance
OBA	Output Based Aid
ODF	Open Defecation Free
OHT	Over Head Tank
PMC	Project Management Consultant
PMO	Project Management Office

Government of Nepal
Ministry of Water Supply and Sanitation
Singhadurbar, Kathmandu

PPTA	Project Preparation Technical Assistance
RVT	Reservoir Tank
SESF	Social & Environmental Safeguards Framework
SOE	Statement of Expenditures
SSTWSSSP	Second Small Towns' Water Supply and Sanitation Sector Project
STW	Shallow Tube Well
STWSSSP	Small Towns' Water Supply & Sanitation Sector Project
TDF	Town Development Fund
TL	Transmission Line
ToR	Terms of Reference
TSTWSSSP	Third Small Towns' Water Supply & Sanitation Sector Project
UfW	Unaccounted for Water
USD	US Dollar
VDC	Village Development Committee
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization
WQ	Water Quality
WRA	Water Resources Act
WS	Water Supply
WSS	Water Supply and Sanitation
WSSDO	Water Supply and Sanitation Division/ Sub-division Office
WSTFC	Water Supply Tariff Fixation Commission
WTP	Water Treatment Plant
WUA	Water Users' Association
WUSC	Water Users' & Sanitation Committee
WWTP	Wastewater Treatment Plant

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Chapter 1

1. NAME AND ADDRESS OF THE PROPONENT

This Terms of Reference (TOR) has been prepared with reference to Feasibility Study Report to carry out the Initial Environmental Examination (IEE) of Birendranagar Water Supply and Sanitation Project in Chitawan District. TOR for this IEE study of this project is needed as a reference to EPR 1997 (amendment 2007). The project proponent, Small Towns' Water Supply and Sanitation Sector Project (STWSSSP) of the Government of Nepal, Department of Water Supply and Sewerage (DWSS), Ministry of Water Supply and Sanitation (MoWSS), is responsible for the preparation of the IEE 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 and Sanitation

Government of Nepal

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Chapter 2

2. BACKGROUND AND DESCRIPTION OF THE PROJECT

2.1 Project Background

In January 2000 the government endorsed the 15-year Development Plan for Small Towns' Water Supply and Sanitation in order to improve the health and economic and environmental living conditions of the people in small towns in Nepal. The project embraces the community managed demand responsive approach, where the community is involved in all aspects of planning and implementation of the town projects. The Asian Development Bank (ADB) has been providing financial assistance to this sector project. The Department of Water Supply and Sewerage (DWSS) is the implementing agency whereas the Ministry of Water Supply and Sanitation (MoWSS) is the executive agency.

The first phase of the Project, whose duration was 2001-2008, has already been completed and the people of 29 small towns have been benefitted by the Project. Upon the completion of the first phase and after finding positive impacts of the Project, the Government of Nepal decided to implement the second phase, with the name, Second Small Town's Water Supply and Sanitation Sector Project. Simultaneously after the successful completion of second phase DWSS has brought some changes on this project and named as Third Small Town's Water Supply and Sanitation Sector Project (TSTWSSSP). For the implementation, formulation, and operation and maintenance of the Project, TSTWSSS[3] aims to have full participation of the users of the respective towns. The cost will also be shared by the users and GON.

The Project has many stakeholders such as WUSC, Project Management Office (PMO) of DWSS, Water Supply and Sanitation Division/ Sub-division Office, Regional Project Management Office (RPMO), Town Development Fund (TDF), Design and Supervision and Management Consultant (DSMC) are responsible for social mobilization, health and hygiene programs and preparation of social profiles.

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

2.2 Objective of TOR and IEE study

The main objectives of the TOR is to guide the subsequent IEE study, to produce a comprehensive and coherent IEE Report as per the Environmental Protection Act, 1997 and Environmental Protection Rules, 1997 (with amendments). The specific objectives of the proposed IEE study include to:

- Identify the major issues that may arise as a result of proposed works on bio-physical, socioeconomic and cultural environment of the project area,
- Recommend practical and site specific environmental mitigation and enhancement measures prepare and implement environmental monitoring plan for the project,
- Provide information on the general environmental setting of the Birendranagar area as baseline data. Make sure that IEE is sufficient for the proposed water supply project.

2.3 Description of the Project

2.3.1 Location and Accessibility of the Project Area

The Project area Birendranagar Town Project is formed by incorporating ward no. 1 to 5 of Birendranagar VDC, ward no. 2 and 3 of Bhandra VDC and wards no 4 of Kathar VDC. The project area lies in the newly formed Rapti municipality. This area is situated in Chitwan District of Central Development Region along East-West Highway. Birendranagar is about 32 km far from Bharatpur, the districts headquarter of Chitwan, and about 150 km from Kathmandu. There are regular flights from Kathmandu to Bharatpur, the nearest available airport. It lies between 27º35'20" N to 27º36'42" N latitude to 84º35'47"E to 84º39'41"E longitude. It is at an altitude of 285-315 meter from the mean sea level. Birendrangar is located in the inner terai. The climate is essentially warm temperate or lower tropical. The temperature ranges from 3.4º to 40.8º Celsius. As in other Teral towns, it is very cold in winter and very hot in summer days. April is the hottest month in project area with its monthly average monthly high temperatures at 35º C. The average annual rainfall is about 1170 mm.

Figure 1: Location of Project Area

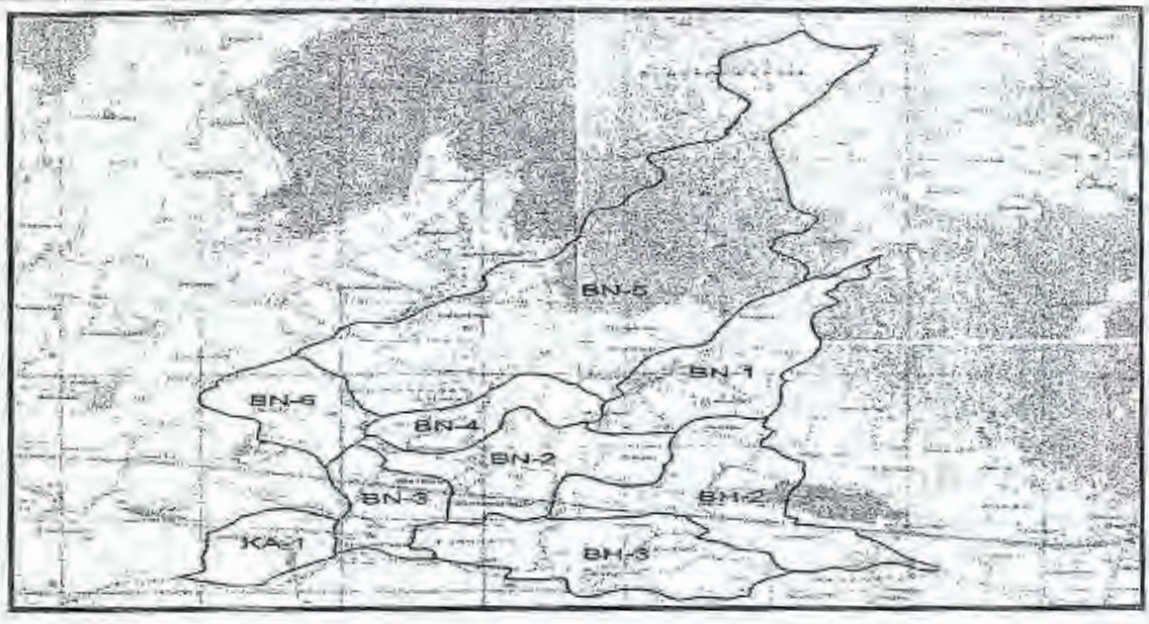

Figure 2: Proposed Service Area

2.3.2 Proposed service area

The service area which lies in recently formed Rapti Municipality, is a growing town along East-West highway comprises of three former VDCs; Birendranagar VDC, BhandaraVDCand Kathar VDC.

The service area of the proposed project covers entire ward area of former ward nos 2, 3, 4, and 6 of Birendranagar VDC (BN), ward no. 4 of Kathar VDC (KA) and ward no 2 of Bhandara VDC (BH). The project also serve partial areas of ward No. 3 of Bhandara VDC, ward No. 1 and 5 of Birendranagar VDC as given in Figure 2.

2.3.3 Population and Demographic Characteristics

The ward-wise population of the project town according to census, 2001 and 2011 has been presented below:

Table 1: Population of the Concern Ward of Project Town

Ward	VDC	W. Area (Ha)	Census 2001			Census 2011			Growth Rate (2001-11)
			HHs	Pop.	P. Densities (PPHA)	HHs	Pop.	P. Densities (PPHA)	
1	BN	183.47	500	2,677	14.6	616	2,859	15.5	0.63
2		167.65	368	1,970	11.8	591	2,636	15.7	2.96
3		89.32	265	1,411	15.8	375	1,673	18.7	1.72
4		87.56	194	1,110	12.7	277	1,261	14.4	1.28
5		720.67	225	1,084	1.5	274	1,233	1.7	1.3
6		105.70	116	680	6.4	165	787	7.5	1.47
2	BH	221.15	269	1,605	7.3	435	2,003	9.1	2.24
3		204.57	128	810	4.0	135	705	3.5	-1.38
4	KA	77.55	132	791	10.2	158	813	10.6	0.34
Total		1,858.64	2,197	12,138	6.5	3,026	13,956	7.5	1.41

Source: CBS 2001 and 2011

The above tables show that average annual population growth rate of the area comprising of entire wards area increased at 1.41%. However, the average HH size of the area has decreased from 5.52 in 2001 to 4.62 in 2011. Ward 1, 2, 3 and 4 of Birendranagar VDC are relatively densely populated wards in the project area. The overall population density of the project area increased from 6.5 (2001 AD) to 7.5 (2011 AD) person per hectare. The consultants conducted a socio economic survey in 2015 of the proposed service area. It shows that the total population of the service area is 11,053 which include both house owners and population residing in rented accommodation. The following table shows the coverage of population including beneficiary households in the project area.

Table 2: Beneficiaries households

Ward No.	VDC	Permanent		Rented		Total	
		HHs	Population	HHs	Population	HHs	Population
1	BN	177	654	3	13	130	667
2		413	2261	52	265	465	2526
3		325	1726	35	145	360	1871
4		328	1779	13	60	341	1839
5		45	214	1	4	46	218
6		245	1382	7	20	252	1402
2	BH	256	1439	15	76	271	1515
3		80	435	3	15	83	450
4	KA	103	565	0	0	103	565
Total		1922	10455	129	598	2051	11053

Source: Socio economic survey 2014

2.3.4 Existing Water Supply

There is one piped water Gravity supply system constructed by Water Supply and Sanitation Division Office (WSSDO) Chitwan during 2003 AD. Located in Sixgroup ward No 1 of Birendranagar is surface water system. The system is also referred as Amirit Khanipani System. The system comprises of two spring source. The transmission line is about 2500 m from the RVT. The two spring source is located in Ward no 8 and 9 of Korke VDC of Chitwan district. There are two reservoirs. The big and old reservoir is of 200 cum capacity Stone Masonry reservoir constructed during project construction period. However, the new RCC reservoirs of 60 cum capacity have been added few years back next to old reservoir. The yield of these two spring source is about 4.63 lps have been reported even in driest months of the year. A year back the existing system of Amrit Khanepani has been upgraded with drilling borehole to augment the system by increasing discharge. A well of about 89 m in depth has been drilled with well size of 250/200 mm size. A pump of 4 HP capacities has been installed in the well which pumps water to about 600 m far to the existing reservoirs. Apart from the Amrit Khanepani System, there are no other water supply systems in the project area

2.3.5 Existing Sanitation facilities

The overall sanitary condition of the Project Area is found to be reasonably satisfactory. Although Chitwan district has been declared ODF, yet 2.76% HHs does not have proper latrines or they use neighbor's facilities. However, 97.24% HHs has toilets in the project area. Out of all latrine users 3.43 % HHs has pit latrines; 35.69% HHs has Ventilated pit latrines; 56.35% HHs has Water seal/ pour flush latrines and only 1.77% has Cistern Flush latrines. The socio-economic survey (2015) reported that none of the HHs practice

open defecation in project area and majority of HHs i.e. 58.12% have water-borne private toilets. The following table shows that 98.4% have one or other type of toilets.

Table 3: Toilet coverage (HHs)

Ward No.	Total No of Surveyed HH	Type of Toilet in Use				
		Pit Latrine	Ventilated Pit Latrine	Water Seal/ Pour Flush	Cistern Flush	NA
BN	127	23	40	53	4	7
2	413	9	287	102	0	1
3	325	4	38	275	5	3
4	328	5	60	236	21	6
5	45	2	2	41	0	0
6	245	14	211	7	1	1
BH	256	0	11	237	2	6
3	80	0	2	75	1	2
KA	103	9	35	57	0	2
Tot	1522	66	686	1083	34	5
%of	100	3.43	35.69	56.35	1.77	2

Source: Socio-economic survey, 2015

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 periphery.

There is no public toilet within the project area.

2.3.6 Solid Waste Management

Since the town does not have a systematic system of collection of solid waste, the waste is either buried in the backyard itself or is separated and treated accordingly. The organic wastes are either fed to the cattle (vegetable remains) or are composted. Other wastes are buried. The waste is thrown on street or highway from the houses, with smaller land holdings. With the growth of settlements along the highway and along main streets, the problem of solid waste and its management will exacerbate in the future if not dealt with. Hence, a master plan for solid waste management is being prepared and will be submitted separately. The average per capita household waste generation rate in the service area was not available but observing the trend in similar towns and settlement it could be estimated at around 0.2 kg/person/day. It can be estimated that the waste generation is about 2.5 tons per day. The waste from household level (estimated) could have a larger share of organic waste at around 80.0% and rest would be plastic waste, paper waste, Glass, Metal, and others. The service area lacks an institution responsible to collect such waste and is not done

There is no site for solid waste disposal and being a small settlement the service area does not feel the urgency as well to find one. No institution means any personnel to clean the streets/ area etc. and also no vehicles for collecting the solid waste.

2.3.7 Hydrology and Climate

The district has a subtropical climate and is heavily influenced by the monsoon (June-September) with an average annual rainfall of 1,442 mm. The maximum temperature averages 36.6° C and the minimum 8.8° C.

2.3.8 Flora and Fauna

The Project area is located on the East-West Highway. The Churia hill and further hilly area is situated at the northern side of the project area is covered with a deciduous forest. Sal (*Shorea robusta*) and associated species predominate, including khair (*Acacia catechu*), Indian laurel (*Terminalia tomentosa* or T. *alata*), karma or haldu (*Adina cordifolia*), jaamun (*Syzygium cumini*), Sisau (*Dalbergia sissoo*), seto siris (*Albizzia procera*), bakaino (*Melia azedarach*), teak (*Tectona grandis*), bael (*Aegle marmelos*), bot dhangero (*Lagerstroemia parviflora*) and several bamboo species and genera.

Non-timber forest products (NTFP) available in the project area include bamboo and cane, fruits and herbs like Amala, Harro, Barro, Neem, Bayar, Aamp (mango), Amba (guava), Hadebayar (wild berry), Bakaino (Indian lilac). Other important products available in the project area are Simal (silk cotton tree), Pipal and Bains (weeping willow). Bamboo is fairly available in the area, especially on private lands.

Some of the mammals reported to be present in the nearby forests are listed in Table: 1.

Table 4: Mammals in the Project Area

Common Name	*Scientific Name*
Tiger	*Panthera Tigris*
Rhesus monkey	*Macaca mulatta*
Jungle cat	*Felis chaus*
Chamero	*Cynopterus sphinx*
Fishing cat	*Felis viverrina*
Common mongoose	*Herpestes edwardsi*
Jackal	*Canis aureus*
Indian Fox	*Vulpes bengalensis*
Squirrel	*Funambulus sps*
Flying squirrel	*Petaurista*
Jungle rat	*Bandicota inglica*
Hare	*Lepus nigricollis*

Some of the birds reported in the forest areas are listed in Table: 2.

Table 5: List of Birds in the Project Area

Common Name	*Scientific Name*
Cuckoos	*Cuculus sp.*
Jungle crow	*Corvus macrorhychos*
Green Wood Pecker	*Picus squamatus*
Kalij pheasants	*Lophura leucomelano*
Spotted dove	*Streptopelia chinensis*
Indian moor hen	*Gallunila chloropus*
Duck	*Anol acuta*
Blossom headed parakeet	*Psittacula cyaniocephala*
Rose ringed parakeet	*Psittacula krameri*

Common Name	Scientific Name
Red whiskered bulbul	*Pycnonulus jocosus*
Gray headed fly catcher	*Culicicapa ceylonensis*
Red jungle fowl	*Gallus gallus*

Some reptiles and amphibians observed in the project area are presented in Table: 3.

Table 6: List of Reptiles and Amphibians Found in the Project Area

Common Name	Scientific Name
Cobra	*Naja naja*
Common Karait	*Bungarus caeruleus*
Garden lizard	*Calotes versicular*
Common lizard	*Hemidactylus brookil*
Common toad	*Bufo melanostictus*
Stream frog	*Rana cyanophylectis*

Similarly, common fishes found in the project area are given in Table: 4.

Table 7: List of Fishes Found in the Project Area

Common Name	Scientific Name
Rawa	*Cirrhinus sps.*
Rohu	*Labeo rohita*
Andha bam	*Amphipnos cuchia*
Bam	*Mastacembelus sps.*
Garahi	*Chouna punctatus*

2.3.9 Protected Areas

No national parks and protected areas for forest/ wildlife exist at the project area. No forest will get affected from the proposed project intervention.

2.5 Infrastructure Facilities

2.5.1 Communication

There is a regular service of landline and mobile phone services in the project area. The various Mobiles are there to serve the communication facilities demand. Nepal Telecom and N-Cell Mobile communication is easily available.

2.5.2 Electricity

The Nepal Electricity Authority (NEA) has provided electricity for household consumption through its national grid.

2.5.3 Irrigation

The project area consists of one irrigation project. This is from the drilled groundwater source. Parsa irrigation project fulfills the requirement of the irrigation water. Previously a local irrigation system was

also there but currently is not operating. Community based drilled schemes are also there to fulfill the local requirement of the peoples

2.5.4 Transportation

The Project area is located on an all-weather black topped road some 32 kilometers from Narayanghat Bazar, the major junction on the Central Nepal. The main Highway of Nepal crosses the proposed project area. The nearest airport is the Bharatpur Airport, where daily flights from Kathmandu provide services.

2.5.5 Educational Institutions

The overall literacy rate is 92.7% according to the socio economic survey, 2015. About 8.3% are still illiterate and only 16.1% have graduated or above graduate level. The summary of the educational institutions has been presented below:

Table 8: Status of educational institutions

S. No.	Educational Institution	Primary School	Lower Sec. School	Sec. School	Higher Sec. School	Campus	Training Centre	Child Dev. Centre	Total
1	Private			6					6
2	Community	5							5
3	Government				1	1	1		3
	Total	5		6	1	1	1		14

Source: Social Survey, Birendranagar VDC, 2015

The socio economic survey 2015 shows that there are 12 educational institutions in the project area. The total number of students enrolled in these schools/campuses is 3252. The number of teachers and staff are 180 and 39 respectively with the total people in educational establishments to be 3413. Most of these educational institutions i.e. 68% are located in Birendranagar, ward 2, the core area of the VDC. Two training centers are operating in the service area.

2.5.6 Other Institutions

There are several government and non-government offices including private institutions in the project area.

2.6 Quality of Life Values

The Project is not expected to adversely affect any cultural or recreational resources but will increase the existing quality of life values due to the improvement in personal, household and community hygiene practices and community health.

2.7 Cultural and religious sites

There are temples at various locations in the project areas as would be expected in a typical Nepali urban centre but no culturally important place.

2.8 Resettlement, Relocation and Compensation Issues

The proposed Birendranagar Town Water Supply Project does not have any issues related with resettlement, relocation and compensation.

2.9 Salient Features

Table 9: Salient features of the project.

S.N.	Items	Description
1	Name of Project	Birendranagar Town Water Supply and Sanitation Project
2	Type	Pumping (Lifting)
3	Study Level	Detail Design
4	Location Area	
	Region	Central Development Region
	Zone	Narayani
	District	Chitwan
	VDC/Municipality	Rapti Municipality (former Birendranagar VDC, Bhandara VDC and Kathar VDC)
	Ward	Complete area of Ward No. 2,3,4,6 of Birendranagar VDC, Ward no 2 of Bhandara VDC and ward No. 4 of Kathar VDC ; Partial area of ward No. 3 of Bhandara VDC, ward no. 1 and 5 of Birendranagar VDC.
5	Available Facilities	
	Road	On the East-West Highway
	Supply Water System	Hand pumps and few HHs with WUSC operated system
	Electricity	Available
	Communication	Available
	Health Services	Available
	Banking Facilities	Available
6	Source Characteristics	
	Source Name	Deep Tube well
	Source Type	Ground Water
	Source Location	Within Service Area
	Safe Yield (lps)	20-25lps
7	Type of Structures	
	(a) Bore Hole Drilling	3 Sets

	(b) Pumps, Electricity line, Transformer and Generator	Pumps-4 (with1stand by pumps), Electricity line-11kV, Transformer-1(125kVA and Generator-1(1-125KVA)
	(c) Overhead Tank (Nos.-Capacity m3)	Proposed 1-450
	(d) Ground Reservoir	-
	(e) Valve Chamber (Bricks/RCC)	100/40
	(f) Office Cum GH /Guard House / Boundary Wall	1/0/1
	(g) Generator House	1
	(h) Household Connection	1922
	(i) Fire Hydrant	6
	Total Length of pipe:	
	Distribution Network (meter)	52911
	Pipe Used (in m)	
	DI	7,522
	PE	45,389
8	Social Status	
	Present Population (2014)	11,053
	Base Year Population (2017)	11,7630
	Design Year Population (2037)	22,100
	Weighted Growth Rate %	3.2
9	Total Cost of WS Scheme (Inclusive of all) NRs.	316,002,667.00
10	Cost Sharing Arrangement	
	GON Component (70	221,201,867

	%)	
	TDF Loan (25 %)	79,000,667
	WUSC's Contribution for upfront (Cash 5 %)	15,800,133
11	Tariff	
	Average Household	562
	Low income Household	390
	Poor Household	251
12	Economic Analysis	
	EIRR (Base case) %	38.28
13	Environment	
	ADB Category	B, Only IEE necessary
	IEE finding	No significant adverse impact.
14	Sanitation Cost (Inclusive of all] NRs.	127,612,500.41
	GON Contribut on (85 %)	108,470,625.35
	Local Authority / Users' (15 %)	19,141,875.06
15	Per Capita Cost for W/S component	
	Per Capita Cost (for base year pop.)	27,118.93
	Per Capita Cost (for design year pop.)	14,434.39
16	Per Capita Cost for Sanitation component	
	Per Capita Cost (for base year pop.)	10,848.64
	Per Capita Cost (for design year pop.)	5774.32

2.10 Proposed water supply system

2.10.1 Sub-project Components

The Birendranagar Water supply and sanitation small town project has been conceptualized as a typical groundwater pumped system with Overhead RCC Tanks for distribution. The entire distribution network is to be supplied from multiple reservoir systems. The major sub-components of the sub-project with their characteristic features are described in the sections below. The major components of a groundwater based water supply system in the Terai consists typically of boreholes with pumps, treatment units, ground and overhead RCC reservoirs, valve boxes and distribution system. The following table shows that the total water demand of the sub system (DMA wise)

Table 10: DMA Wise water demand

DMA	YEAR						DEMAND (Litres)				
	2015	2017	2022	2027	2032	2037	2017	2022	2027	2032	2037
DMA-1	6,182	6,581	7,696	9,005	10,543	12,350	1,235,044	123,504	1,358,548	203,782	1,562,330
DMA-2	2,747	2,921	3,408	3,981	4,657	5,455	545,531	54,553	600,085	90,013	690,097
DMA-3	2,124	2,262	2,650	3,109	3,652	4,294	429,399	42,940	472,339	70,851	543,190
Total	11,053	11,763	13,754	16,095	18,852	22,100	2,209,974	220,997	2,430,971	364,646	2,795,617

The water supply system has its own boring, OHT, disinfection system, Generator and other associated structures. The three DMA/sub systems are also interred linked and water from one DMA/sub system can be supplied to another DMA/sub system in case of maintenance and other unforeseen events. Appropriate Valve Chambers have been proposed to regulate this. The major sub-components of the sub-project with their characteristic features are described in the sections below.

Tube Well

Secondary geo-hydrological information reveals that drilling depth varies from 100 to over 130 meters in Birendranagar and adjacent areas. However, based on the results of a recently installed borehole in the neighboring area, the total depth of tube wells is about 130 meters. Considering the secondary information available from developed tube wells with a static water level varies from 27 to 30 m below ground level and draw down of 8 to 10 m (pumping water level in the range of 35m to 40m below ground level) for 22 to 30lps yield, it has been estimated that the proposed pumping level below ground will be about 40 meters. Therefore, a submersible pump will be placed at around 60m below ground level. It is proposed that all proposed boreholes of expected yield capacity ranging between 20-22lps shall be drilled. The boreholes shall be used alternatively to avoid unnecessary wear and tear, excessive draw down and reliability. The details of tube well and boreholes are given below.

Table 11: The details of tubewell and boreholes

Description of Items	
Proposed depth of Borehole (m)	~130
Required No. of Tube well	3
Diameter of ERW Housing/Casing Pipe (mm.)	250
Length of Steel Screen (m)	~24
Pump Capacity in each DTW (HP)	~42
Transformer Capacity (KVA)	125

250 mm diameter screen pipe is required for this depth and discharge according to IS 8110: 2000 has been used.

The existing lithological data of neighboring DTW area indicates possibilities of successful Deep tube wells with stainless steel continuous screen of about 24 m with at least 22% opening area. It has been proposed in order to draw at least 20 lps from one well of around 130 m depth. Three wells have been proposed in 6 to 8 katha land.

Submersible pumps with the required capacity to serve the design demand per year have been recommended to be installed in the boreholes. The detail calculation has been presented in Appendix D. In order to ease in replacement, maintenance and repair submersible pumps of same capacity of 42 HP for all bore holes shall be installed. The pumps will be connected to the control panel by flat submersible cable. Each borehole shall have pumps installed and one pump will be provided as a standby for each zone.

Well Casing, Riser Pipes and Pumping Mains

The diameter of well casing required is that needed to accommodate the pump, with some margin for clearance around the unit. Manufacturers of pump will recommend a "minimum" casing. The diameter must be large enough for the pump to be a comfortable fit, making allowances for non-verticality of the borehole. In general, the vertical velocity within the well casing needs to be less than 1.5-2 m/sec to minimize well losses.

Riser pipe has been provided to extract for required discharge with minimal velocity. Minimum velocity has been maintained in the riser pipe to maintain surge pressure within the limit of allowable pressure head of the pipes. The riser pipes are recommended as per IS-1239-1. It is MS pipe with galvanization. Pipe ND of 125 mm has been proposed for all proposed well. In most cases, majority of the pumping mains stretches are kept common to minimize cost. All production wells of OHT system discharge into common pumping mains. In this case also pipe diameter has been adopted to carry design discharge with minimal frictional losses. However, the cost implication due to larger diameter pipes has been also triangulated. The surge analysis of pumping mains (from the well head to tank) has been carried out as the NRV and air release valve are recommended in borehole platform assembly. As entire pipe section, valve, fittings are of PN 16 rating, entire pumping mains are safe from surge pressure during power failure. A double orifice air valve of rating 16 PN has been proposed as the surge pressure on the main is 18.3 bar. However it is less than the allowable pressure rating of adopted pipe (C-25 ISO).

Electrical Facilities

High voltage transmission line of 11kV has to stretch by nearby 11 kV line. Proposed area for OHT is closed to 11 kV transmission line. The transformer is used to step down the 11 kV voltage to 415/230 V. The three-phase, 50 Hertz, oil-immersed, natural –cooled transformers suitable for outdoor installation are proposed. The capacity of transformer is 125KVA.

Reservoir

One RCC overhead tanks each having 450 cum capacity shall be constructed for the entire sub-project. The base of the reservoir tank is proposed at an elevation of at least 20 meters above the ground. This will ensure adequate pressure at the pipeline of the system. The capacity of the reservoir has been determined by the recommended consumption pattern and proposed pumping hours with possible design yield of tube well. The Consultants also recommend that appropriate geo-technical investigation be carried out during the detail design/construction phase at the reservoir location to determine the soil properties. However, the costing of the geotechnical investigation has been allocated in provisional sum.

Water Treatment Facility

Water is not considered fit for drinking from bacteriological point of view after analysis of water samples previously taken from Well. All other parameters of water quality of sampled well with physical and

chemical aspects are within the permitted value by NDWQS. Presently chlorine dosing with pressure filters has been proposed. It is recommended taking few samples from test well before construction phase. The result of water quality from the test well will determine the exact need of WTP type and size. Therefore, presently provisional cost of mechanical WTP has been estimated. The water treatment unit shall treat the water such that the quality of water supplied is in accordance with the NDWQS / WHO drinking water guidelines.

The disinfection will be carried out by the addition of bleaching powder. Bleaching powder is to be dosed from chlorine dosing tank through a dosing.

Distribution Main

The distribution system comprises of a pipe network, which are looped in certain cases and branched in other. The network has been analyzed using EPAnet, a design analytical software tool. The entire system has been designed using Polyethylene (PE) and Ductile Iron (DI) pipes. In order to proper saddle arrangement at household connection in distribution pipe, minimum diameter of distribution pipe has been adopted as 50mm. Only two types of pipes shall be used in the distribution network; Ductile Iron (DI) and PE pipes. All the pipes of 150mm internal diameter and above shall be of DI pipes and all the pipes of 160mm outer diameter or less shall be of PE pipes. The total pipe length of various diameters is given in table below.

The total pipe length of the proposed distribution system works out to 52911 m. Total 7,522 m of DI pipes (150-300 mm diameter) of spigot joint have been proposed. The PE pipes of 50 to 160 outer diameters are of 45,389 m having been proposed.

Table 12: Pipe Used for Distribution Network

	DIA.	INNER DIA.	ACTUAL LENGTH
DI PIPES	350	350	-
	300	300	1187
	250	250	313
	200	200	3677
	150	150	2345
HDPE PIPES	160	136	2802
	140	119	2676
	125	106.1	2634
	110	93.4	1469
	90	76.3	2772
	75	63.6	3859
	63	53.3	5690
	50	42.2	23,487
	Total		52911

Both sides' flanged DI pipes have been provided in structures and OHT premises for pumping mains.

The pipelines have been proposed for laying and placing along the both sides of the wider roads and paved roads to avoid the pavement demolition and long house connection. Therefore, double pipe lines are

essential to avoid long household connection. However to reduce the initial investment, all other narrow and rural roads are provided with only one pipe at the either side of the road.

House Connection

The system has been designed as a private house connection. The existing scenario of household connection from existing system is very poor. Total household of the project area will have a new household connection of numbers. Most of all connection will be private.

The house connection shall comprise of about 12 m pipe PE Pipe and water meter. The house connection pipe shall be PE-100, 20mm outer diameter pipe of rating PN-16. Tapping of household connection in PE pipe has been proposed from PE saddle with ferrule and in case of DI pipe; DI saddle shall be used with ferrule without touching DI pipe by ferrule. Dry dial volumetric rotary piston type water revenue meter for all house connections are proposed. These household water meters have 15mm ND and have been recommended.

Appurtenances

These shall primarily comprise of valve chambers to house flow control valves etc. Altogether 40 valve chambers are expected in the system. The RCC valve chamber has been expected less in numbers since the road is wider and most of the chamber will be in non-traffic area.

2.13 Relevancy of the Project

As per the TOR issued to the PMC, it is stated that the Project needs to be studied from the environmental point of view as per EPA 1997 and EPR 1997(Amendments 1999 and 2007). The proposed water supply and sanitation project is intended to serve the water demand of the service area of Chitawan District. It is expected that on implementation of the project the users of the area will be able to avail of adequate amount of safe drinking water and need not resort to use of unsafe hand pumps to fulfill their water needs. The project needs to go through IEE process as stipulated in EPR 1997(Amendments 1999 and 2007). The proposed project shall be using Ground water sources. The Project does not involve construction of any tunnels; relocation of people or households, there is no need to settle any households above the gravity source, and construction of river training works is also not required. The project is expected to benefit a design population of about 22,100.

As the proposed project falls within the definitions provided in the EPR 1997(Amendments 1999 and 2007) Annex 1 (G) for drinking water projects; only an IEE shall be necessary. The regulation stated in Annex 1 (H) shall only be applicable, if the proposal does not fall under categories (A) through (H) of Annex 3. Table 13 compares the status of the project point by point against the conditions defined by Environment Protection Act 1997 and Environment Protection Regulation 1997 (and its amendments 2007) for which a drinking water would require IEE or EIA.

Table 13: Criteria for requirement of IEE and/or EIA for Drinking water supply Projects

S. N	Condition described in the Act and Regulations	IEE Required as per the Regulation Annex 1 g	EIA Required as per the Regulation Annex 3 h	Conditions in the project
v	River Control (training)	Up to 1 kilometer	Over 1 kilometer	NA
v	Channeling Water from one Watershed to Another	Applicable	Applicable	NA
a	Rain Water Collection and use of spewing Wetland	Up to 200 hectares	More than 200 hectares	NA

S. N	Condition described in the Act and Regulations	IEE Required as per the Regulation Annex 1 g	EIA Required as per the Regulation Annex 3 h	Conditions in the project
•	Supply of Water in Dry Season from Surface Water Source with a safe yield of	Up to 1 cusec and utilizing up to 50 % of the available quantity	More than 1 cusec and utilizing the total available quantity	NA
•	Ground Water Recharge	Up to 50 % of total aquifer	More than 50 % of aquifer	NA
•	Water Treatment	Up to 25 liter per sec		Within 25 liter per sec
•	Construction of Tunnel for Channeling Drinking Water	Tunnel constructed		Not constructed
•	Water Resource Development which Displaces People Permanent Residents)	25 to 100 people	Over 100 people	Not done
•	Settlement of People Upstream of Water Source	Settlement of up to 500 people	Settlement of above 500 people	Not done
•	Supply of water to a population of	5, 000 to 50, 000	Over 50, 000	This is an extension of the existing system. Newer service areas have been added and new sources are to be tapped.
•	Connection of New Source to Supply Water to existing water supply system for a population of	10, 000 - 100, 000	More than 100, 000	The current population is 25,497 in 2014 and the project is designed for a final population of 41,161 in 2035.
•	Operation of a drinking water supply system with inclusion of sewage disposal system with sewage treatment system	Installed	Installed	Sewage treatment plant not yet installed.
•	Extraction of ground water from sources which are located at point and non-point sources of biological and chemical pollution and/or their influenced areas.	Not done	Applicable	No non-point and point sources of pollution in the vicinity of the water source
•	Operation of water supply project included in a multipurpose project utilizing a source of 25 litres per sec water. (Construction of Multiple Purpose Reservoir Required)	Not operated	Operated	This is not a multipurpose project and is solely for water supply

CHAPTER 3

3. PROCEDURES TO BE ADOPTED FOR THE STUDY

The IEE approach, methodology and procedure adopted to prepare a comprehensive IEE report will generally follow the provisions of the EPA & EPR and related national and sectoral guidelines. Checklist method will be utilized for environmental impact identification and comparison according to National EIA guideline, 1993. Significance impact prediction in reference to magnitude, extent and duration will be done on the basis of baseline data on environmental condition. The approach /methodology to be used for conducting the IEE include review of literature, sample survey/ inspections/ observations with simple measurements, discussion with communities and other stakeholders, and IEE team observation. More specifically, the following procedures will be adopted to prepare IEE report of the proposed project. Study includes information on mitigation; costs associated with construction activities (during design, construction and operation and maintenance activities) will also be included.

3.1: Data Required

- **Physical and Chemical Environmental Study**

Physical data on land use pattern, topography, climate, Soils and geology, surface and ground water hydrology, solid and hazardous waste, air, noise and water quality will be collected using both primary and secondary sources. GPS location for OHT, Camp, solid waste disposal, storage site will be noted during further stage of works and will be marked in the maps. Water samples will be collected from the sources to test for physical, chemical and microbiological parameters.

- **Biological Environmental Study**

Site specific biological data on vegetation, flora, fauna, rare and endangered species, religious trees and sensitive habitats, aquatic ecology and wildlife of the project area will be collected and analyzed. The area and type of forest will be collected.

- **Sociological Environmental Study**

Socio-economic information on demography, ethnic group/composition and income, existing infrastructures, social institutions, cultural and archaeological sites, social issues etc. will be collected and analyzed. The number of local people involved in the activities will be identified and employment generated will be analyzed. Different types of survey will be carried out using standard method, techniques and tools as required. Information on Religious/cultural site including cremation site will be collected.

3.2 Methodology to be followed for IEE Study

- Literature review (Reports, Journals, research papers, maps and other publications)

While preparing the IEE report both primary and secondary data will be used. Secondary sources of information will be reviewed during desk research. This includes review of EPA, EPR, Public Works Directives and IEE reports of the similar projects, manual for environmental and social aspects of water supply and sanitation projects and other environment management documents. During desk study, extensive use of internet sources will also be used. Checklist/questionnaire will be developed for FGD and data collection on physical, biological, chemical, socio-economic and cultural environment of the project area.

Desk research will be done to determine the depth of the study to be carried out. It will be followed by field works. The Policies, Acts, Regulations and guidelines, as listed in this ToR will be reviewed carefully and all the relevant information will be taken into account.

- **Field investigation (for Physical, Biological and socio-economic environment)**

A multidisciplinary team will visit the project area for physical inspection and data collection. Field study will be focused on collection of information on existing social, economic, physical, and biological environment of the project area by Questionnaires/checklists/matrices. The team will also collect information on the project, which might bring changes on physical, social and cultural environment. To be more precise, the field visit will be carried out for the assessment of the impacts on the environmental and social issues due to the proposed project. Provide a description of relevant parts of the town project, using maps with appropriate scale and photographs and aerial photographs, where necessary, including the following information: location, alignment, alternatives, design, standards, pre-construction, construction and post-construction activities, work schedule, staffing and support facilities and services.

- **Public consultation**

The IEE team will perform public consultation activities according to the requirements, situations and demands of the concern public. The consultation program will mainly focus on the findings of consensus on the implementation of the project, identification and consideration of key issues in the IEE report.

- **Impacts Identification, Prediction and evaluation methods**

During the field visit, the IEE team will collect appropriate maps, drawings and photos which will be used to illustrate field condition on physical, biological and socio-economic and cultural environment. Rapid Environmental Assessment (REA) Checklist will be used to assess environmental condition of the proposed project. Based on primary and secondary data, the environmental impacts will be identified, predicted and evaluated. The impact identification & ranking will be made.

3.3 Environment Assessment

The consultant shall study the existing environmental constraints and potential impacts in the Project area through field surveys, complemented by secondary information from reports and interviews with a number of government officials, representatives of NGO and international organizations (IO) supported projects and researchers.

The consultant shall collect primary and secondary data, evaluate them and describe the relevant environmental characteristics of the area along the pipeline routes and its corridor of influence, including the following information:

Physical Environment: topography, soils, climate, and meteorology, geology, surface and ground water hydrology, noise, air and water quality.

Biological Environment: flora, fauna, rare and endangered species, religious trees and sensitive habitats (including parks and reserves).

Chemical Environment: Use of various chemicals including fuel, lubricants, oil, acids, cement etc.

The Consultant will develop all necessary documents for field visit and collect data with the help of the survey team. It is suggested that the IEE team go to the field and work as a team and not dispersed at different times.

3.4 Socio-Economic Assessment

Social assessment of the project tries to determine the social implication (issues) in terms of assumed positive and negative impacts related to location, design, construction, and operation. Preparation and actual implementation of the construction activities will create some nuisance and inconvenience for the communities in the area.

Primary data shall be obtained through Focus Group Discussion (FGD) with communities, along the pipeline routes under consideration. Additional data shall be collected from various Committees (Municipalities/VDCs, DDCs, NGOs, Community groups, etc) through which the respective pipe alignment pass.

The Consultant shall collect primary and secondary data, evaluate them and describe the relevant environmental characteristics along the pipe routes and its corridor of influence, along with the following information:

Population, land use, planned development activities, community structure, government services, demography, employment, distribution of income and sources of livelihood, goods and services produced, water supply, public health, education, extension services, cultural sites and heritage, tribal people, customs, aspirations and attitudes, expected water users and those benefitting from it, different needs and demands of VDCs, and the present quality of life (QOL), etc.

3.5 Report Preparation

An IEE report as per revised format combining formats of both GoN and ADB shall be prepared in accordance with contents given in chapter 9 of this TOR. The draft report shall be presented to the MoWSS and after receiving the comments and suggestion from the MoWSS the final report will be prepared after incorporating the comments on the draft report.

CHAPTER 4

4. Constitution, Act, Rule, Plan/Policies, Guidelines, Standards and International Convention

The consultant shall describe the pertinent regulations, standards that govern environmental quality, health and safety, protection of sensitive areas and endangered species etc. at international, regional, district, VDC and Ward levels. Nepal is a signatory to many international conventions, including those concerning habitat, biodiversity, cultural heritage protection. These issues shall be considered during IEE and their avoidance/mitigation measures shall be identified. The EE should also be conducted in compliance with the following Constitution, Act, Rule, Plan/Policies, Guidelines, Standards and International Convention

4.1 Constitution of Nepal 2072 B.S. (2015 A.D.)

4.2 Acts

Land Acquisition Act 2034 B.S. (1977 A.D.)

Solid Waste Management and Resource Mobilization Acts 2044 (1987)

Water Resources Act 2049 B.S. (1992 A.D.)

Water Tax Act 2023 (1966)

Soil and Water Conservation Act, (1995)

Local Self Governance Act 2055 B.S. (1999 A.D.)

Child Labor Prohibition and Regulation Act 2056 B.S. (2001 A.D.)

Town Development Act 2045 (1988 A.D.)

Nepal Water Supply Corporation Act, (1989)

Water Supply Management Board Act, (2006)

Labor Act 2048 B.S. (1992 A.D.)

Forest Act 2049 (1993 A.D.)

Environmental Protection Act 2053 B.S. (1997 A.D.)

4.3 Rules and Regulations

Environmental Protection Regulations 2054B.S (1997 A.D.) with Amendment

Solid waste (Management & Resource Mobilization), Rules, 2047 B.S (1990)

Water Resources Regulations 2050 B.S. (1993)

Forest Regulations 2050 B.S (1995 A.D.)

Local Self Governance Regulations 2056 B.S. (2000 A.D.)

Drinking Water Regulations 2055 B.S. (1998 A.D.)

4.4 Plan/ Policies

Rural Water Supply and Sanitation National Policy, Strategy and Action Plan 2060 B.S. (2004 A.D.)

Three Year Interim Plan 2063 B.S. (2007 A.D.)

Urban Water Supply and Sanitation Policy 2066 B.S. (2009 A.D.)

ADB's "Safeguard Policy Statement (SPS)" 2066 B.S. (2009 A.D.)

4.5 Strategies and Guidelines

National EIA Guidelines 2050 B.S. (1993 A.D.)

Water Resources Strategy, 2055 B.S (2002 A.D.)

4.6 Standards & International Convention

National Drinking Water Quality Standards 2062 B.S. (2005)

World Heritage Convention, 1978

Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention), 1987

Convention on Biodiversity, 1992,

Vienna Convention for the Protection of the Ozone Layer and its Montreal Protocol and subsequent London (Amendment, 1994)

Basel Convention on the Control of Trans boundary Movements of Hazardous Wastes and Their Disposal, 1996

Chapter 5

5. REQUIRED TIME, ESTIMATED BUDGET AND SPECIALISTS REQUIRED FOR PREPARING THE REPORT

This includes time schedule, estimated budget and appropriate manpower (experts) for conducting IEE study.

5.1 Time Schedule

Considering the time limitations, the study has to be completed within about 9 weeks. The work schedule is presented in the following table:

Table 14: Proposed Work Schedule

S.N.	Activity / Work	Weeks								
		1	2	3	4	5	6	7	8	9
1	Desk Study									
2.	Preparation and Approval of TOR									
3.	Public Notification									
4.	Field Work									
5.	Data Compilation/Evaluation									
6.	Preparation of Draft IEE Report									
7.	Submission of Final IEE Report									

5.2 Estimated Budget

The total estimated cost for the Initial Environmental Examination (IEE) work of Birendranagar Small Town Water Supply and Sanitation Project is included under the consultancy services of the design and supervision package.

5.3 Human-Resource Required

As the IEE requires different personnel for specific tasks, the following inter-disciplinary manpower will be required. A team leader will be required to co-ordinate the different tasks of the personnel involved. The Team will be consisting of:

- Water Supply and Sanitation Engineer
- Environment Specialist
- Sociologist
- Geo-hydrologist
- Botanist/Forester

Three to four enumerators will also be required to help the team. The IEE team will also benefit from the inputs provided by the design team.

Chapter 6

6. ANTICIPATED IMPACTS OF THE PROPOSED PROJECT ON ENVIRONMENT

The impacts shall be identified for different phases of project activities i.e. project pre-construction, construction and post construction (O&M) phase on the existing physical, biological and socio-economic resources. A distinction will have to be made between potentially significant positive & adverse impacts, direct & indirect impacts. The impacts shall be characterized as (i) low, high & medium in terms of magnitude, (ii) long term, short term & medium term in terms of duration and (iii) site specific, local & regional/national in terms of extent. As a part of the study, enhancement of the positive impacts shall also be carried out. The potential physical, biological and socio-economic impacts should be considered as follows:

6.1 Physical Impacts

Pre Construction Stage

i) Inadequate protection of Reservoir area

ii) Deterioration in the water quality in the storage reservoirs

iii) Delivery of unsafe/ raw water to distribution system

Construction Stage

i) Changes in land use pattern along the alignment due to construction of different component structures,

ii) Land instabilities, soil erosion, silt runoff, landslides and setting of street surfaces due to excavation works, and other construction related activities during construction phase of the project.

iii) Changes in land form and in drainage pattern due to spoil dumping, excavating and aggregate mining etc.

iv) Possible loss of agriculture land, cereal crops and settlements due to laying of pipes, Reservoirs and construction activities and thus need of compensation at market price for so.

v) Disposal of solid waste, waste materials and construction spoils in the productive land.

vi) Issue related to the Groundwater extraction and associated off shore erosion, silt runoff and sedimentation.

Post Construction and Operation Stage

i) Changes in land use patterns and its economic impacts on the affected people

ii) Natural hazards associated with the reservoir due to reservoir induced seismic effects.

6.2 Biological Issues

Pre-Construction Stage

i) Forest Clearance if so

ii) Tree Cutting and Forest Clearance process

Construction Stage

i) Encroachment of the vegetation as well as wildlife habitats and bio-diversity of the protected species.

ii) Loss of vegetation and terrestrial habitat due to project component and facility placements.

iii) Loss of local vegetation and wildlife habitats due to illegal exploitation of the resources like felling, hunting & poaching activities of the construction workforce.

iv) Impacts on Groundwater resource

v) Extinction of rare and endangered species of floral species

Post Construction and Operation Stage

i) Permanent disturbances and losses to the local wildlife habitat and natural vegetation.

ii) Impacts on Groundwater due to extraction of the water for project

iii) Protection and ecological balance of Groundwater resource

6.3 Socioeconomic Cultural and Chemical Issue

Pre-Construction Stage

i) Water use conflicts due to source dispute

ii) Land acquisition, resettlement and compensation

iii) Impairment of historical/ cultural monuments/ areas

Construction Stage

i) Effects of land and property acquisition on the social and economic status of the people.

ii) Impacts on the social structures, social amenities and community resources due to exposition to outside workforce.

iii) Impacts on sanitation and health of the community due to increase in disease vector and transmission of disease from outside workforce.

iv) Loss of cultural values and norms due to exposition to outside workforce.

v) Impacts due to encroachment to religious and cultural sites having historical significance by the project structures and associated facilities.

vi) Changes in migration pattern, influx of the workers and impact on vulnerable groups of the community.

vii) Possibility of employment (income) generation activities amongst the community people of the project area.

Post-Construction and Operation Stage

i) Impacts due to withdrawal of economic activities after the completion of the construction.

ii) Changes in aesthetic values of landscape due to project structures and facilities associated impacts.

iii) Impacts of permanent loss of production from the project occupied areas.

iv) Changes in Religious values of area due to project

v) Changes in religious aspects of the people in and around source areas

Besides it the water supply and sanitation project will have numerous beneficial issues. The proposed project shall enhance the access to the safe drinking water facility and improved sanitation and help

transfer the rural settings to the semi urban market centers. The project will also increase the comfort of human life in the project area.

The following aspects of impacts will be considered during the environmental examination period. The study will reveals the impacts associated with the following aspects.

Chapter 7

7. ALTERNATIVE ANALYSIS

The alternative analysis of the project shall be considered as an integral part of IEE study, which involves an alternative ways of achieving the objectives of a proposed project. The aim of alternative analysis will be to arrive at a development option, which shall be conducted during the study to minimize the possible negative environmental impacts. Alternative measures to the proposed project to meet the same project objectives will have to be described in following aspects:

- No action option
- Alternative Design
- Alternative Location
- Alternative schedule and process

Alternatives in terms of potential environmental impacts, capital and operating costs and institutional training and monitoring requirements should be described. Costs and benefits of each alternative should be quantified (wherever possible); incorporating the estimated costs of any associated mitigation measures. The no project option is always open.

Environmental Impacts will be categorized in to adverse and beneficial during construction and operation stage. Mitigation measures will have to be incorporated from the planning stage onwards. Checklist method will be utilized for impact identification and comparison accord ng to National EIA guideline, 1993. Impact prediction in reference to magnitude, extent and duration will be done on the basis of baseline data on environmental conditions. In general the following area shall be covered while preparing mitigation measures:

In general the following area shall be covered while preparing mitigation measures:

a.Project Design/pre-construction phase

The Rapid Environmental Assessment (REA) Checklists for water supply and sewerage will be used to identify potential impacts/issues/concerns of the Subproject. The REAs identified the issues and concerns that will be considered during design and impacts will be mitigated during construction.

b. Project construction phase

The mitigation measures for adverse potential impacts due to location, design, construction and post-construction will have to be proposed during the preparation of IEE report for all the perceived impacts to minimize the environmental impacts of project implementation after the prediction of extent, magnitude and duration of the impacts.

c. Project operation and maintenance phase

Concerned agencies like STWSSSP, DWSS, WUSC and local agencies, Local administration, police office shall be consulted during the implementation of mitigation measures. The proponent is required to prepare Environmental Management Plan (EMP) and these measures should be outlined in the EMP in order to implement the proposed measures during the project implementation.

7.1 Alternative System Analysis

System alternatives need to be developed to assess the most cost effective, reliable and efficient system that can serve the design population. Optimization of a proposed water supply system can be done in terms of system layout, alternative technology, alternative materials or even alternative design parameters.

Chapter 8

8. MATTERS TO BE IMPLEMENTED WHILE IMPLEMENTING THE PROJECT

8.1 Environmental Management Plan

The project proponent has to develop an Environmental Management Plan (EMP) to systematically manage all the perceived environmental impacts of the project. It shall be therefore based on the mitigation measures for the project induced impacts. Mitigation measures for environmental impacts will be presented in EMP separately under physical, biological, socio-economic and cultural characteristics during construction. An Environmental Management Plan (EMP) has a dual purpose. It is designed to monitor the contractor's work during project implementation. It helps to check contractual compliance with specified mitigation measures. It also helps in making periodic checks on the actual environmental impacts of the Project over the years following completion of the works, and compares these with those impacts anticipated at the time of Project appraisal. The EMP therefore provides the necessary feedback required for correcting potentially serious Project deficiencies, and for planning of other projects. The EMP shall include the responsibilities of different stakeholders based on preliminary plans and schedules. This program shall include measures required during the project design, construction and operational phases and shall include recommendations on allocation of components of the EMP to the various parties involved. Feasible and cost-effective measures to prevent/mitigate/reduce significant negative impacts should be recommended in an Environmental Management Plan. The impacts and costs associated with implementing the measures will have to be detailed. The EMP will include proposed work programs, budget estimates, schedules, staffing and training requirements and other support services to implement the mitigating measures.

8.2 Environmental Monitoring Plan

The project will develop Environmental Monitoring Program for the pre-construction, construction and post construction activities of the project. The program will evaluate: (i) the extent and severity of the adverse environmental impacts as compared to what was predicted, (ii) how effective the mitigating measures were and compliance with the regulations and (iii) the overall effectiveness of the EMP. The environmental monitoring of the project includes field supervision and reporting of project activities prior to and during the project construction and operation in order to ensure that the works are being carried out in accordance with the approved design and that the environmental mitigation measures are fully implemented in accordance with the EMP. A monitoring system will be developed involving (i) front line monitoring (ii) monitoring by the government line agencies or independent monitors and (iii) auditing through the involvement of government agencies, donor agencies and independent auditors.

8.3 Information Disclosure, Public Consultation and Participation

Public consultation is the process of exchanging information with those persons and organizations with a legitimate interest in a project and/or who are likely to be affected by the project (stakeholders). It is a two-way process that informs and involves the community in developing a project, and informs the proponent about issues and concerns, which can then be addressed in project design. Information disclosure involves stakeholders in monitoring the development and implementation of a project and fosters openness in decision-making by presenting documents and other project materials for public scrutiny. The consultation and disclosure involves consultation with stakeholders at an early stage of

project preparation, and throughout project implementation. As a minimum, stakeholders will be consulted regarding the scope of the environmental study before work has commenced in earnest, and should then be informed about the likely impacts of the project and proposed mitigation once the draft IEE report is under preparation. The report should record the views of stakeholders and indicate how these have been taken into account in project development. Information is disclosed through public consultation and more formally by making documents and other materials available in a form and at a location in which they can be easily accessed by stakeholders. This normally involves making draft reports available (in the local language) at public locations in the community and providing a mechanism for the receipt of comments and making documents available more widely.

Public consultation and involvement should be given highest priority in the implementation of mitigation measures. Public consultation should take place and on the basis of decision of the consultation meeting, implementation of mitigation measures should be prioritized and should be carried out with the involvement of the local people.

Monitoring is one of the components of EMP. The results of monitoring should also be disclosed in the form of demonstration, charts, figures, graphs, and samples, etc., to the local people, school students and other interested stakeholders. In the process of compliance monitoring of the project construction, local people and construction workers should be consulted.

8.4 Grievance Redress Mechanism

A project-specific grievance redress mechanism (GRM) will be established to receive, evaluate and facilitate resolution of affected persons' concerns, complaints, and grievances related to social, environmental and other concerns on the project. The GRM will aim to provide a time-bound and transparent mechanism to resolve such concerns.

A Grievance Redress Committee (GRC) will be formed at the town/VDC/Municipality level, comprising the Chairperson of V/M/D WASH CC as the chairperson of GRC, and Secretary of concerned WUA or local bodies as the GRC secretary. The GRC members will comprise of (1) RPMO social development/environmental (as relevant) officer, (2) representative of affected persons, (3) DSMC's safeguards specialist (social/environment as relevant), (4) a representative of reputable CBO/SHG/organization working in the project area1, and (5) 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 DSMC will support the RPMO safeguard's officer and Project Manager of RPMO to ensure that grievances, including those of the poor and vulnerable are addressed. All GRCs shall have at least two women committee members. Along with representatives of the APs, civil society and eminent citizens can be invited as observers in GRC meetings. A three tier GRC will be operative as per PAM, TSTWSSSP.

The Social Development Officer at the Regional Project Management Office (RPMO) will be the focal person for facilitating the grievance redress at the local level.

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

Chapter 9

9. REPORT

The IEE report shall be prepared as per this ToR. The IEE report, whenever applicable, shall contain maps, graphs, photographs, tables and matrix. The format of report will be in accordance with EPR, 2054(1997) Schedule 5(Relating to Rule 7) or the format provided by PMO, SSTWSSSP. However, the IEE report should include the following but not limited to:

Executive Summary (in English and Nepali)

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List of Tables

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Appendices

List of Abbreviations

Acknowledgements

Introduction

Description of the Project

Description of the Environment

Anticipated environment impacts and mitigation measures

Analysis of alternatives with and without project situations

Information disclosure, consultation and participation

Grievance and redress mechanism

Environment Management Plan

Conclusions and Recommendations

References

Annexes

Chapter 10

10. OTHER NECESSARRY MATTERS

The other necessary matters to be included in the IEE report will be the relevant information, reference lists, annexes, maps, photographs, tables and charts, and questionnaires to be used at the time of carrying out the baseline survey. The report will clearly recommend whether an Environmental Impact Assessment (EIA) is required or whether an Initial Environmental Examination (IEE) is sufficient for the proposed project.

Annex

Rapid Environmental Assessment (REA) Checklist and Preliminary Climate Risk Screening Checklist for Sub Project

Instructions:

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

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

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

Country/Project Title: NEP: Third Small Towns Water Supply and Sanitation Sector Project

Subproject:

Screening Questions	Yes	No	Remarks
A. PROJECT SITING IS THE PROJECT AREA			
• DENSELY POPULATED?			
• HEAVY WITH DEVELOPMENT ACTIVITIES?			
• ADJACENT TO OR WITHIN ANY ENVIRONMENTALLY SENSITIVE AREAS?			
◦ CULTURAL HERITAGE SITE			
◦ PROTECTED AREA			

Screening Questions	Yes	No	Remarks
• WETLAND			
• MANGROVE			
• ESTUARINE			
• BUFFER ZONE OF PROTECTED AREA			
• SPECIAL AREA FOR PROTECTING BIODIVERSITY			
• BAY			
B. POTENTIAL ENVIRONMENTAL IMPACTS Will the Project cause...			
▪ pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and soil erosion runoff?			
▪ impairment of historical/cultural monuments/areas and loss/damage to these sites?			
▪ hazard of land subsidence caused by excessive ground water pumping?			
▪ social conflicts arising from displacement of communities ?			
▪ conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?			
▪ unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?			
▪ delivery of unsafe water to distribution system?			
▪ inadequate protection of intake works or wells, leading to pollution of water supply?			
▪ over pumping of ground water, leading to salinization and ground subsidence?			

Screening Questions	Yes	No	Remarks
• excessive algal growth in storage reservoir?			
• increase in production of sewage beyond capabilities of community facilities?			
• inadequate disposal of sludge from water treatment plants?			
• 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?			
• health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals,			
• 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?			
• 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?			
• increased road traffic due to interference of construction activities?			
• continuing soil erosion/silt runoff from construction operations?			
• delivery of unsafe water due to poor O&M treatment processes (especially mud accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?			
• delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?			

Screening Questions	Yes	No	Remarks
• accidental leakage of chlorine gas?			
• excessive abstraction of water affecting downstream water users?			
• competing uses of water?			
• increased sewage flow due to increased water supply			
• increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant			
• large population influx during project construction and operation 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 the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction?			
• Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?			

Preliminary Climate Risk Screening Checklist for Sample Sub Project Towns

	Screening Questions	Score	Remarks
Location and design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides		
	Would the project design (e.g. the clearance for bridges) need to consider		

	any hydro-meteorological parameters (e.g. sea-level, peak river flow, reliable water level, peak wind speed etc.)
Materials and maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity, and hydro metrological parameters) affect the selection of project inputs over the life of project outputs (i.e. construction materials)
Performance of Project Outputs	Would climate/weather conditions and related extreme events likely to affect the performance throughout their design life time?

Options for answers and corresponding scores are given below

Response	Score
Not Likely	0
Likely	1
Very Likely	2

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

Result of Initial Screening (Low, Medium, High):
Other comments:

Review and Comments on TOR for IEE – Birendranagar Town Project

S.N	Comments and suggestions	Action(s) Taken
1	Cover page: submitted by and submitted to	Incorporated
2	Star new chapter in fresh page	Each chapter starts on new page
3	Chapter 3 should be elaborated. Giving details on what data will be collected & which method will be used.	Detailed methodology for Study & data collection incorporated
4	Chapter 4 should be ordered in Sequence of: Constitution -1, Acts-2, Rules & Regulation-3, plans, policies-4 & Strategies, Guidelines-5, Standards & International convention-6	Sequence of order has been followed.
5	Chapter-7: Also mention that impacts will be categorized into: Beneficial & Adverse and construction & operation phase.	Impacts have been categorized and incorporated
6	Mention that national EIA Guidelines, 1993 will be used for significance analysis of impacts.	Use of Guidelines clearly mentioned
7	Chapter-8 Mitigation measures should be presented separately under: physical, Biological & socio culture domain.	Incorporated
8	Add check list to be used for IEE Study.	REA Checklist added to the ToR

ANNEX 2: SAMPLE FORMS, FORMATS AND REPORT TEMPLATE

ANNEX A:
RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST FOR BIRENDRANAGAR SUB PROJECT AND PRELIMINARY CLIMATE RISK SCREENING CHECKLIST FOR SAMPLE SUB 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 (RSES) for endorsement by the Director, RSES and for approval by the Chief Compliance Officer.

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

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

Country/Project Title: NEP: Third Small Towns Water Supply and Sanitation Sector Project

Subproject: Birendranagar Water Supply and Sanitation Subproject

Screening Questions	Yes	No	Remarks
A. Project Siting **Is the project area**			
Densely populated?	√		The distribution pipeline will partially go through RoW of road in Rapti Municipality & Khairahani Municipality with moderate population density
Heavy with development activities?	√		The distribution pipeline will partially go through RoW of road in Rapti Municipality & Khairahani Municipality with moderate population density.
Adjacent to or within any environmentally sensitive areas?			
Cultural heritage site		√	
Protected Area		√	
Wetland		√	
Mangrove		√	

Screening Questions	Yes	No	Remarks
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?			Ensure sustainable pumping (if pumping option is selected)
social conflicts arising from displacement of communities ?		√	
conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		√	
unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?	√		Basic water treatment is proposed under the Subproject. EMP recommends water quality monitoring as prescribed in the NDWQS & its Directives.
delivery of unsafe water to distribution system?	√		Design proposes monitoring kits, a lab room. EMP recommends continuing training of WUSC in water quality monitoring, as prescribed in the NDWQS Directives.
inadequate protection of intake works or wells, leading to pollution of water supply?	√		Design proposes housing for intake wells, as well as perimeter fencing of the entire land area of the intake wells & associated facilities.
over pumping of ground water, leading to salinization and ground subsidence?		√	High cost involved in pumping will constrain over pumping. EMP recommends monitoring pumping & maintaining record to control pumping to design limit.
excessive algal growth in storage reservoir?		√	EMP provides mitigation measures.
increase in production of sewage beyond capabilities of community facilities?		√	Most of the communities have septic tanks leading to soak pits. EMP provides mitigation measures.
inadequate disposal of sludge from water treatment plants?		√	Minimal sludge expected. EMP provides mitigation measures.
inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?		√	

Screening Questions	Yes	No	Remarks
Impairments associated with transmission lines and access roads?	√		No water transmission or distribution lines exist. Power transmission lines crossing the proposed water transmission & distribution lines will not be affected. EMP provides measures to mitigate impacts on power supply poles in the bazaar that are immediately adjacent to, or onto, road carriageways.
health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.	√		$Ca(ClO)_2$, commonly used in basic water treatment, will be used. 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?		√	$Ca(ClO)_2$, commonly used in basic water treatment, will be used. 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 MWSS accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?	√		EMP incorporates monitoring of distributed water according to the Directives for the NDWQS.
delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?	√		Concern for corrosion of G.I. pipes caused by the chlorine content in treated water is low. EMP provides mitigation measures.
accidental leakage of chlorine gas?		√	
excessive abstraction of water affecting downstream water users?		√	
competing uses of water?		√	
increased sewage flow due to increased water supply	√		Most of the communities have septic tanks leading to soak pits. EMP provides mitigation measures.
increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant	√		There is no wastewater collection & treatment system. EMP provides mitigation measures.
large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		√	
social conflicts if workers from other regions or countries are hired?	√		Expected as low concern. Priority will be given to local workers.
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction?	√		EMP provides mitigation measures.

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

Preliminary Climate Risk Screening Checklist for Sample Sub Project Towns

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

Options for answers and corresponding scores are given below.

Response	**Score**
Not Likely	0
Likely	1
Very Likely	2

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

Result of Initial Screening (Low, Medium, High): Low Other comments: None

ANNEX B:
RELEVANT ENVIRONMENTAL QUALITY STANDARDS

B.1 Ambient Air Quality Standards

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

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

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

^ Air Quality Guidelines for Europe, Second Edition, 2001. WHO Regional Office for Europe, Copenhagen

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

B.2 Noise Level Standards

Receptor / Source	National Noise Standard Guidelines, 2012 (dB)		WHO Guideline Values for Noise Levels Measured Out of Doors * (One Hour L_{Aeq} in dBA)	
	Day	Night	07:00 - 22:00	22:00 - 07:00
Industrial area	75	70	70	70
Commercial area	65	55		
Rural residential area	45	40	55	45
Urban residential area	55	50		
Mixed residential area	60	55		
Quiet area	50	40	-	-
Water pump	65		-	
Diesel generator	90		-	

* Guidelines for Community Noise. WHO, 1999.

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

B.3 National Drinking Water Quality Standards, 2006

Group	National Drinking Water Quality Standards, 2006			WHO Guidelines for Drinking-water Quality, 4th Edition, 2011*
	Parameter	Unit	Max. Concentration Limits	
Physical	Turbidity	NTU	5 (10) **	-
	pH		6.5 - 8.5	none
	Color	TCU	5 (15)	none
	Taste & Odor		Would not be objectionable	-
	TDS	mg/l	1000	-
	Electrical Conductivity	µc/cm	1500	-
	Iron	mg/l	0.3 (3)	-
	Manganese	mg/l	0.2	
	Arsenic	mg/l	0.05	0.01
	Cadmium	mg/l	0.003	0.003
	Chromium	mg/l	0.05	0.05
	Cyanide	mg/l	0.07	none
	Fluoride	mg/l	0.6 - 1.5 ^	1.5
	Lead	mg/l	0.01	0.01
	Ammonia	mg/l	1.5	none established
Chemical	Chloride	mg/l	250	none established
	Sulphate	mg/l	250	none
	Nitrate	mg/l	50	50
	Copper	mg/l	1	2
	Total Hardness	mg/l	500	-
	Calcium	mg/l	200	-
	Zinc	mg/l	3	none established
	Mercury	mg/l	0.001	0.006
	Aluminum	mg/l	0.2	none established
	Residual Chlorine	mg/l	0.1 - 0.2	5 ^^
Micro Germs	E-coli	MPN/100ml	0	must not be detectable in any 100 ml sample
	Total Coliform	MPN/100ml	0 in 95% of samples taken	

* Health-based guideline values

** 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.

Parameter with WHO guideline value as more stringent than national standard value.

National Drinking Water Quality Standards was obtained from the Environment Statistics of Nepal 2011, Government of Nepal, National Planning Commission Secretariat, Central Bureau of Statistics, Kathmandu, Nepal.

ANNEX C:
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:	

ANNEX D:
SAMPLE TRAFFIC MANAGEMENT PLAN

SAMPLE: TRAFFIC MANAGEMENT PLAN (TMP)

A. Principles

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

- the safety of pedestrians, bicyclists, and motorists travelling through the construction zone;
- protection of work crews from hazards associated with moving traffic;
- mitigation of the adverse impact on road capacity and delays to the road users;
- maintenance of access to adjoining properties
- Avoid hazards in addressing issues that may delay the project.

B. Operating Policies for TMP

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

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

C. Analyze the impact due to street closure

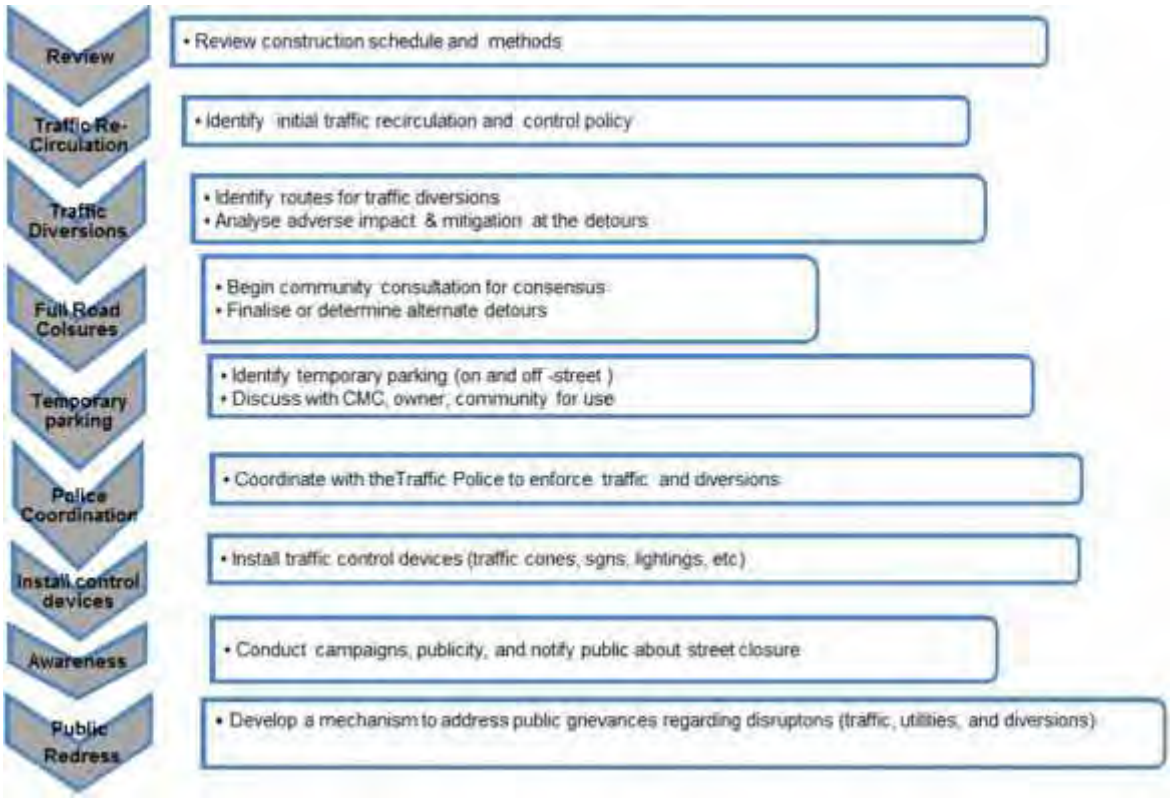
Apart from the capacity analysis, a final decision to close a particular street and divert the traffic should involve the following steps:

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

- contacting emergency service, school officials, and transit authorities to determine if there are impacts to their operations; and
- developing a notification program to the public so that the closure is not a surprise. As part of this program, the public should be advised of alternate routes that commuters can take or will have to take as result of the traffic diversion.

If full road-closure of certain streets within the area is not feasible due to inadequate capacity of the Detour Street or public opposition, the full closure can be restricted to weekends with the construction commencing on Saturday night and ending on Monday morning prior to the morning peak period.

Figure **Error! No text of specified style in document.**-1: Policy Steps for the TMP



D. Public awareness and notifications

As per discussions in the previous sections, there will be travel delays during the constructions, as is the case with most construction projects, albeit on a reduced scale if utilities and traffic management are properly coordinated. There are additional grounds for travel delays in the area, as most of the streets lack sufficient capacity to accommodate additional traffic from diverted traffic as a result of street closures to accommodate the works.

The awareness campaign and the prior notification for the public will be a continuous activity which the project will carry out to compensate for the above delays and minimize public claims as result of these problems. These activities will take place sufficiently in advance of the time when the roadblocks or traffic diversions take place at the particular streets. The

reason for this is to allow sufficient time for the public and residents to understand the changes to their travel plans. The project will notify the public about the roadblocks and traffic diversion through public notices, ward level meetings and city level meeting with the elected representatives.

The ICG will also conduct an awareness campaign to educate the public about the following issues:

- traffic control devices in place at the work zones (signs, traffic cones, barriers, etc.);
- defensive driving behavior along the work zones; and
- reduced speeds enforced at the work zones and traffic diversions.

It may be necessary to conduct the awareness programs/campaigns on road safety during construction.

The campaign will cater to all types of target groups i.e. children, adults, and drivers. Therefore, these campaigns will be conducted in schools and community centers. In addition, the project will publish a brochure for public information. These brochures will be widely circulated around the area and will also be available at the ICG, and the contractor's site office. The text of the brochure should be concise to be effective, with a lot of graphics. It will serve the following purpose:

- Explain why the brochure was prepared, along with a brief description of the project;
- Advise the public to expect the unexpected;
- Educate the public about the various traffic control devices and safety measures adopted at the work zones;
- Educate the public about the safe road user behavior to emulate at the work zones;
- Tell the public how to stay informed or where to inquire about road safety issues at the work zones (name, telephone, mobile number of the contact person; and
- Indicate the office hours of relevant offices.

E. Vehicle Maintenance and Safety

A vehicle maintenance and safety program shall be implemented by the construction contractor. The contractor should ensure that all the vehicles are in proper running condition and it comply with roadworthy and meet certification standards of GoN. All vehicles to be used at STWSSP shall be in perfect condition meeting pollution standards of GoN. The vehicle operator requires a pre state of shift checklist. Additional safety precautions will include the requirement for:

- Driver will follow the special code of conduct and road safety rules of Government of Nepal.
- Drivers to ensure that all loads are covered and secured drivers to ensure operation equipment can’t leak materials hauled
- Vehicles will be cleaned and maintained in designed places.

F. Install traffic control devices at the work zones and traffic diversion routes

The purpose of installing traffic control devices at the work zones is to delineate these areas to warn, inform, and direct the road users about a hazard ahead, and to protect them as well as the workers. As proper delineation is a key to achieve the above objective, it is important to install good traffic signs at the work zones. The following traffic control devices are used in work zones:

- Signs
- Pavement Markings
- Channelizing Devices
- Arrow Panels
- Warning Lights

Procedures for installing traffic control devices at any work zone vary, depending on road configuration, location of the work, construction activity, duration, traffic speed and volume, and pedestrian traffic. Work will take place along major roads, and the minor internal roads. As such, the traffic volume and road geometry vary. The main roads carry considerable traffic; internal roads in the new city areas are wide but in old city roads very narrow and carry considerable traffic. However, regardless of where the construction takes place, all the work zones should be cordoned off, and traffic shifted away at least with traffic cones, barricades, and temporary signs (temporary "STOP" and "GO").

The work zone should take into consideration the space required for a buffer zone between the workers and the traffic (lateral and longitudinal) and the transition space required for delineation, as applicable. For the works, a 30 cm clearance between the traffic and the temporary STOP and GO signs should be provided. In addition, at least 60 cm is necessary to install the temporary traffic signs and cones.

Traffic police should regulate traffic away from the work zone and enforce the traffic diversion result from full street closure in certain areas during construction. Flaggers/ personnel should be equipped with reflective jackets at all times and have traffic control batons (preferably the LED type) for regulating the traffic during night time.

In addition to the delineation devices, all the construction workers should wear fluorescent safety vests and helmets in order to be visible to the motorists at all times. There should be provision for lighting beacons and illumination for night constructions.

The ICG and contractor will coordinate with the local administration and traffic police regarding the traffic signs, detour, and any other matters related to traffic. The contractor will prepare the traffic management plan in detail and submit it along with the EMP for the final approval.

ANNEX E:
SPOIL MANAGEMENT PLAN

Spoil Management Plan (SMP)

Purpose and application: SMP is to describe how STWSSP will manage the spoil generated and reuse related to design and construction works. This is an integral part of EMP. The objective of SMP is to reuse of spoil from works in accordance with the spoil management hierarchy outlined in this document.

Objectives of SMP: The objectives of SMP are:

- 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

Structure of SMP:
Section 1: Introduction of SMP
Section 2: Legal and other requirements
Section 3: Roles and responsibilities
Section 4: Identification and assessment of spoil aspects and impacts
Section 5: Spoil volumes, characteristics and minimization
Section 6: Spoil reuses opportunities, identification and assessment
Section 7: On site spoil management approach
Section 8: Spoil transportation methodology
Section 9: Monitoring, Reporting, Review, and Improvements

Aspects and Potential Impacts
The key aspects of potential impacts in relation to SMP are listed in table below

Aspects	Potential Impacts
Air Quality	Potential for high winds generating airborne dust from the stock piles
Sedimentation	Potential for sediment laden site runoff from spoil stockpiles and potential for spillage of spoil from truck on roads
Surface and Groundwater	Contamination of 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

Spoil volumes, Characteristics and Minimization

Spoil volume calculations: Estimate the volumes of spoils produced from each of the construction sites.

Characterization of spoil: Based on the type of spoil; characterization is done (sand stone, MWSS mix materials, reusable materials

Adopt Spoil Reduce, Reuse Opportunities
An overview of the assessment methodology to be used is mentioned below.

- Consideration of likely spoil characteristics
- Identification of possible reuse sites
- Screening of possible reuse opportunities

Identification of possible safe disposal sites for spoil: Those spoils which can't be reuse shall be properly disposed in designated areas, such disposal areas should be identified in project locations. Such disposal areas should be safe from environmental aspects 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.

Storage and stock piling

Transportation and haulage route

Based on the above, the contractor will prepare a SMP as an integral part of EMP and submit it to the DSMC for their review and approval.

SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

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

Appendixes

- Photos
- Summary of consultations
- Copies of environmental clearances and permits
- Sample of environmental site inspection Report
- Others

ANNEX F:
SAMPLE SEMI-ANNUAL ENVIRONMENTAL MONITORING REPORT TEMPLATE

This template must be included as an appendix in the EIA/IEE that will be prepared for the project. It can be adapted to the specific project as necessary.

INTRODUCTION

- Overall project description and objectives
- Description of sub-projects
- Environmental category of the sub-projects
- Details of site personnel and/or consultants responsible for environmental monitoring
- Overall project and sub-project progress and status

No.	Sub-Project Name	Status of Sub-Project				List of Works	Progress of Works
		Design	Pre-Construction	Construction	Operational		
		☐	☐	☐	☐		
		☐	☐	☐	☐		
		☐	☐	☐	☐		

COMPLIANCE STATUS WITH NATIONAL/STATE/LOCAL STATUTORY ENVIRONMENTAL REQUIREMENTS

No.	Sub-Project Name	Statutory Environmental Requirements	Status of Compliance	Action Required

COMPLIANCE STATUS WITH ENVIRONMENTAL LOAN COVENANTS

No. (List schedule and paragraph number of Loan Agreement)	Covenant	Status of Compliance	Action Required

COMPLIANCE STATUS WITH THE ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

- Provide the monitoring results as per the parameters outlined in the EMP. Append supporting documents where applicable, including Environmental Site Inspection Reports.
- There should be Reporting on the following items which can be incorporated in the checklist of routine Environmental Site Inspection Report followed with a summary in the semi-annual Report send to ADB. Visual assessment and review of relevant site documentation during routine site inspection needs to note and record the following:
- What are the dust suppression techniques followed for site and if any dust was noted to escape the site boundaries;

- Adequacy of type of erosion and sediment control measures installed on site, condition of erosion and sediment control measures including if these were intact following heavy rain;
- Are their designated areas for concrete works, and refueling;
- Are their spill kits on site and if there are site procedure for handling emergencies;
- Is there any chemical stored on site and what is the storage condition?
- Is there any dewatering activities if yes, where is the water being discharged;
- How are the stockpiles being managed;
- How is solid and liquid waste being handled on site;
- Review of the complaint management system;
- Checking if there are any activities being under taken out of working hours and how that is being managed.

Summary Monitoring Table

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
Design Phase						
Pre-Construction Phase						
Construction Phase						
Operational Phase						

Overall Compliance with CEMP/EMP

No.	Sub-Project Name	EMP/CEMP Part of Contract Documents (Y/N)	CEMP/EMP Being Implemented (Y/N)	Status of Implementation (Excellent/ Satisfactory/ Partially Satisfactory/ Below Satisfactory)	Action Proposed & Additional Measures Required

APPROACH AND METHODOLOGY FOR ENVIRONMENTAL MONITORING OF THE PROJECT

Brief description on the approach and methodology used for environmental monitoring of each sub-project

MONITORING OF ENVIRONMENTAL IMPACTS ON PROJECT SURROUNDINGS (AMBIENT AIR, WATER QUALITY AND NOISE LEVELS)

- Brief discussion on the basis for monitoring
- Indicate type and location of environmental parameters to be monitored
- Indicate the method of monitoring and equipment to be used
- Provide monitoring results and an analysis of results in relation to baseline data and statutory requirements

As a minimum the results should be presented as per the tables below.

Air Quality Results

Site No.	Date of Testing	Site Location	Parameters (Government Standards)		
			PM10 (µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)

Site No.	Date of Testing	Site Location	Parameters (Monitoring Results)		
			PM10 (µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)

Water Quality Results

Site No.	Date of Sampling	Site Location	Parameters (Government Standards)					
			pH	Conductivity (µS/cm)	BOD (mg/L)	TSS (mg/L	TN (mg/L)	TP (mg/L)

Site No.	Date of Sampling	Site Location	Parameters (Government Standards)					
			pH	Conductivity (µS/cm)	BOD (mg/L)	TSS (mg/L	TN (mg/L)	TP (mg/L)

Noise Quality Results

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

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

ANNEX G:
SAMPLE ENVIRONMENTAL SITE INSPECTION REPORT

Project Name
Contract Number

NAME: _____ DATE:
TITLE: _____ DMA:
LOCATION: _____ GROUP:

WEATHER CONDITION:
_____
_____

INITIAL SITE CONDITION:
_____

CONCLUDING SITE CONDITION:

Satisfactory _____ Unsatisfactory_____ Incident_____ Resolved _____ Unresolved _____

INCIDENT:
Nature of incident:
_____
_____

Intervention Steps:
_____
_____

Incident Issues

Resolution

Project Activity Stage	Survey	
	Design	
	Implementation	
	Pre-Commissioning	
	Guarantee Period	

Inspection

Emissions	Waste Minimization
Air Quality	Reuse and Recycling
Noise pollution	Dust and Litter Control
Hazardous Substances	Trees and Vegetation

Site Restored to Original Condition Yes No

Signature

_____

Sign off

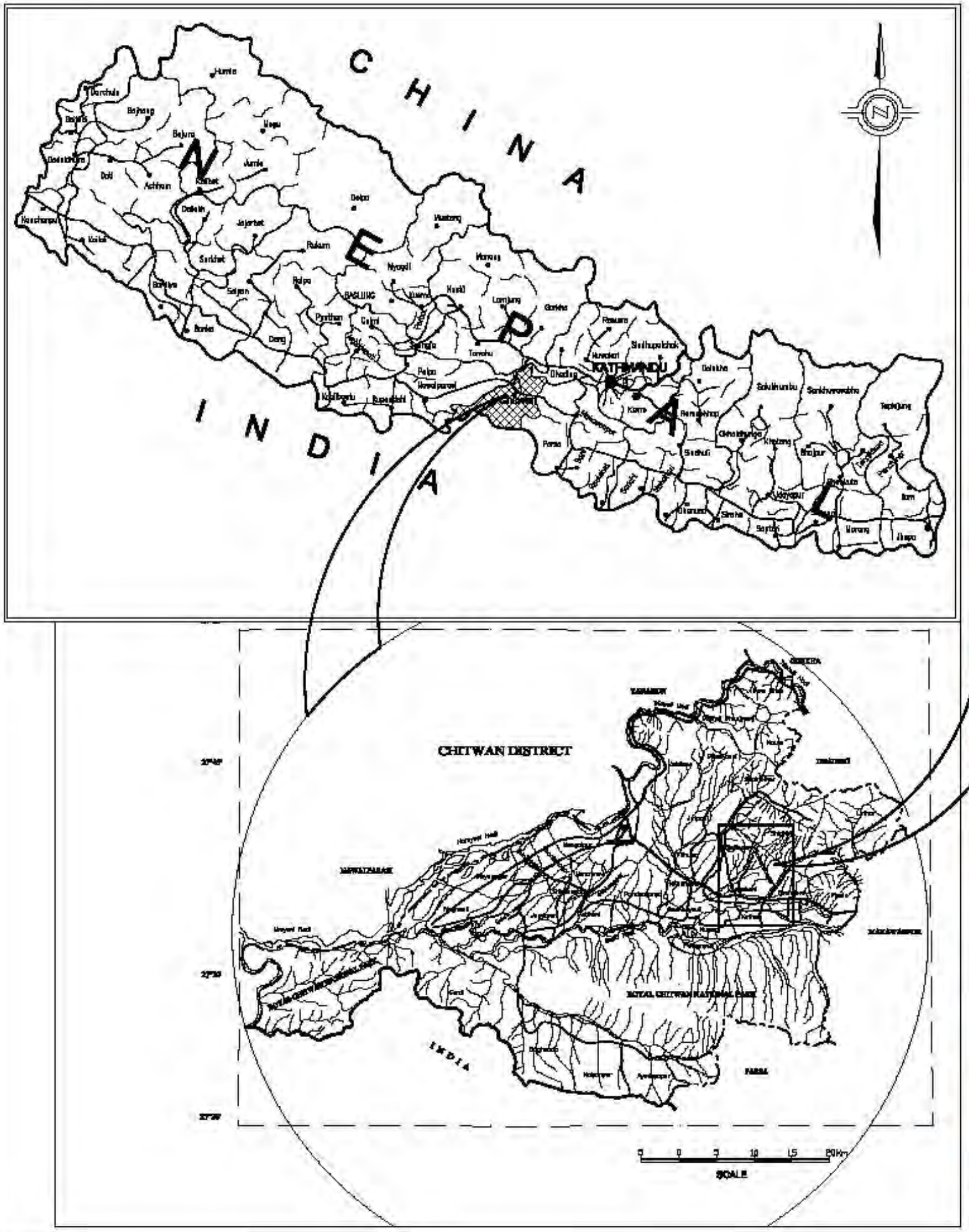
_____ _____

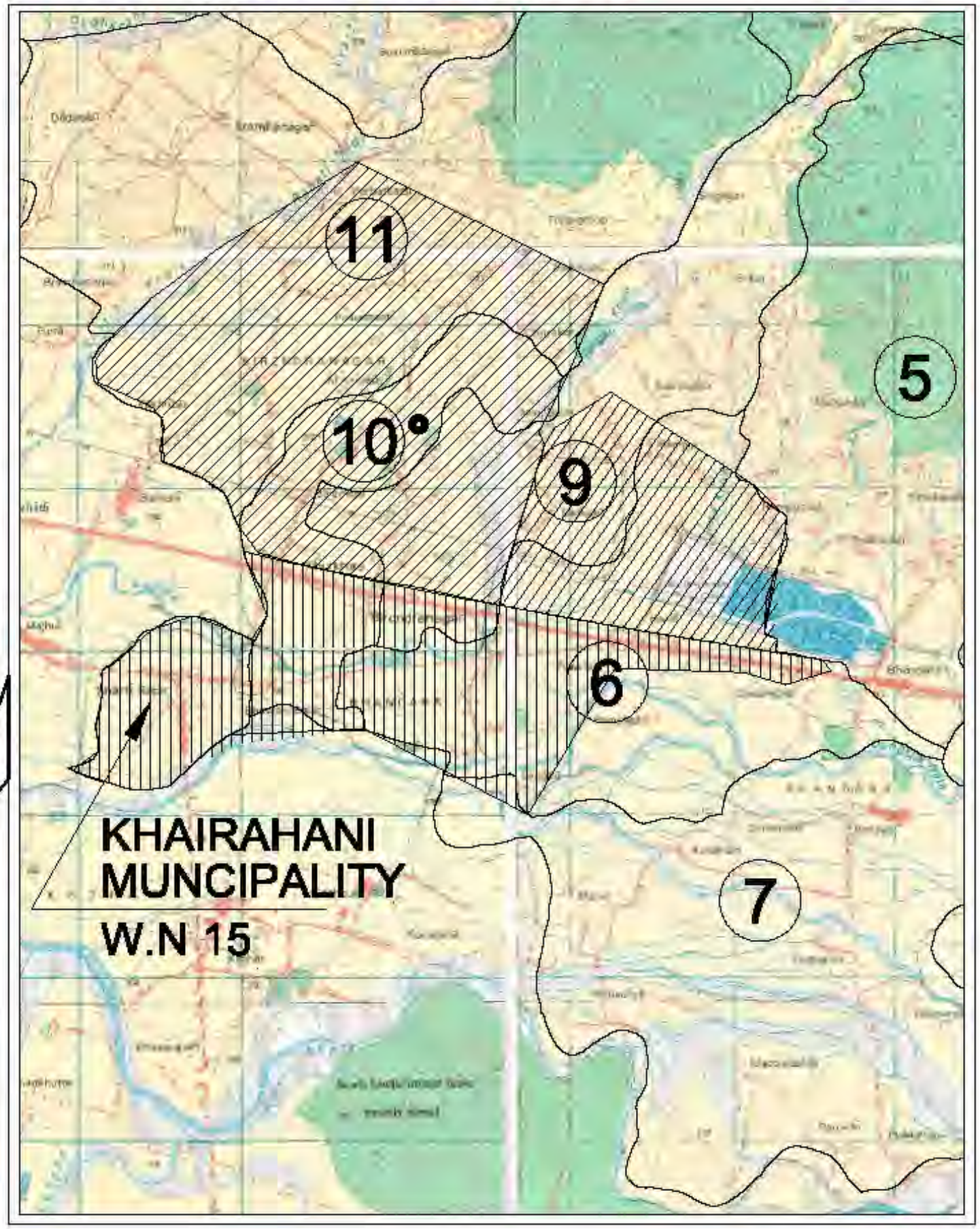
Name **Name**

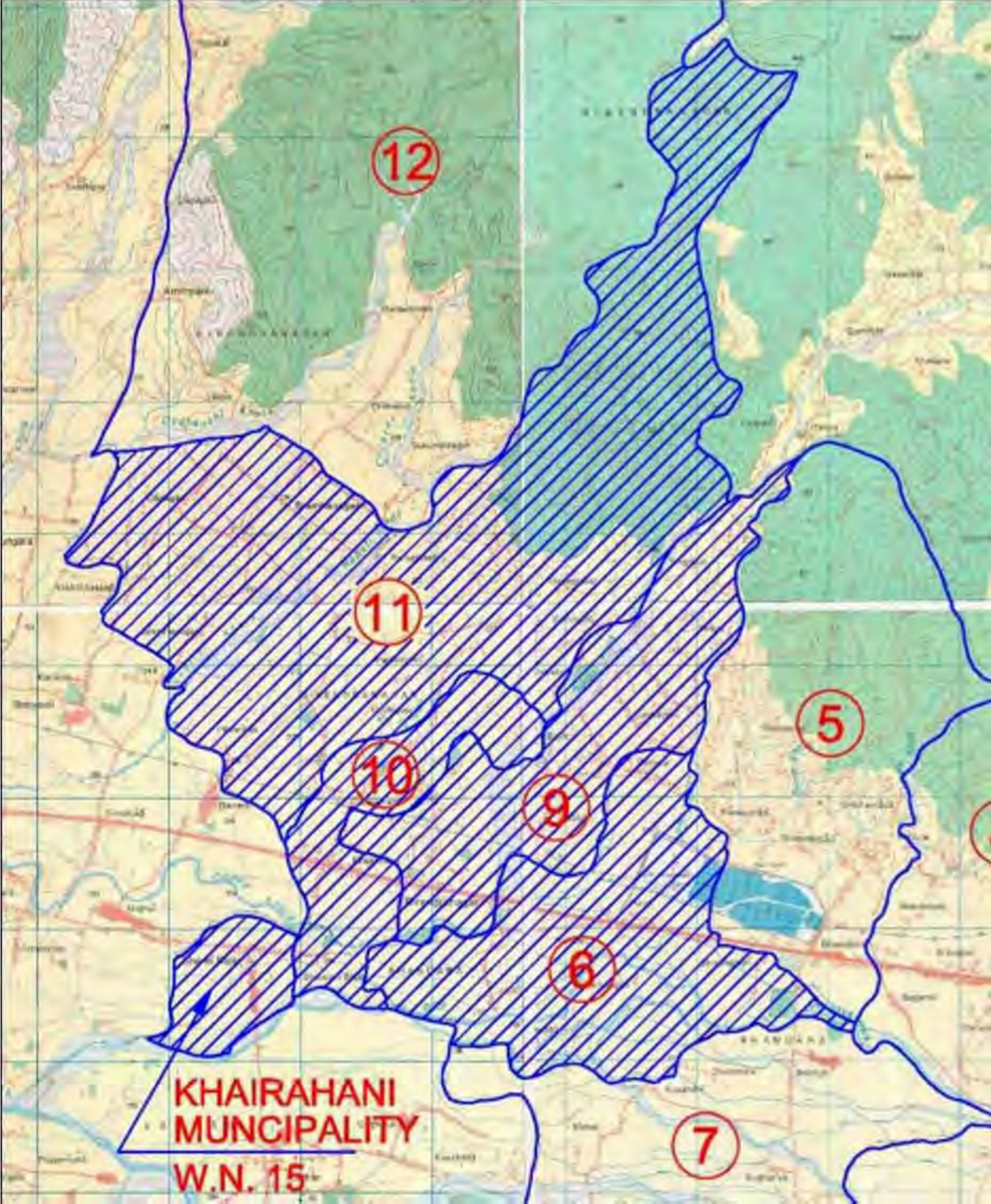
Position **Position**

ANNEX 3:
PROJECT LOCATION, SERVICE AREA AND SCHEMATIC MAP

Fig. 1 PROJECT LOCATION MAP



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MUNCIPALITY
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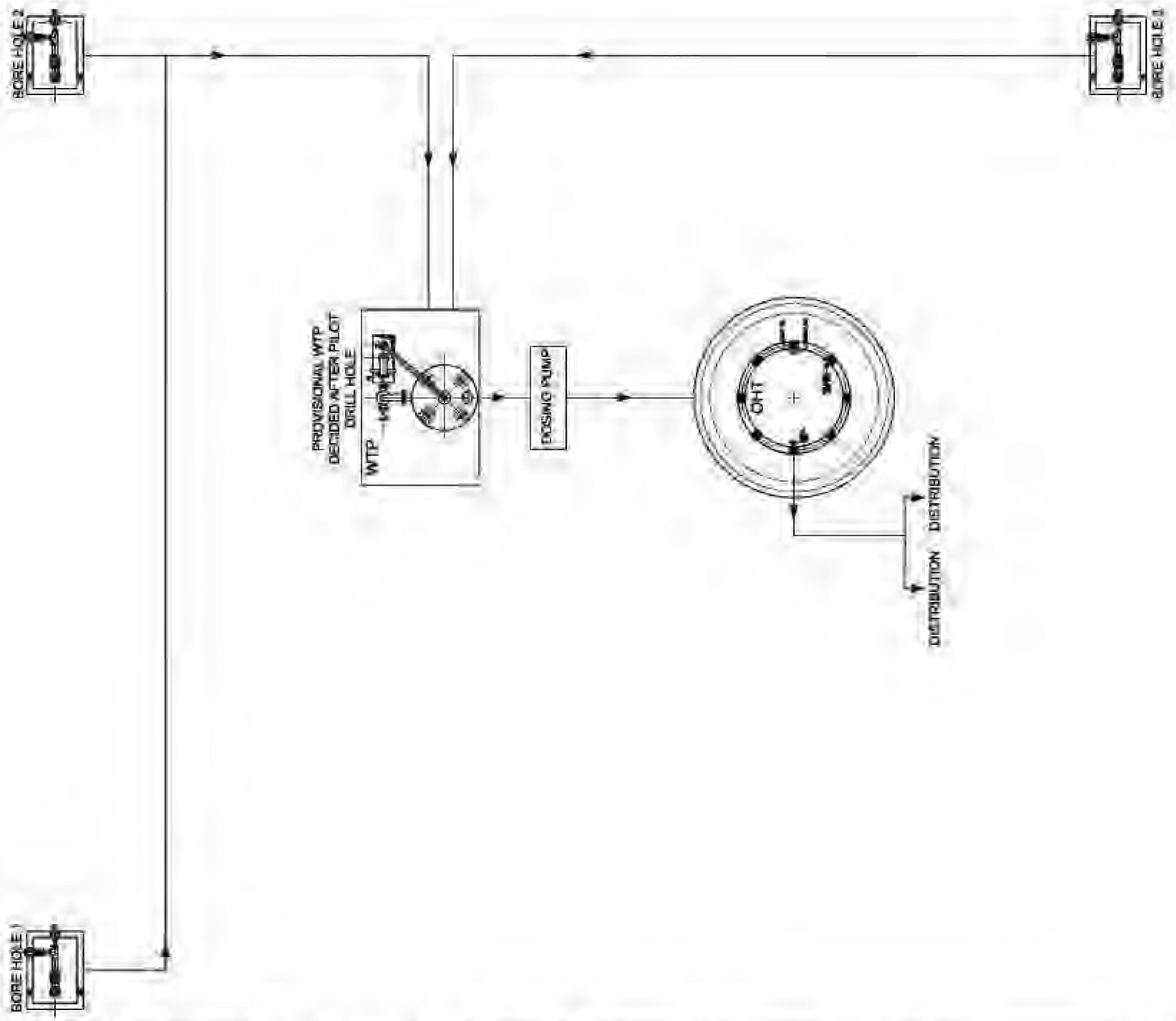

TAEC Consult P. Ltd. JOINT VENTURE WITH ICON	REVISION	DATE	PROJECT MANAGEMENT OFFICE THIRD SMALL TOWN WATER SUPPLY & SANITATION SECTOR PROJECT Department of Water Supply and Sewerage	SCALE NOT TO SCALE	SCHEMATIC LINE DIGRAM	DESIGNED BY: DRAWN BY: CHECKED BY:	
			DETAIL ENGINEERING DESIGN OF BIRENDRANAGAR TOWN WATER SUPPLY AND SANITATION PROJECT		WATER SUPPLY COMPONENT	APPROVED BY: FILE NAME:	SHEET NO: TOTAL SHEET:

ANNEX 4:
PUBLIC NOTICE. MUCHULKA & RECOMMENDATION LETTERS

खानेपानी तथा ढलनिकास विभाग

तेस्रो सानाशहरी खानेपानी तथा सरसफाइ आयोजना

चितवन खानेपानी तथा सरसफाइ आयोजना

प्रारम्भिक वातावरणीय परिक्षणका लागि राय सुझाव पेश गर्ने सम्बन्धमा

सार्वजनिक सूचना

एशियाली विकास बैंकको आर्थिक सहयोगमा **चितवन** जिल्लाको **राप्ती** नगरपालिका अन्तर्गतवडा नं **६, ९ र १०** तथा **वैरहानी नगरपालिकाको वडा नं. १५**मा निर्माण हुन गइरहेको **चितवन नगर** सानाशहरी खानेपानी तथा सरसफाइ आयोजनाको प्रारम्भिक वातावरणीय परीक्षण (Initial Environmental Examination) को प्रतिवेदन तयार गरिएको छ । आयोजनाबाट भौतिक, जैविक, सामाजिक, आर्थिक एवं सांस्कृतिक पक्षहरूमा के-कस्तो असरहरु पर्न सक्छन सो बारे लिखित राय सुझाव सहित १५ (पन्ध्र) दिनभित्र बुझाउने गरी निम्न ठेगानामा पठाइ दिनु हुन वातावरण संरक्षण नियमावली २०५५ को नियम ७ (२) अनुसार सम्बन्धित सबैको जानकारीका लागि यो सूचना प्रकाशित गरिएको छ । साथै लिखित राय सुझावको प्रतिलिपी खानेपानी तथा सरसफाइ मन्त्रालय, सिंहदरबार, काठमाडौं र खानेपानी तथा ढलनिकास विभाग, बानी पोखरी, काठमाडौंमा उपलब्ध गराईदिन हुन समेत अनुरोध गरिन्छ ।

राय सुझावपठाउने ठेगाना:

खानेपानी तथा सरसफाइ
सब-डिभिजन कार्यालय, भरतपुर, चितवन
फोन नं. ०५६-५२२१०४
फ्याक्स : ०५६-५२०१२१

खानेपानी तथा सरसफाई उपभोक्ता समिति, चितवन
अध्यक्ष
सम्पर्क नं. ९८५४०५५१६९

टेक कन्सल्ट प्रा.लि.
आइकन कन्सल्टेन्ट नेपाल प्रा.लि जेभी
शंखमुल, काठमाडौं, नेपाल
फोन नं. ४७८१४४६, ४७८२४४०
फ्याक्स ४७८१४४७
Email: tec@mos.com.np

तेस्रो सानाशहरी खानेपानी तथ सरसफाई आयोजना
आयोजना व्यवस्थापन कार्यालय, पार्तीपोखरी, काठमाडौं
फोन नं. ४४२३२८६, फ्याक्स : ४४१३२८०
Email: info@ssiwsssp.gov.np

क्षेत्रिय आयोजना व्यवस्थापन कार्यालय,
इटहरी, सुनसरी
सम्पर्क नं : ०२५-५८८१४१,
फ्याक्स : ०२५-५८८१४२
Email: rpoitahari@gmail.com

नेपाल सरकार
स्थानीय विकास मन्त्रालय
जिल्ला विकास समितिको कार्यालय
भरतपुर, चितवन

कार्यालय : ☎०५६-५२०३३२, ५२०१४७ स्थानीय विकास अधिकारी निवास : ☎०५६-५२०१७८ फ्याक्स : ०५६-५२२५४७

प.सं.
च.नं. २४५२

मिति : २०६३/२/६

विषय : सूचना टाँस सम्बन्धमा ।

श्री श्याम कन्सल्ट प्रा.लि.
इटहरी सुनसरी ।

उपर्युक्त सम्बन्धमा त्यस कार्यालयको च.नं. ३१५ मिति २०६३।१।२४ को सूचना यस कार्यालयको सूचना पाटीमा मिति २०६३।१।२६ गतेका दिन टाँस गरिएको व्यहोरा जानकारीका लागि अनुरोध छ ।

नेपाल सरकार
सङ्घीय मामिला तथा स्थानीय विकास मन्त्रालय

खैरहनी नगरपालिका कार्यालय

खैरहनी, चितवन, नेपाल, फोन नं. +९७७-५६-५८२०८५
स्था.: २०७१

पत्र संख्या:- ०७२।०७३ (१५)
चलानी नं.:- १०४२

मिति: ०७३।०१।२२

विषय :- सूचना टाँस सम्बन्धमा

श्री विरेन्द्रनगर खाना आहारे खानेपानी तथा सरसफाई
आयोजना मार्फत न.पा. चितवन

उपरोक्त सम्बन्धमा यस खैरहनी नगरपालिका अन्तर्गत संयुक्त वडा कार्यालय १५ (शान्तिबजार) मा विरेन्द्रनगर खाना आहारे खाने पानी तथा सरसफाई आयोजना को मिति २०७३।१।२७ च.नं. ६२ - को पत्र साथ संलग्न प्रारम्भिक वातावरणीय परिक्षण को सार्वजनिक सूचना मितिमा टाँस गरी सो को टाँस मुचुल्का यसै पत्र साथ संलग्न राखी पठाइएको व्यहोरा जानकारीको लागि अनुरोध छ।

(हस्ताक्षर)
वडा सचिव

नेपाल सरकार
सङ्घीय मामिला तथा स्थानीय विकास मन्त्रालय

राप्ती नगरपालिकाको कार्यालय

हर्दी, भण्डारा, चितवन

फोन: ०५६-५५००१५, ५८२१००, ४०५१०१

पत्र संख्या ०६८/०६९
चलानी नं. १२९६

मिति: २०६९/१/२२

विषय :- सूचना टाँस सम्बन्धमा ।

श्री विरेन्द्रनगर सानो शहरी खानेपानी तथा सरसफाई आयोजना
राप्ती न.पा. चितवन ।

उपरोक्त सम्बन्धमा यस न.पा. को विरेन्द्रनगर सानो शहरी खानेपानी तथा सरसफाई आयोजना को मिति २०६९/१/२० गते ६८-६९ को पत्र साथ संलग्न प्रारम्भिक वातावरणीय परीक्षणको सार्वजनिक सूचना आजै मिति २०६९/१/२२ मा प्राप्त भई कार्यालयको सूचना पाटीमा टाँस गरी सोको टाँस मुचुल्का यसै पत्र साथ संलग्न राखी पठाइएको व्यहोरा जानकारीका लागि अनुरोध गरिन्छ ।

संयुक्त वडा सचिव

लिखितम हामी तपसिल बमोजिमका मानिसहरू आगे एसियाली विकास बैंकको आर्थिक सहयोगमा चितवन जिल्लाको राप्ती न.पा. अन्तर्गत वडा नं. ६, ८, १० र ११ तथा रत्ननगर न.पा. ४ मा निर्माण हुन गइरहेको विरेन्द्रनगर साना सहरी खानेपानी तथा सरसफाई आयोजनाको प्रारम्भिक वातावरणीय परिक्षणको प्रतिवेदन तयार गर्ने प्रारम्भिक वातावरणीय परिक्षणको सार्वजनिक सुचना च.नं. ०६८ ३/७५ को मिति २०६४/५/२२ गतेका दिन राप्ती नगरपालिकाको सुचना पाटीमा टाँसेको रोहवरमा राख्न आएको और यस आएको [illegible] मुचुल्कामा सही छाप गरि दियौं

तपसिल

चितवन राप्ती न.पा. १२ बस्ने वर्ष ४३ राम प्रसाद पौडेल
" " १२ बस्ने वर्ष ३६ आगम पुन
" " १२ बस्ने वर्ष ५० हुमाया पुन
" " ११ बस्ने वर्ष ३६ माया आपबुंगा
" " ११ बस्ने वर्ष ३२ निमा लामा

रोहवर

न.पा. सामाजिक परिचालक कपिला क्षेत्री
२०६४/५/२२

लिखितम हामी तपसिल बमोजिमका मानिस हरु आगे एसियाली विकास बैंकको आर्थिक सहयोगमा चितवन जिल्लाको रत्नानगर न.पा. अन्तर्गत वडा नं ६, ७, १०, ८, ११ तथा खैरहनी न.पा. १, ५ मा निर्माण हुन गइरहेको विरेन्द्र नगर सानो सहरी खानेपानी तथा सरसफाइ आयोजनाको प्रारम्भिक वातावरणीय परिक्षणको प्रतिवेदन तयार गर्न प्रारम्भिक वातावरणीय परिक्षणको सार्वजनिक सूचना च.नं. ०६८/२४५ को मिति २०६८/१/२२ गतेका दिन रत्ननगर नगरपालिकाको सूचना पाटीमा हाम्रो रोहबरमा टाँस भएको साँचो सत्य भए को मुचुल्कामा सही छाप गरि दियौं

तपसिल

जिल्ला चितवन रत्ननगर न.पा. ५ बस्ने वर्ष २६ को रणजीत देवकोटा

ऐ ऐ बस्ने वर्ष ५२ को इश्वर बाबु तिवारी

ऐ बस्ने वर्ष २० का किरणकुमार ढकाल

ऐ बस्ने वर्ष ३२ का टुलबहादुर लिम्बु

ऐ ऐ बस्ने वर्ष ३८ का कमल तिवारी

रोहबर

न.पा. कर्मचारी तीम राज भण्डारी

२०६८/१/२०

नेपाल सरकार
संघीय सामिला तथा स्थानीय विकास मन्त्रालय
जिल्ला विकास समितिको कार्यालय
भरतपुर, चितवन

च.सं.०७२/०७३
च.नं. १५२८

मिति : २०७३।२।१३

श्री तेस्रो साना शहरी खानेपानी तथा सरसफाइ आयोजना व्यवस्थापन कार्यालय
इटहरी,सुनसरी ।

विषय : राय सुझाव सम्बन्धमा ।

प्रस्तुत विषयमा मिति २०७३।१।२४ गतेको पत्रानुसार चितवन जिल्ला राप्ती नगरपालिका अन्तर्गत वडा नं. ६,९,१०,११ तथा खैरहनी नगरपालिकाको वडा नं. १५ मा निर्माण हुन गइरहेको विरेन्द्रनगर साना शहरी खानेपानी तथा सरसफाई आयोजनाको प्रारम्भिक वातावरणीय परिक्षण सम्बन्धी सुचना यस कार्यालयको सुचना पाटीमा टांस भई उक्त आयोजना संचालन कार्यले यस क्षेत्रको भौतिक, जैविक, सामाजिक एवं सास्कृतिक वातावरणमा कुनै असर नपर्ने र यस आयोजनाले त्यस क्षेत्रमा खानेपानीको दिर्घकालिन समस्या समाधान हुने भएकोले यस आयोजना छिटो कार्यान्वयनमा ल्याउन सम्बन्धित निकायलाई अनुरोध सहितको राय सुझाव साथ सिफारिस गरिन्छ ।

वातावरण, वन तथा जलवायु परिवर्तन
अधिकृत

नेपाल सरकार
वन तथा भू-संरक्षण मन्त्रालय
वन विभाग

जिल्ला वन कार्यालय, चितवन

फोन नं :- ०५६-५२०२१५
फ्याक्स नं :- ०५६-५२७५५७

प.सं :- २०७२/०७३ (विकास)
च.नं.:- 2426

मिति : २०७३।२।१५

विषय :- राय सुझाव सम्बन्धमा ।

श्री TAEC Consult P.Ltd.
इटहरी, सुनसरी ।

उपरोक्त सम्बन्धमा एसियाली विकास बैंकको आर्थिक सहयोगमा चितवन जिल्लाको राप्ती नगरपालिका अन्तर्गत वडा नं. ६, ९, १० र ११ तथा खैरहनी नगरपालिकाको वडा नं. १५ मा निर्माण हुन गईरहेको **विरेन्द्रनगर साना शहरी खानेपानी तथा सरसफाई आयोजना** को प्रारम्भिक वातावरणीय परीक्षणको प्रतिवेदन तयार गर्नुपर्ने भएकोले सो आयोजना वाट भौतिक, जैविक, सामाजिक, आर्थिक एवं सास्कृतिक प्रणालीहरुमा के कस्ता असरहरु पर्न सक्छन, सो बारे लिखित राय सुझावको साथै योजना कार्यान्वयन सिफारीस पत्र उपलब्ध गराईदिनु हुन मनी त्यस P.Ltd. को मिति २०७३।१।२४ को पत्र वाट लेखी आए बमोजिम यस कार्यालय अन्तर्गत अभिलेपानी ई.व.का का से.व.अ लाई लेखी पठाउदा निज वाट मिति २०७३।१।३१ मा यस कार्यालयमा प्राप्त राय सुझाव अनुसार आयोजना कार्यान्वयन वाट भौतिक, जैविक, सामाजिक, आर्थिक एवं सास्कृतिक प्रणालीहरुमा कुनै पनि नकारात्मक असर नपर्ने देखीएको व्यहोरा अनुरोध छ ।

३१।२।१७
सहायक वन अधिकृत

खैरहनी नगरपालिका कार्यालय

खैरहनी, चितवन फोन नं. : ०५६-५८२८८५

प.सं.०७२/७३
च.नं. ८९३

मिति :-२०७३/०१/२९

विषय :-राय सुझाव सम्बन्धमा ।

श्री तेस्रो साना शहरी खानेपानी तथा सरसफाई आयोजना व्यस्थापन कार्यालय

इटहरि ,सुनसरी

उपरोक्त विषयमा मिति २०७३/०१/२० को त्याहाको प्राप्त पत्र अनुसार चितवन जिल्ला को राप्ती न.पा. को वडा नं.६,९,र १०तथा खैरहनी न.पा. को वडा नं.१५ मा निर्माण हुन गईरहेको विरेन्द्रनगर साना शहरी खानेपानी तथा सरसफाई आयोजनाको प्रारम्भिक वातावरणिय परिक्षण सम्बन्धि सुचना यस खैरहनी न.पा.को सुचना पाटीमा टाँस गरि उक्त आयोजना संचालन कार्यले यस क्षेत्रको भौतिक, जैविक, सामाजिक, आर्थिक क्षेत्र लगायत अन्य क्षेत्रमा कुनै प्रकारको असर नपर्ने र यस खानेपानी योजना तथा सरसफाई बाट दिर्घकालिन समस्या समाधान हुने भएकोले यस आयोजना छिटो कार्यान्वयनमा ल्याउन सम्बन्धित निकाय लाई अनुरोध सहितको राय सुझाव प्रदान गरिन्छ ।

अमरनाथ ढकाल
नगर प्रमुख एवम् कार्यकारी अधिकृत

नेपाल सरकार
सङ्घीय मामिला तथा स्थानीय विकास मन्त्रालय

राप्ती नगरपालिका कार्यालय

हर्दी, भण्डारा, चितवन
फोनः ०५६-५५००१५, ५८२१००, ४०५१०१

पत्र संख्या
चलानी नं. १६४८

मितिः ०७३।१।२२

विषय :- सिफारिस गरिएको सम्बन्धमा

श्री जो जस संग सम्बन्ध राख्दछ

उपरोक्त विषयमा मिति २०७३।१।१० च.नं. ६२-३१५ को प्राप्त पत्रमा एसियाली विकास बैंकको आर्थिक सहयोगमा चितवन जिल्लाको राप्ती नगरपालिका अन्तर्गत वडा नं. ५,६,८,१०,११ तथा खैरहनी नगरपालिकाको वडा नं. १५ मा निर्माण हुन गइरहेको पिप्लेनगर आला सतही रुपले पानी तथा सरसफाई आयोजनाको प्रारम्भिक वातावरणीय परीक्षणको प्रतिवेदन तयार गर्न आयोजनाबाट भौतिक, जैविक, सामाजिक, आर्थिक एवं सांस्कृतिक प्रणालीहरूमा के-कस्ता असर पर्छ भनी पत्र आएको सम्बन्धमा सम्बन्धित राप्ती नगरपालिका वडा नं. ६,१०,११ मा २०७३।१।२१ गते टोल भेला गरी सो विषयमा छलफल गर्दा सो आयोजना संचालन गर्दा कुनै किसिमको भौतिक, जैविक, सामाजिक, आर्थिक एवं सांस्कृतिक प्रणालीमा कुनै असर नपर्ने गरि स्थानीय टोल भेलाले सर्वसम्मत निर्णय भइ आएको व्यहोरा अनुरोध गरी सो भेलाको छाया प्रति यसै साथ पठाएको व्यहोरा अनुरोध गरिन्छ।

संयुक्त वडा सचिव

Annex 5:
FOCUS GROUP DISCUSSION

आज मिति २०६२/ /१४ गते विरेन्द्रनगर तेस्रोशहरी खानेपानी सरसफाई योजना समिति का अध्यक्ष श्री राजेन्द्र प्रसाद वुलाकोटीको अध्यक्षतामा बैठक बसि विभिन्न शिर्षकहरुमाथि छलफल गरी निर्णय गरियो।

उपस्थिति!

१.	श्री राजेन्द्र प्र. वुलाकोटि	अध्यक्ष	
२.	श्री रामचन्द्र पाठक	उपाध्यक्ष	
३.	श्री सिर्जना शिवाकोटी(खरेल)	सचिव	
४.	श्री उमा गुरुङ	कोषाध्यक्ष	
५.	श्री मुरारि प्र. सिलवाल	सदस्य	
६.	श्री ओम प्रकाश सेढाइ	,,	
७.	शशि महता	,,	
८.	कमला सुनार	,,	
९.	रामभक्त काराखेती	,,	
१०.	श्री विजल डोब्ठ	(सामाजिक परिचालक)	

प्रस्तावहरु ! -

१. जग्गा खरिद गर्ने सम्बन्धमा
२. प्रतिनिधि खटाइने सम्बन्धमा
३. विविध

प्रस्ताव नं १ माथि छलफल गर्दा सालिक बड्हरा २ को राम ब. अर्यालको नाममा दर्ता रहेको कि. नं. ९६६ मध्येवाट -६-० ६ कठ्ठा जग्गा को रु ३६०००००/- (छतिस लाख रु) मा रजिस्टेसन पास गरी यस विरेन्द्रनगर तेस्रो शहरी खानेपानी तथा सरसफाइ समितिका नाममा गर्ने निर्णय गरियो।

प्रस्ताव नं २ माथि छलफल गर्दा जग्गा पास गर्नेको लागी यस संस्थाका उपाध्यक्ष श्री रामचन्द्र पाठकलाई

पछाडने निर्णय गरियो ।

बैठक नं ६ मिति: २०६२।८।२९

आजमिति २०६२।८।२९ गते वीरेन्द्रनगर खानेपानी को कार्यालयमा यस संस्थाको अध्यक्ष श्री राजेन्द्र प्रसाद बुर्लाकोटिको अध्यक्षतामा बसेको बैठकमा निम्न प्रस्तावहरूमाथि छलफल गरि निर्णय गरियो।

उपस्थिति:-

१. अध्यक्ष - श्री राजेन्द्र प्रसाद बुर्लाकोटि
२. उपाध्यक्ष - श्रीराम चन्द्र पाठक
३. सचिव - श्री सिर्जना खरेल
४. कोषाध्यक्ष - श्री अमा गुरुङ
५. सदस्य - श्री मुरारी प्र सिलवाल
" श्री ओमप्रकाश श्रेष्ठ
श्री रामपुकार पाठक
श्री पद्मराज बुर्लाकोटि
श्री शशी मह्तो
श्री कमला सुनार
श्री हिमला पाण्डे

सामाजिक परिचालक - श्री विजय श्रेष्ठ

प्रस्तावहरू:-

१. घरभाडा सम्बन्धमा
२. गोष्ठी सम्बन्धमा
३. जग्गा पास सम्बन्धमा
४. विविध

प्रस्ताव नं. १ माथी छलफल गर्दा अफिस घरभाडा २०६२ वैशाख १ गते देखि महिनाको १८ हजारको दरले दिने र २ वर्ष पछि १०% को दरले वृद्धि गर्नेगरी भाडा लिने निर्णय गरियो।

प्रस्ताव नं २ माथी छलफल गर्दा २०६२ पौष ३ गते शुक्रबार शान्तिभवनमा गर्ने सो विचार गोष्ठीमा यस

सुरक्षा निकाय होल समिति लाई पत्र परिचालन गर्ने निर्णय निर्णय गरियो।

प्रस्ताव नं ३ माथि छलफल गर्दा वीरेन्द्रनगर वडा नं ४ को रामबहादुर अयालको जग्गा छ कठ्ठा १० धुर प्रति कठ्ठा छलाख को दरमा किन्ने निर्णय गरियो।

प्रस्ताव नं ४ विविध (क) माथि छलफल गर्दा यस कार्यक्षेत्रभित्र पर्ने नयाँ घरधुरी हरूलाई पनी सदस्यता गरि फारम भर्ने निर्णय गरियो।

विविध (ख) माथि छलफल गर्दा यस संस्थाको साधारण सभा २०६२ पौष २० गते यसै कार्यालयमा बस्ने निर्णय गरियो।

ज.ध.प्र.पुर्जा नं.:-

भरतपुर चितवन

फोटो प्रमाणित गर्नेको दस्तखत

औठा छाप

दायाँ | बायाँ

जग्गाधनीको दस्तखत

जग्गाधनीको नाम थर :- विरेन्द्रनगर साना शहरी खानेपानी तथासरसफाइ उपभोक्त सं

ठेगाना :- जिल्ला:- चितवन गा.वि.स./न.पा.:- बिरेन्द्रनगर वडा नं.:- ३

:-

:-

नागरीकता /दर्ता नं. :- ३८१ मिति २०७२/०५/०४

कार्यालय :- सहकारी विभाग , चितवन

प्रमाण संकेत			गा.वि.स./ न.पा.	वडा नं/ नक्सा सिट	कित्ता नं.	विवरण (घर, आबादी, इत्यादि)	ज.ध.को हकहिस्सा	मोहीको नाम थर	किसिम वा वर्ग	क्षेत्रफल विगाहा/वर्गमीटर	रोठ/थाना नं.	कैफियत विवरण	अभिलेख गर्नेको दस्तखत
स.के.नं.	कारोबार व्यहोरा												
१७८	५१४०ग	२०७२/१०/११	बडहरा	२	१८५	आबादी	एकलौटी		खेत	०-०-०-०	३७		
	राजिनामा			५		रेकर निजि			अब्बल	२,०३१.७८	५१४०ग		

जम्मा क्षेत्रफल (व.मी.) २,०३१.७८

105BS002

प्रिन्ट गर्नेको दस्तखत :- _____

प्रिन्ट मिति :-२०७२/१०/११

रुजु गर्नेको दस्तखत :- _____

Annex 6:
SURVEY QUESTIONNAIRE

तेस्रो साना शहरी खानेपानी तथा सरसफाई क्षेत्रगत आयोजना

घरधुरी सर्वेक्षण प्रश्नावली

जिल्ला: नगरपालिका/गा.वि.स. वडा नं.
नगर आयोजना: घर नं.
अन्तरवार्ता लिनेको नाम: अन्तरवार्ता मिति:
सुपरिवेक्षकको नाम:

१. सामाजिक-आर्थिक विवरण

(उपयुक्त कोठामा (√) यो चिन्ह लगाउनु होस्)

१.१ अन्तरवार्ता दिनेको नाम
१.२ घरमुलिको नाम लिङ्ग: पुरुष ☐ महिला ☐ ☐
१.३ यस परिवारमा अपाङ्गता भएको कुनै सदस्य हुनु हुन्छ: छ ☐ छैन
१.४ जातजातिमध्ये कुन हो: क. आदिवासी जनजाति ☐ ख. दलित ☐ ग. अल्पसंख्यक ☐ घ. अन्य ☐
(अन्तर्वार्ता लिनेले थरको आधारमा उपयुक्त कोठामा चिन्ह लगाउने।)
१.५ अन्तरवार्ता दिने व्यक्तिको नाता ________
१.६ यस परिवारका सदस्यहरुको विवरण दिनुस्

क.सं.	घरमुलिसितको नाता/नाम	उमेर	लिङ्ग	शिक्षा स्तर	पेशा
१					
२					
३					
४					
५					
६					
७					
८					
९					

नोट: पेशा: १ कृषि २ व्यापार ३ नोकरी ४ उद्योगधन्दा
५. रेमिटेन्स (वैदेशिक रोजगार) ६. ज्याला ७. अन्य
शिक्षा: १ निरक्षर २ साक्षर ३ प्राथमिकसम्म ४ माध्यमिकसम्म ५. एस.एल.सी. उत्तीर्ण
६. आई.ए. ७. बि.ए. ८. एम.ए. ९. अन्य
१.७ यस परिवारमा बसोबास गर्ने अन्य सदस्यहरुको सहयोगी डेराबाल कुल संख्या
१.८ यस नगर क्षेत्रमा कहिले देखि बस्दै आउनु भएको छ? वर्ष
स्थवासी बसाइ सरेको बसाइ सरी आएको भए कुन जिल्लाबाट ________।
१.९ बसाइ सर्नुको कारण: प्राकृतिक प्रकोप व्यापार-व्यवसाय शिक्षा द्वन्द जिविकोपार्जन सामाजिक विस्थापन
१.१० कहिले देखि यस घरमा बस्दै आउनु भएको हो? साल/वर्ष
१.११ यो घर आफ्नै हो? हो होइन यदि हो भने हालको मूल्य कति होला अनुमानित रु.
ख) भाडामा बसेको हो होइन हो भने मासिक घर भाडा कति तिर्नुहुन्छ? रु.
ग) सुकुम्बासी हो होइन
१.१२ यस घरमा भान्छा कोठा बाहेक अन्य कति वटा कोठाहरु छन्?
१ कोठा २ कोठा ३ कोठा ४ कोठा वा सो भन्दा बढि
१.१३ घरको अवलोकन गरी घरको किसिम लेख्ने। पक्की अर्ध पक्की कच्ची
*(**पक्की**: छत ढलान, **अर्ध पक्की**: इटा ढुङ्गाको गारो, टीनको छाना, इटा-ब्लेट/सिमेन्टी गारो आदि, **कच्ची**: माटो गारो र खर/टायलले छाएको)*
१.१४ यस परिवारको जग्गा जमीन छ? छ छैन
यदि छ भने ५ रोपनी (०.२५ हेक्टर) भन्दा बढि वा ५ रोपनी भन्दा कम
१.१५ यहाँको जग्गाको किसिम: क. खेत वा बारी (अंसिचित जग्गा) ______ बिघा/रोपनी
ख. खेत वा बारी (सिंचित जग्गा) ______ बिघा/रोपनी
१.१६ यहाँले गाई/भैंसी पाल्नु भएकोछ? छ छैन छ भने कतिवटा? १-२वटा दुईवटा वा बढि
१.१७ तपाईंको परिवारमा तल उल्लेखित कुन कुन सामान छन्? (भएको सामानको संख्या लेख्ने)

क.सं	सम्पत्ती	संख्या	कैफियत
१	साइकल/रिक्सा		
२	मोटरसाइकल		
३	बैलगाडा		
४	कार/जिप		
५	मिनीबस/बस		
६	ट्रयाक्टर/ट्रक		
७	रेडियो/क्यासेट		
८	टेलिभिजन/भिडियोसेट		

९	स्टोभ / ग्यास चुलो		
१०	रेफ्रिजेटर		
११	वासिङ मेसिन		
१२	वाटर फिल्टर		
१३	कम्प्युटर		
१४	इमेल / इन्टरनेटको सुविधा		
१५	अन्य भए उल्लेख गर्ने ।		

१.१८ यदि मूल पेशा कृषि भए कति महिना खान पुग्छ: ३ महिना ☐ ६ महिना ☐ १२ महिना ☐ यदि नपुग भएमा कसरी धान्नु हुन्छ ?
पसल / घरभाडा ☐ नोकरी ☐ पेन्सन ☐ अन्य ☐

१.१९ तपाईंको परिवारको औसत मासिक खर्च कति छ उल्लेख गर्नुहोस ।

खर्चको शिर्षक र किसिम	मासिक खर्च रु	कैफियत
(क) कृषि तर्फ		
रसायनिक मल, बिउ, किटनाशक आदी खरिद गर्न		
माटोको तयारी, रोप्ने, गोड्ने, बाली काट्ने, भित्र्याउने, ढुवानी र बिक्री गर्दा हुने खर्च		
अन्य भए उल्लेख गर्नुस्	•	
(क) को जम्मा		
(ख) गैर कृषि तर्फ		
खाद्यान्न (अन्न र दैनिक उपभोग्य वस्तु)		
कपडा		
शिक्षा		
घर भाडा / घर मर्मत		
यातायात / संचार		
विद्युत		
पानी पोत / मर्मत सम्भार		
औषधि उपचार (पानीबाट हुने रोग)		वार्षिक खर्च
औषधि उपचार (अन्य रोग)		वार्षिक खर्च
अन्य: चाडपर्व कर्मकाण्ड संस्कार आदि उल्लेख गर्ने		वार्षिक खर्च
(ख) को जम्मा		
क+ख को कुल जम्मा		

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

आयस्रोत	संलग्न परिवार		प्राप्त हुने आय (रु. मासिक)	कैफियत
	पुरुष	महिला		
(क) कृषि तर्फ				
कृषि उत्पादनको बिक्रीबाट आय (मकै, गहुँ, धान, तरकारी, फलफूल)				
पशुजन्य उत्पादन (दुध, दही, घ्यू, मासु, अण्डा आदि)				
(क) को जम्मा				
(ख) गैर कृषि तर्फ				
नोकरी / जागिर				
ज्याला मजदुरी				
पेन्सन, उपदान आदि				
वैदेशिक रोजगार (रेमिट्यान्स)				
व्यापार / व्यवसाय				
उद्योग				
बहाल / घर भाडा				
गाडी / ढुवानी व्यवसाय				
अन्य भए उल्लेख गर्ने				
(ख) को जम्मा				
क+ख कुल जम्मा				

१.२५ यहाँको परिवारले कुनै कुनै ऋण लिनु परेको छ ? छ ☐ ☐

२ खानेपानी तथा सरसफाई व्यवस्थापन

२.१ तपाईंको परिवारका लागी खान, खाना पकाउन, नुहाउन, भाँडावर्तन तथा लुगा धुनका लागी प्रयोग गरिने पानीको स्रोत पुग्दो हो ?
हो ☐ होइन ☐

२.२ तपाईंको ☐ तपाईंको ☐ स्रोत कहाँ छ ? घर कम्पाउण्ड भित्र ☐ सार्वजनिक स्थलमा ☐

२.३ तपाईंको परिवारले पिउन, खाना पकाउनका लागी प्रयोग गर्ने पानीको स्रोत कुन हो ? दैनिक कति लिटर पानी खपत हुन्छ ? कृपया तलको कोठामा ✓ चिन्ह लगाउनुहोस् ।

क.सं.	वर्षायाममा	✓	लिटर/ दैनिक	सुख्खा याममा	✓	लिटर/ दैनिक
१	ईनार/कुवा (खुल्ला)	A		ईनार/कुवा (खुल्ला)	A	
२	ईनार/कुवा (ढक्कन भएको)	A		ईनार/कुवा (ढक्कन भएको)	A	
३	ट्युबेल हयाण्डपम्प	A		ट्युबेल हयाण्डपम्प	A	
४	डिप ट्युबेल	A		डिप ट्युबेल	A	
५	ईनार/कुवा मर्मोतले तान्ने	A		ईनार/कुवा मर्मोतले तान्ने	A	
६	सार्वजनिक धारा	A		सार्वजनिक धारा	A	
७	निजी धारा	A		निजी धारा	A	
८	मुल, खोला, नदी, पोखरी	A		मुल, खोला, नदी, पोखरी	A	
९	विक्रेतासंग पानी किनेर	A		विक्रेतासंग पानी किनेर	A	
१०	वर्षातको पानी संकलन गरेर	A		वर्षातको पानी संकलन गरेर	A	
११	अन्य	A		अन्य	A	
१२	थाहा छैन	A		थाहा छैन	A	

२.४ दैनिक खानेपानी आवश्यक पूर्ति पानी संकलनबारे निम्न विस्तृत विवरण दिनुहोस् ।

क.सं.	विवरण	वर्षा याममा				सुख्खा याममा			
		पुरुष	महिला	बालिका	बालक	पुरुष	महिला	बालिका	बालक
१	कति खेप/पटक								
२	लिटर/खेप								
३	कुल परिमाण								
४	पानी ल्याउन लाग्ने समय (मिनेट/ खेप								
	• पानीको मुहान सम्म पुग्न								
	• मुहानमा पर्खनु पर्ने समय								
	• फर्कदा लाग्ने समय								
५	प्रति खेप लाग्ने समय								

नोट : *अन्तर्वार्ता लिने व्यक्तिले पानीको भाँडो हेरी भाँडो अनुसार परिमाण यकिन गरि उल्लेख गर्ने ।*

२.५ भाँडा माझ्न, नुहाउन र लुगा धुन तथा अन्य कामका लागी कुन स्रोतको पानी प्रयोग गर्नुहुन्छ ? कति पानी खपत गर्नुहुन्छ? कृपया ☑ चिन्ह लगाउनुहोस् ।

क.सं.	वर्षायाममा	✓	लिटर/ दैनिक	सुख्खा याममा	✓	लिटर/ दैनिक
१	ईनार/कुवा खुल्ला	A		ईनार/कुवा खुल्ला	A	
२	ईनार/कुवा ढक्कन सहित	A		ईनार/कुवा ढक्कन सहित	A	
३	ट्युबेल हयाण्डपम्प सहित	A		ट्युबेल हयाण्डपम्प सहित	A	
४	डिप ट्युबेल	A		डिप ट्युबेल	A	
५	ईनार/कुवा मर्मोतबाट तान्ने	A		ईनार/कुवा मर्मोतबाट तान्ने	A	
६	सार्वजनिक धारा	A		सार्वजनिक धारा	A	

७	घरकै निजी धारा	Ȧ		घरकै निजी धारा	Ȧ	
८	मूल,खोला, नदी, पोखरी	Ȧ		मूल खोला, नदी, पोखरी	Ȧ	
९	पानी बिक्रेतासँग किनेर	Ȧ		पानी बिक्रेतासँग किनेर	Ȧ	
१०	आकाशे पानी संकलन गरेर	Ȧ		आकाशे पानी संकलन गरेर	Ȧ	
११	अन्य	Ȧ		अन्य	Ȧ	
१२	थाहा छैन	Ȧ		थाहा छैन	Ȧ	

२.६ लुगा धुन र नुहाउन घरबाट पानीको मुहान सम्म जान कति समय लाग्दछ । (यदि स्रोत/मुहान छुट्टाछुट्टै भएमा समय (मिनेटमा) उल्लेख गर्ने)

क) लुगा धुन जाने ☐ नुहाउन ☐ भाँडा माझ्न ☐

ख) वर्षायाममा लाग्ने समय ☐ मिनेट सुख्खा याममा लाग्ने समय ☐ घ

२.७ यदि धाराको पानी यहाँको आवश्यकता परिपूर्तिगर्न पर्याप्त छैन भने कसरी आपूर्ति गर्नु हुन्छ:

पानीको स्रोत	परिमाण लिटर	खर्चनु पर्ने समय (घण्टा) दैनिक	रुप खर्च मासिक
कुवा इनार			
आकाशे पानी संकलन			
निजी टैंकरबाट पानी किन्ने			
ह्याण्ड पम्प,ट्युबवेल			
मिनरल वाटर जार			
अन्य			

२.८ गाईवस्तुको लागि चाहिने पानी कुन स्रोतबाट कति मात्रामा उपयोग गर्नुहुन्छ ।

क) प्रयोग भएको स्रोत ____________

ख) परिमाण (लिटर/दैनिक) ____________

ग) स्रोतसम्म जान आउन लाग्ने समय (मिनेट) ____________

३. निजी धारा जडान

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

३.२ के तपाई आफ्नो घरमा धारा जोड्न चाहनु हुन्छ ? चाहन्छु ☐ चाहन्न ☐ चाहनु हुन्छ भने कस्तो प्रकार ☐ जडान गर्न इच्छा राख्नु हुन्छ ।

क) घरभित्र निजी धारा ☐

ख) कम्पाउण्डभित्र निजी धारा

ग) सामुदायिक धारा ☐ ☐

३.३ यदि तपाइको घरमा निजी धारा जडान भएको छैन भने, किन जडान नगरेको ?

क) खर्च गर्ने क्षमता नभएकोले ☐

ख) जडान शुल्क धेरै पर्ने भएकोले ☐

ग) मासिक पानी बिल धेरै आउने भएकोले ☐

घ) पानीको मात्रा पर्याप्त नभएकोले ☐

ङ) पानीको आपूर्ति नियमित नभएकोले ☐

च) यस ठाउमा पाइपलाइन जडान गर्ने व्यवस्था उपलब्ध नभएकोले ☐

छ) पानीको गुणस्तर राम्रो नभएकोले ☐

ज) अन्य कारण उल्लेख गर्ने ☐

झ) थाहा छैन ☐

३.४ हाल तपाईंले पानीको धारा बापत भएको महिनामा पानीको महशुल कति तिर्नु भयो ? रु ☐

३.५ गएको महिनामा तिरेको बिल देखाउन सक्नु हुन्छ । (बिल उपलब्ध भए योको विवरण भर्ने ☐

क) तिरेको रकम रु ☐ ख) खपत भएको पानीको मात्रा ☐ लिटर

३.६ पानीको बिल ☐ तिर्नुहुन्छ ☑ चिन्ह लगाउनुहोस् ☐

क) मासिक निश्चित तोकिएको रकम ☐

ख) मिटर रिडिङ अनुसार ☐

ग) धारामा अपनाइने भने छुट ☐

घ) तिर्नु पर्दैन ☐

ङ) अन्य ☐

च) थाहा छैन ☐

३.७ तपाईलाई पानीको बिल तिर्ने कुन तरिका मन पर्छ ☐

क) निश्चित तोकिएको मासिक शुल्क ☐

ख) मिटर रिडिङ बिल अनुसार ☐

३.८ घरको धारामा पानी नआउदा पनि पानी महशुल तिर्न पर्छ ? पर्छ ☐

३.९ निजी धाराको पानी बाहेक तपाईंले बाहिर बाट पानी किन्न पर्ने भएको ☐ ☐ ☐

वर्षायाममा लिटर ______ सुख्खायाममा लिटर ______ पर्दैन

३.१० निजीस्तरका ______ स्रोतबाट किन्दा कति पर्छ ______ दरमा पानी किन्नु भएको छ ।

लिटर ______ ______ प्रति लिटरको दर रु. ______

३.११ तपाइको घरमा धारा कति भरपर्दो छ ।

- क) पानी निरन्तर आउछ
- ख) पानी कहिले आउछ र कहिले आउदैन
- ग) पानी एक दिन बिराएर आउछ
- घ) पानी प्रत्येक दिन केही घण्टा आउछ

३.१२ खानेपानी वितरण प्रणाली अवरुद्ध हुदा मर्मत सम्भार गर्दा लाग्ने खर्च व्यहोर्न जिम्मा कसको हो ।

- क) नेपाल सरकार
- ख) खानेपानी उपभोक्ता सरसफाइ समिति
- ग) समुदाय / छर छिमेकी
- घ) अन्य उल्लेख गर्ने

३.१३ खानेपानीको पाइप धारा मर्मत सुधारको लागि वार्षिक कति रकम खर्च गर्नुहुन्छ । गर्छु ☐ गर्दिन ☐

३.१४ सार्वजनिक धारा प्रयोग गरे बापत पानी महशुल तिर्नु पर्छ ।

पर्दैन ☐ ☐ भने कति । रकम ______ मासिक वार्षिक

३.१५ पानीको गुणस्तर तपाइले प्रयोग गर्ने पानीको गुणस्तर ______ सन्तुष्ट हुनुहुन्छ छु ☐ छैन ☐

यदि छैन भने, पानीको गुणस्तर सम्बन्धि समस्या कस्ता छन् ।

- अ) पानी गन्हाउँछ
- आ) स्वाद नराम्रो छ
- इ) पानी प्रदुषित धमिलो छ
- ई) अन्य केहि समस्या भए उल्लेख गर्ने

३.१६ यसरी प्रयोग गर्ने पानीको गुणस्तर कायम गर्न के गर्नु हुन्छ ।

पानीको प्रशोधनका घरेलु विधि	थप खर्च मासिक
उमाल्ने	
फिल्टर गर्ने	
छान्ने	
क्लोरिन (पियुष, वाटरगार्ड, पोटास)	
घाम लगाई	
सोडिस	

सह-लगानी अवधारणा सम्बन्धी प्राथमिकता

४.१ यदि तपाईको नगरपालिका / गा.वि.स. मा विभिन्न योजना सञ्चालन गर्ने रकम उपलब्ध छ भने निम्नलिखित मध्ये कुन कुन योजनालाई पहिलो प्राथमिकता दिनुहुन्छ ।

- क) सडक बत्ती
- ख) कालोपत्रे सडक
- ग) विद्यालय
- घ) अस्पताल
- ङ) व्यवस्थित खानेपानी प्रणाली
- च) पैदलयात्री सडक
- छ) विद्युत
- ज) सञ्चार
- झ) सरसफाई सुविधा
- ञ) सिंचाई
- ट) पाटीपौवा धर्मशाला
- ठ) अन्य

४.२ यदि तपाईले व्यवस्थित खानेपानी वितरण प्रणालीलाई महत्वपूर्ण ठान्नु हुन्छ भने, कस्तो किसिमको खानेपानी वितरण प्रणालीको चाहना गर्नु भएको छ ।

- क) घर [illegible] व्यक्तिगत निजी धारा जडान
- ख) [illegible] सामुदायिक धारा जडान
- ग) [illegible] जडान
- घ) [illegible] जडान
- ङ) [illegible] सुधार आवश्यक छैन
- च) अन्य उल्लेख गर्नुहोस

४.३ यदि तपाइको घरमा धारा छैन र निजी धारा जडान इच्छुक हुनुहुन्छ भने, कति रकम सह-लगानी गर्न सक्नुहुन्छ । [illegible] रकमको सीमामा ☑ चिन्ह लगाउनुहोस ।

क्र.सं.	लगानीको विवरण	☑ चिन्ह लगाउने

१	१५००० भन्दा माथी	☐
२	९००१ देखि १५००० सम्म	☐
३	६००१ देखि ९००० सम्म	☐
४	३००१ देखि ६००० सम्म	☐
५	१५०१ देखि ३००० सम्म	☐
६	१५०० भन्दा कम	☐

४.४ निजी धारा जडान बापत लाग्ने शुल्क [illegible] पर्नेछ। मन्जुर छ ☐ मन्जुर छैन ☐

४.५ नयाँ खानेपानी योजना शुरु भएमा र सो योजनाबाट चौबिसै घण्टा पर्याप्त मात्रामा गुणस्तरयुक्त पानी उपलब्ध भएको खण्डमा के तपाईले आफ्नो घरमा धारा जडान गर्न इच्छुक हुनु हुन्छ? छ छैन

यदि इच्छुक भए नयाँ नियमानुसार मासिक पानी महशुल तिर्न ☐ सुभाउनु हुन्छ? ☐

छ ☐ छैन ☐ यदि इच्छुक हुनु हुन्छ भने तल दिईएको तालिकामा पानी महशुलको सीमामा ☑ चिन्ह लगाएर आफ्नो इच्छा व्यक्त गर्नुहोस ।

क्र.सं.	मासिक पानी महशुल	☑ चिन्ह लगाउने
१	रु ५०० भन्दा माथी	☐
२	रु ४५१ देखि ५००	☐
३	रु ४०१ देखि ४५०	☐
४	रु ३५१ देखि ४००	☐
५	रु ३०१ देखि ३५०	☐
६	रु २५१ देखि ३००	☐
७	रु २०१ देखि २५०	☐
८	रु १५१ देखि २००	☐

४.६ नयाँ खानेपानी वितरण प्रणालीको व्यवस्था हुन तपाईको परिवारबाट पनि प्रतिबद्धता स्वरुप अग्रिम रकम योगदान गर्नु पर्ने हुन्छ, यहाँको विचारमा कति प्रतिशत योगदान हुन सक्छ?

लागतको ५% ☐ १०% ☐ १५% ☐

४.७ नयाँ सरसफाइ सुविधा (सामुदायिक शौचालय तथा नाली) हरु निर्माणको लागि कुल लगानी स्वरुप १५% स्थानीय निकाय र उपभोक्ताले सहलगानी गर्न इच्छुक हुनुहुन्छ? छ ☐ छैन ☐

यदि चाहनुहुन्छ भने, कति सम्म? ☐ ☐

४.८ यहाँलाई नभई नहुने तथा भए राम्रो हुने प्राथमिक आवश्यकता कुन हो?

निजी धारा जडान ☐ निजी चर्पी निर्माण ☐ दुवै ☐

५.लैंङ्गिक दृष्टिकोणबाट महिला सहभागिता

आयोजनाको विभिन्न चरणमा महिला सहभागिता सम्बन्धि जानकारी संकलन गर्ने उद्देश्य घरधुरीमा, लक्षित समूह छलफलबाट र छुट्टै महिला समूहसँग सोध्ने प्रश्नहरु।

क) महिलाहरुको उपस्थिति र सहभागीता

५.१ आयोजनाकोबारेमा छलफल गर्न गरी बैठक बोलाइएको थियो ।

थियो ☐ थिएन ☐

५.२ के आयोजनाको छनौट गर्ने बैठकमा महिला उपभोक्ताहरुको उपस्थिति थियो ।

थियो ☐ थिएन ☐

यदि थियो भने महिला उपभोक्ताहरुको भूमिका कस्तो थियो ?

बोल्ने मात्र ☐ प्रश्नोत्तरात्मक ☐ निर्णायक ☐

५.३ [illegible] ☐ को [illegible] ☐ हरु खानेपानी उपभोक्ता ☐ [illegible]

समिति संस्था गठन भएको छ । छ ☐ छैन ☐

५.४ [illegible]

ख) लैङ्गिकताका आधारमा कार्य विभाजन

५.५ [illegible]

दैनिक कार्यतालिका

क.स.	घरायसि क्रियाकलापहरु	पुरुष	महिला	कुल समय
१	खानेपानी भर्ने, बोक्ने, भण्डारण र प्रयोग गर्ने			
२	खाना तयार गर्ने, भाँडा माझ्ने			
३	बालबालिका र वृद्धवृद्धाको स्याहार			
४	लुगा धुने घर सफा गर्ने			
५	खाद्यान्न भण्डारण तथा तयारी			
६	अन्य			

ग) पारिवारिक व्यवस्थापन, आय श्रोत र अन्य विषयमा महिलाहरुको नियन्त्रण र पहुँच

५.२ तलको तालिकामा उल्लेखित पारिवारिक विषय वा क्षेत्रहरुमा निर्णय गर्दा यहाँको घर परिवारमा महिला पुरुषको मनाइको सुनुवाई हुन्छ। उपयुक्त कोठामा ✓ चिन्ह लगाउनुस्

क.सं.	विषय वा कार्यक्षेत्रहरु	हुन्छ ✓	हुँदैन ✓
१	आर्थिक सरोकारका कुराहरु		
२	केटाकेटीको शिक्षा दिक्षा		
३	केटाकेटी र वृद्धवृद्धाको स्वास्थ्य र स्याहार		
४	अचल सम्पत्ति किनबेच (घर जग्गा)		
५	दैनिक क्रियाकलापहरु		
६	सामाजिक विधि व्यवहार, विवाह, व्रतबन्ध, चाडपर्व तथा सामाजिक/पारिवारिक सुसम्बन्धन आदि	*	
७	अन्य		

५.३ यहाँको परिवारमा पारिवारिक सम्पत्तिका निम्न विषयमा महिलाको पहुँच र स्वामित्व रहेको छ छैन तलको तालिकामा उपयुक्त कोठामा ✓ चिन्ह लगाउनुस्

क.सं.	विवरण	पहुँच	स्वामित्व
१	जग्गा जमिन		
२	घर तथा अन्य संरचनाहरु		
३	चल सम्पत्ति/संचित पैसा		
४	दैनिक क्रियाकलापहरु		
५	अन्य		

घ) खा.पा.उ.स.स. तथा समुदायमा महिलाको स्तर (हैसियत) (निम्न बुँदाहरु अन्तर्वार्ता लिने व्यक्तिले गरेका अवलोकनका आधार हुनेछ।)

क.सं.	विषय	उच्च	मध्यम	निम्न
१	आत्मसम्मानबोध			
२	आत्मविश्वास नेतृत्व सीप			
३	दायित्वबोध र क्षमता			
४	स्याकत, तर्क संगत, धैर्य र मेहनत			
५	अन्य			

६. सम विकासमा पहुँचका आधारमा सामाजिक समावेशी सहभागिता

आयोजनाको विभिन्न चरणमा गैरलाभान्वित विपन्न वर्गको, आदिवासी जनजाति, दलित तथा पछाडि परेका वर्गको समावेशी सहभागिता सम्बन्धि जानकारी संकलन गर्ने प्रत्येक घरधुरीमा, फोकस समूह छलफलबाट र छुट्टै महिला समूहसँग छलफल गर्दा सोध्ने प्रश्नहरु

क) आयोजना क्रियाकलापमा गैरलाभान्वित विपन्न वर्गहरु, जातजाति, दलित, अपाङ्गता भएको व्यक्तिको उपस्थिति

६.१ आयोजनाको बारेमा छलफल गर्ने कुनै भेला/बैठकमा समावेशी तवरले बोलाइएको थियो ?

थियो ☐ थिएन ☐

६.२ के आयोजनाको छनौट गर्ने बैठकमा समावेशीताको आधारमा सहभागिहरुको उपस्थिती थियो? थियो ☐ थिएन ☐

६.३ के खा.पा.उ.स.स.को गठनमा समावेशीता अंगीकार गरेको थियो? थियो ☐ थिएन ☐

ख) निर्णय प्रक्रियामा समावेशी प्रकृया अपनाएको थियो।

६.४ आयोजना छनौट गर्ने उपभोक्ताहरुको कस्तो भूमिका रहेको थियो

उच्च ☐ मध्यम ☐ निम्न ☐

६.५ [illegible]

[illegible] ☐ मध्यम ☐ निम्न ☐

७. स्वास्थ्य र सरसफाइ

क. खानेपानी

[illegible]

[illegible]

७.१ [illegible]

१.२ दात चिप्लिने, रंगीन

१.३ बिरामी बनाउने

१.४ अन्य (उल्लेख गर्ने)

२ के तपाईंलाई पानी भर्ने र राख्ने भाँडा पानी भर्नु र भण्डार गर्नु पूर्व सफा गर्नु पर्ने लाग्छ ? छ ☐ छैन ☐

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

खाली पानी माझ्ने ☐ खरानीले माझ्ने ☐ धुलो, पिठो र पानीले ☐

साबुन पानीले ☐ अन्य (उल्लेख गर्नुस्) ____

३ तपाईं घरमा पानी कसरी राख्नु हुन्छ ?

(एक भन्दा बढी उत्तर आउन सक्ने)

३.१ पानी भर्नु पहिले भाँडा सफा गर्ने ☐

३.२ बासी पानी फ्याँक्ने ☐

३.३ पानी राख्ने भाँडो राम्रोसंग ढाकेर छोपेर राख्ने ☐

३.४ अन्य (उल्लेख गर्ने) ☐

४ तपाईं गाग्रो वा घैंटोबाट पानी कसरी निकाल्नुहुन्छ ?

४.१ पानी सार्नु अघि अम्खोरा, लोटा, करुवा, मग धोएर ☐

४.२ गिलास, मग, कप गाग्रीमा डुबाएर ☐

४.३ गाग्रोबाट लोटा, अम्खोरा, करुवा, गिलासमा पानी सारेर ☐

४.४ अन्य (उल्लेख गर्ने) ☐

ख. चर्पी

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

१.१ बृद्ध, बालक तथा बिरामीलाई सुविधा ☐

१.२ घर तथा वातावरण सफा हुने ☐

१.३ गोप्यता हुने ☐

१.४ रोगबाट बचावट हुने ☐

१.५ अन्य (उल्लेख गर्ने) ____

२ के तपाईंलाई दिसाबाट रोग सर्छ भन्ने लाग्छ ? ☐ लाग्छ ☐ लाग्दैन

यदि लाग्छ भने, मानिसको दिसाबाट सर्ने रोगहरुको नाम भन्नुहोस् ?

३ के तपाईंको घरमा चर्पी छ ? छ ☐ छैन ☐

३.१ यदि छ भने, कस्तो प्रकारको चर्पी छ ? ☐

१ खाल्डे चर्पी

२ भेन्टिलेटेड खाल्डे चर्पी

३ वाटर सिल - पोर फ्लस

४ सिस्टर्न फ्लस

५ अन्य

२ यदि छ भने, तपाईंको घरमा चर्पी कसकसले प्रयोग गर्नुहुन्छ ? ☐

(१. सबैले, २. वयस्क बालक सबैले ३. वयस्क ४ ठूलाले मात्रै ५. बिरामी मात्रैले)

३.३ यदि छैन भने, किन चर्पी नबनाउनु भएको हो ? ☐

(क. बनाउने तरिका थाहा नभएर, ख. लगानी गर्न नसकेर, ग. खुल्ला मैदानमा दिसा गर्न बानी भएर, घ. जग्गाको अभावले ङ. अन्य उल्लेख गर्ने)

३.४ यदि छैन भने, दिसा गर्न कहाँ जानुहुन्छ ? ☐

(क. खोला, जङ्गल, किनार ख. खुल्ला मैदान, ठाउँ ग. घर नजिक खेत घ. जहाँ सजिलो हुन्छ)

३.५ यदि छैन भने, चर्पी बनाउन कति लगानी गर्न सक्नु हुन्छ ? रु ☐

ग. खानेकुराको सरसफाइ

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

१.१ पकाएको खाना छोपेर, ढाकेर राख्ने ☐

१.२ बासी खाना नखाई फालिदिने ☐

१.३ काँचै खाइने खानेकुरा राम्रोसँग पखालेर [illegible] मात्र खाने ☐

१.४ हात गोडा सफा गरेर मात्र भान्साघरमा पसेर ☐

१.५ ताजा तातो खाना पकाउने ☐

१.६ डाडु पन्यु, थाल, कचौरा [illegible] सफा गरेर मात्र खाना पस्केर खाने ☐

१.७ [illegible] फोहोर [illegible] भाँडा [illegible] सफा राख्ने ☐

१.८ [illegible] बासी [illegible] फलफूल तरकारी [illegible] ☐

२ के तपाईं खानेकुरा छोपेर, ढाकेर राख्नुहुन्छ ? राख्छु ☐ राख्दिन ☐

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

२.१ धुलो, मैला, झिंगा, साङ्ला, किरा आदि हानिकारक जीवजन्तुहरुबाट बचावट ☐

२.२ सफा, सुग्घर, स्वास्थ्य [illegible] ☐

२.३ खाद्य प्रदूषणबाट हुने रोगबाट रक्षा ☐

२.४ अन्य (उल्लेख गर्ने) ....

जीवनजल बनाउने तरिका जान्नु हुन्छ कि हुन्न सोध्ने, यदि आफ्नो तरिकाले जीवनजल बनाउने । जीवनजल बनाउने सही तरिका निम्नअनुसारको छ ।
१ पहिला साबुन पानीले हात सफा गर्ने, २ चिया गिलासको ६ गिलास (एक लिटर) पानी एउटा सफा भाँडामा हाल्ने (यदि पानी उमालेको भएमा सेलाउन दिने, ३ जीवनजलको एक प्याकेटभित्र भएको धुलो पुरै पानीमा हाली पानीलाई राम्ररी चलाएर धुलोलाई घुल्न दिने ।

घ व्यक्तिगत सरसफाइ

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

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

२ तपाई र परिवारका अन्य सदस्यले के ले हात धुनुहुन्छ । धुनेमा यस्तो (✓) चिन्ह लगाउनुहोस् र नधुनेमा यस्तो (×) चिन्ह लगाउनुहोस ।

क्र. सं.	क्रियाकलाप	५ वर्ष मुनिका बालबालिका		महिला		पुरुष	
		धुने (✓)	नधुने (×)	धुने (✓)	नधुने (×)	धुने (✓)	नधुने (×)
१	पानी मात्रै						
२	खरानी पानी						
३	माटो पिठो पानी						
४	साबुन पानी						
५	अन्य (उल्लेख गर्ने)						
जम्मा							

३ तपाई र परिवारका अन्य सदस्यले कहिले कहिले नुहाउनुहुन्छ

नुहाउने भए यस्तो (✓) चिन्ह लगाउनुहोस र ननुहाउने भए यस्तो (×) चिन्ह लगाउनुहोस ।

क्र.स.	क्रियाकलाप	बालबालिका	महिला	पुरुष
		(✓) (×)	(✓) (×)	(✓) (×)
१	प्रत्येक दिन			
२	एक दिन बिराएर			
३	हप्तामा २ पटक			
४	हप्तामा १ पटक			
५	२ हप्तामा १ पटक			
६	महिनामा एक पटक			
जम्मा				

ङ फोहर मैला व्यवस्थापन

१ तपाईको घरबाट निस्कने ठोस फोहर मैला कहा विसर्जन गर्नुहुन्छ ।

१.१ घर नजिकको खाल्डोमा ....

१.२ निजी फोहर संकलनकर्तालाई दिने ....

१.३ गा.वि.स. नगरपालिकाले व्यवस्था गरेको खाल्डो वा कन्टेनर ....

१.४ अन्य (उल्लेख गर्ने) ....

२ ठोस तथा तरल फोहर वस्तुलाई अव्यवस्थित तरिकाले विसर्जन गर्नाले हुने नराम्रा असरहरु के के हुन । (एक भन्दा बढी उत्तर आउन सक्ने)

२.१ फोहोर वातावरणमा वृद्धि ....

२.२ लामखुट्टे, झिंगा, [illegible] वृद्धि ....

२.३ रोग व्याधिमा वृद्धि

२.४ अन्य (उल्लेख गर्ने)

३ तपाईंको घरबाट निस्कने फोहोर पानी कहाँ विसर्जन गर्नुहुन्छ ?

३.१ खाल्डोमा/व्यवस्थित ढलमा

३.२ तरकारी बारीमा/करेसा बारीमा

३.३ सार्वजनिक ढलमा

३.४ अन्य (उल्लेख गर्ने)

ख वस्तुभाउको फोहर व्यवस्थापन

१ के तपाईंले वस्तुभाउ पाल्नु भएको छ ? छ छैन

(यदि छैन भने पानी जन्य सरुवा रोगमा जाने)

यदि छ भने कुन कुन प्रकारका छन् र तिनीहरुलाई कहाँ राख्नु हुन्छ ।

क्र.सं	वस्तुभाउको प्रकार	घरभित्रै राख्ने	बाहिर छुट्टै गोठमा राख्ने
१	गाई, भैंसी		
२	बंगुर/सुंगुर		
३	बाख्रा		
४	कुखुरा, हाँस		
५	अन्य		

२ वस्तुभाउबाट निस्कने फोहोर कहाँ र कसरी विसर्जन गर्नुहुन्छ ?

२.१ मलखाडमा

२.२ आगो बाल्ने गुइँठा बनाउने

२.३ गोबर ग्यास प्लान्टमा प्रयोग गर्ने

२.४ अन्य (उल्लेख गर्ने)

३ वस्तुभाउको फोहोर मैलाको जथाभावि अव्यवस्थित तवरले विसर्जन गर्दा हुने खराब असरहरु के के हुन् ? (एक भन्दा बढी उत्तर आउन सक्ने)

३.१ वातावरणी फोहोरमा वृद्धि हुने

३.२ लामखुट्टे, झिंगा, किराहरुको वृद्धि हुने

३.३ रोगव्याधि बढ्ने तथा सर्ने

३.४ गाउँ, छरछिमेक तथा नगर अशोभनिय देखिने

३.५ अन्य (उल्लेख गर्ने)

छ पानीजन्य सरुवा रोगहरु

१ पानीजन्य सरुवा रोगको कारणहरु के के हुन् ? (एक भन्दा बढी उत्तर आउन सक्ने)

१.१ दूषित पानी प्रयोग गर्दा

१.२ दूषित खाना खाँदा

१.३ घर तथा सार्वजनिक स्थलमा फोहर बढ्दाले

१.४ मानिसको मलमूत्र जथाभावी फाल्दा गर्दा

१.५ फोहर मैला जथाभावी फाल्दा गर्दा

१.६ स्वास्थ्य शिक्षा तथा स्वस्थ बानीको अभाव

१.७ सरसफाई र स्वास्थ्य सम्बन्धी ज्ञान र चेतनाको अभावले

१.८ अन्य

२ तपाईंको परिवारमा कोही बिरामी पर्दा के गर्नुहुन्छ (प्राथमिकता अनुसार नम्बर लेख्ने)

२.१ घरायसी उपचार गर्ने

२.२ धामी, झाँक्री, पुजारी कहाँ जाने

२.३ औषधि पसलमा जाने

२.४ स्वास्थ्य चौकि वा अस्पतालमा जाने

२.५ अन्य (उल्लेख गर्ने)

३ यदि परिवारमा कसैलाई झाडापखाला लागेमा के गर्नुहुन्छ ? (प्राथमिकता अनुसार नम्बर लेख्ने)

३.१ जीवनजल खुवाउने

३.२ घरायसी उपचार गर्ने

३.३ धामी, झाँक्री वा पुजारी कहाँ जाने

३.४ औषधि पसलमा जाने

३.५ स्वास्थ्य चौकि वा अस्पतालमा जाने

३.६ अन्य (उल्लेख गर्ने)

४ [illegible] परिवारमा [illegible] कुन कुन रोगबाट बिरामी भए [illegible] को विवरण

५ तपाईंको परिवारमा पानीजन्य निम्नलिखित सरुवा रोगबाट कोही बिरामी परेको [illegible] संख्या उल्लेख गर्नुस

क्र. सं	रोग	५ वर्ष मुनिका बालबालिका	महिला	पुरुष	वार्षिक खर्च रु
१	झाडापखाला				
२	आउँ				
३	पखा				
४	टाइफाईड				
५	हैजा				
६	छाला सम्बन्धी रोग				
७	औलोरोग (मलेरिया)				
८	कमलपित्त (जण्डिस)				
९	अन्य				
	जम्मा				

६ गत एक वर्षभित्र तपाईको परिवारमा कोही झाडा पखाला तथा पानीजन्य अन्य सरुवा रोगहरुबाट ग्रसित भएको छ ? (भएमा)

रोग	५ वर्ष मुनिका बालबालिका	महिला	पुरुष
झाडा पखाला			
आउँ			
पानीजन्य अन्य सरुवा रोगहरु			
जम्मा			

७ गत एक वर्षभित्र तपाईको परिवारका सदस्यलाई झाडापखाला र पानीजन्य अन्य सरुवा रोगहरुको उपचारमा कति रकम खर्च गर्नु भयो ?

रोग	खर्च रकम (रु.मा)			
	२००० भन्दा	२००१-३०००	३००१-५०००	५००० भन्दा माथि
झाडापखाला				
पानीजन्य अन्य सरुवा रोगहरु				
जम्मा				

सहयोगका लागी धन्यवाद ।

ANNEX 7:
CHLORINE USE GUIDELINES

CHLORINE GUIDELINE VALUE

In humans and animals exposed to chlorine in drinking-water, specific adverse treatment related effects have not been observed.

Chlorine in drinking water is safe for consumption .The small amount of chlorine typically used to disinfect water does not pose risks to human health. The World Health Organization (WHO) has established a guideline value of 5 mg/L for chlorine in drinking water, meaning that such concentrations are considered acceptable for lifelong human consumption. Furthermore, WHO concludes that this value is "conservative," as no adverse effects from chlorine in drinking water were observed in studies reviewed by WHO.

Guideline values for chlorine WHO Guidelines for drinking water quality (2004)

Chlorine	**below 5 milligrams per liter (mg/L)***

*For effective disinfection, there should be a residual concentration of free chlorine of 0.5 mg/L after at least 30 min contact time at pH<8.0

Chlorination does not harm aquatic environments

Chlorinated drinking water is unlikely to be harmful when discharged into aquatic environments. An extensive risk assessment conducted under European Union guidelines examined potential harm from various processes to make drinking water using sodium hypochlorite. This assessment found no significant environmental risks from chlorine or byproducts formed during drinking water chlorination. The DBPs formed in drinking water depend on the nature and quantity of organic matter present as well as on the disinfectant and other treatments used. In drinking water the principal byproducts are trihalomethanes (THMs; mainly chloroform) and halo-acetic acids (HAAs), with smaller amounts of other byproducts. Direct 'whole effluent' experiments representing various uses, including drinking water, have shown that no significant amounts of persistent and potentially bio-accumulative substances are formed. Toxicity tests on these mixtures demonstrated that the presence of DBPs did not increase the toxicity.

A major concern from the past was the formation of some highly-chlorinated, high-hazard molecules, such as dioxins, resulting from chlorine used in paper pulp bleaching. However, dioxins were only formed from 'active chlorine' under specific conditions: acid pH and in the presence of certain phenols such as those abundant in the lignin component of wood. There is no significant formation of dioxins or other high-hazard molecules at neutral or alkaline pH. All current uses of 'active chlorine' for microbial control and cleaning take place at alkaline or neutral pH.

ANNEX 8:
WATER QUALITY TEST

E-mail:crwqti@gmail.com

Government of Nepal
Ministry of Urban Development
Department of Water Supply and Sewerage

Water Supply & Sanitation Division Office
Central Regional Water Quality Testing Laboratory
Bharatpur, Chitawan

WATER QUALITY TEST REPORT

Name of Client:- Third Small Town Water Supply and Sanitation Sector Project
Sample Code:- WL-62
Sampled By:- Client
Date of Collection:- 2072/12/18
Source of Sample: Deep boring
Type of Sample: Drinking Water
Date of Completion:- 2072/12/26
Location : Birendranagar Chitwan

S.No.	Category	Parameters	Observed Values	NDWQS, 2062 BS	Analyzed Methods
1	Physical	Turbidity (NTU)	0.3	5(10)	Nephelometric
2		Temp. °c	-	-	Thermometric
3		pH	6.7	6.5 - 8.5 *	Electrometric
4		Taste and Odor	N.O.	Non-objectionable	-
5		TDS (mg/L)	118	1000	Instrumental
6		Electrical Conductivity (µs/cm)	331	1500	Instrumental
7	Chemical	Iron (mg/L)	<0.2	0.3 (3)	Phenanthroline method
8		Manganese (mg/L)	<0.2	0.2	Persulfate method
9		Arsenic (mg/L)	<0.01	0.05	Digital Arsenator
10		Ammonia (mg/L)	<0.2	.5	Nesselarization
11		Nitrate (mg/L)	24	50	UV Spectrophotometric Screening
12		Fluoride (mg/L)	<0.2	0.5-1.5*	SPADNS Colourimetric
13		Chloride (mg/L)	29	250	ArgentometricTitration
14		Total Hardness (mg/L as $CaCO_3$)	124	500	EDTA Titrimetric
15		Calcium (mg/L)	58	200	EDTA Titrimetric
16		Residual Chlorine (mg/L)	0	0.1-0.2*	Chlorine Comparator
17	Microbiological	Faecal coliform *E.coli*(CFU/100 ml)	0	0	Membrane Filtration
18		Total Coliform (CFU/100ml)	7	0 in 95% samples	Membrane Filtration

** These values show lower and upper limits*
( ) Values in parentheses refer the acceptable values only when alternative is not available

Note: - The entire test was conducted as per the National Drinking Water Quality Guide Line 2062BS (MPPW/GovN)

Comment:
Except Total Coliform other obtained results are within the range of National Drinking Water Quality Standard 2005(NDWQS).

Analyzed By:

Approved By