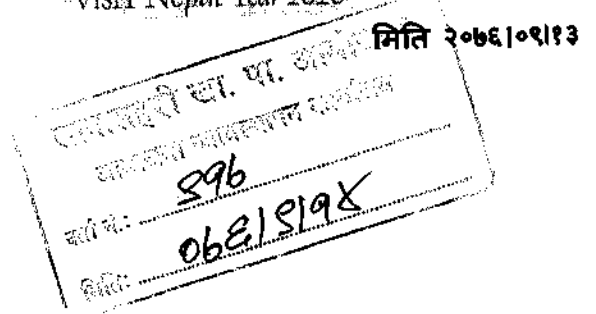




नेपाल सरकार
खानेपानी मन्त्रालय
सिंहदरबार, काठमाडौं

पत्र संख्या:- ०६६/०६६
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सिंहदरबार,
काठमाडौं, नेपाल ।
VISIT Nepal Year 2020



श्री सहरी खानेपानी तथा सरसफाइ (क्षेत्रगत) आयोजना,
पानीपोखरी, काठमाडौं ।

विषय : प्रारम्भिक वातावरणीय परीक्षण (IEE) प्रतिवेदन स्वीकृती सम्बन्धमा ।

प्रस्तुत विषयमा तहां विभाग मार्फत स्वीकृतिका लागि यस मन्त्रालयमा प्राप्त भएको सहरी खानेपानी तथा सरसफाइ (क्षेत्रगत) आयोजना, प्रस्तावक रहेको शुभाघाट, नगर सहरी खानेपानी तथा सरसफाइ आयोजना (सुर्खेत) को परिमार्जित प्रारम्भिक वातावरणीय परीक्षण (IEE) प्रतिवेदन नेपाल सरकार (सचिवस्तर) को मिति २०६६/०९/११ को निर्णयानुसार स्वीकृत भएको व्यहोरा निर्देशानुसार अनुरोध छ ।

(मधुसुदन खनास)
ईन्जिनियर

बोधार्थ :

श्री खानेपानी तथा ढल व्यवस्थापन विभाग,
पानीपोखरी, काठमाडौं ।

संलग्न :

स्वीकृत प्रारम्भिक वातावरणीय परीक्षण (IEE) प्रतिवेदन २ प्रति ।

काठमाडौं विभाग
सचिव
२०६६/०९/१८



Government of Nepal

Ministry of Water Supply

Department of Water Supply and Sewerage Management

Urban Water Supply & Sanitation Sector Project

Project Management Office

Panipokhari, Maharajgunj, Kathmandu

Initial Environmental Examination (IEE)

of

Subhaghat Urban Water Supply and Sanitation Project

Gurbhakot Municipality, Surkhet

Karnali Province



Submitted To
Ministry of Water Supply
Singhadurbar, Kathmandu

Submitted By
Project Management Office
Urban Water Supply and Sanitation Sector Project
Department of Water Supply and Sewerage Management
Panipokhari, Kathmandu

Prepared By
BDA/PEA JV
Kamaladi, Kathmandu



Building Design Authority (P.) Ltd.

Architectural, Engineering & Planning Consultants

G.P.O. Box: 2082, Kamaladi, Kathmandu, Nepal
Tel.: 4-227393 / 4-246209 / 4-247796 / 4-247639
Fax: 977-01-4223636, E-mail: bda@bda.com.np

Plush Engineers & Architects

Engineering & Architectural Design, Project Planning
& Evaluation, Socio Economic Survey etc.

P.O. Box: 2082, Kamaladi, Kathmandu
Tel.: 4242728, 4227303, 4247939, 4245200



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November 2019

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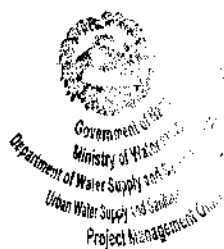
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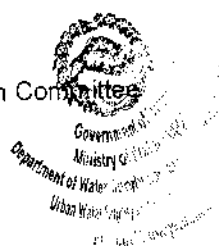
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ACRONYMS

ADB	Asian Development Bank
DCC	District Coordination Committee
DED	Detailed Engineering Design
DRTAC	Design Review and Technical Audit Consultant
DSC	Design and Supervision Consultant
DSMC	Design, Supervision and Management Consultant
DWSSM	Department of Water Supply and Sewerage Management
EARF	Environmental Assessment and Review Framework
EIA	Environment Impact Assessment
EMP	Environment Management Plan
EMR	Environmental Monitoring Report
EPA	Environment Protection Act
EPR	Environment Protection Rules
ESA	Environmental Safeguard Assistant
ESE	Environmental Safeguard Expert
GoN	Government of Nepal
GRM	Grievance Redress Mechanism
HDPE	High Density Polyethylene
HHs	Households
ICG	Implementation Core Group
IEE	Initial Environmental Examination
LPCD	Liter Per Capita Per Day
MoFE	Ministry of Forests and Environment
MoWS	Ministry of Water Supply
NDWQS	National Drinking Water Quality Standard
NPR	Nepalese Rupees
PMO	Project Management Office
PMQAC	Project Management and Quality Assurance Consultant
REA	Rapid environmental assessment
ROW	Right of way
RPMO	Regional Project Management Office
SDG	Sustainable Development Goal
SEMP	Site-specific environmental management plan
SPS	Safeguard Policy Statement
TDF	Town Development Fund
ToR	Terms of Reference
TPO	Town Project Office
UWSSP	Urban Water Supply and Sanitation Sector Project
VDC	Village Development Committee
WHO	World Health Organization
WTP	Water Treatment Plant
WUSC	Water Users and Sanitation Committee

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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




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कार्यकारी सारांश

पृष्ठभूमि

यस प्रस्तावित आयोजनाका प्रस्तावक शहरी खानेपानी तथा सरसफाई आयोजनाको आयोजना व्यवस्थापन कार्यालय हो । यो कार्यालय खानेपानी तथा ढल व्यवस्थापन विभाग (खा.पा.त.ढ.व्य.वि.) अन्तर्गत पर्दछ । यो आयोजना साना शहर र नगरोन्मुख बस्तिहरूको खानेपानी तथा सरसफाई सेवा सुधारमा केन्द्रित रहेको छ । यो आयोजना समुदायको आवश्यकता अनुसारको माग र सोका लागि समुदायकै सक्रिय सहभागिता र व्यवस्थापनको सिद्धान्तमा आधारित छ । यस आयोजनाबाट कर्णाली प्रदेशको सुर्खेत जिल्लाको गुर्भाकोट नगरपालिकाका वडा नं. ६, ७, ८ र ९ का बासिन्दा लाभान्वित हुनेछन् । सरसफाई अन्तर्गत अस्थायी चर्पी भएका अति विपन्न वर्गका घरधुरीहरूलाई ओ.बि.ए. कार्यक्रम मार्फत सहयोग प्रदान गर्ने कार्यक्रम पनि रहेको छ । उपभोक्ता समितिले यस आयोजनाको कूल लागतको ५% अप-फ्रन्ट क्यासको रुपमा जम्मा गर्नुपर्ने छ भने २५% रकम नगर विकास कोषबाट ऋण लिने छ, र ७०% रकम आयोजनाले लगानी गर्नेछ ।

प्रारम्भिक वातावरणीय परीक्षणको उद्देश्य

यस प्रारम्भिक वातावरणीय परीक्षणको मूल उद्देश्य भनेको यस आयोजनाका कार्यहरूबाट वातावरणमा पर्न सक्ने नकारात्मक असरहरूको पहिचान गरी ती असरहरूलाई न्यून गर्नु, निर्मूल गर्नु वा ऐनको स्वीकार्य सिमामा ल्याउन आवश्यक र उपयोगी उपाय तथा सुझावहरू योजनाबद्ध रुपमा दिनु हो ।

नेपाल सरकारका ऐन तथा कानून, र ए. डि. बि. बै.को नीति

नेपाल राष्ट्रको प्रचलित कानून, नियम तथा एशियाली विकास बैंकको नीति अनुसार कुनै पनि विकासको योजना तथा निर्णय प्रक्रियामा वातावरणीय असरहरू बारे ध्यान पुर्‍याउनु पर्ने हुन्छ । नेपाल सरकारको कानूनी प्रक्रिया अनुसार यो प्रस्तावित परियोजनाले वातावरण संरक्षण ऐन, २०५३ र वातावरण संरक्षण नियमावली, २०५४ को पालना गर्नुपर्ने हुन्छ । यो प्रारम्भिक वातावरणीय परीक्षण प्रतिवेदन वातावरण संरक्षण नियमावली (२०५४) को अनुसूची १ को आवश्यकता बमोजिम तयार गरिएको छ ।

एशियाली विकास बैंकको सुरक्षण नीति कथन (जुन २००९) अनुसार यो परियोजना श्रेणी “बी” मा पर्दछ र एशियाली विकास बैंकको निर्देशिका अनुसार समेत यो प्रारम्भिक वातावरणीय परीक्षण गरिएको छ ।

अध्ययन विधि

खानेपानी मन्त्रालयद्वारा मिति २०७५/०७/२९ स्वीकृत कार्यसूची (टी.ओ.आर.) का आधारमा यो प्रतिवेदन तयार गरिएको छ । यस अध्ययनले वातावरण संरक्षण ऐन (२०५३) तथा वातावरणय संरक्षण नियमावली (२०५४), र साथ साथै एशियाली विकास बैंकको सुरक्षण नीति कथन (जुन २००९) का प्रावधान, विधि तथा व्याख्याहरूको पालना गरेको छ । यस अध्ययनका सिलसिलामा प्रतिवेदन अध्ययन, फिल्ड अध्ययन, संकलित तथ्यहरूको विश्लेषण तथा सूचना संप्रेषण तथा सार्वजनिक सहभागिताका क्रियाकलापहरू गरिएका छन् । सार्वजनिक सूचना प्रकाशन, सूचना टाँसको मुचुल्का र सार्वजनिक छलफल गरी सरोकारवालाहरू का सुझावहरू प्रतिवेदनमा उल्लेख गरिएको छ । भौतिक वातावरणीय अवयवहरू, जैविक वातावरणको पक्षहरू तथा सामाजिक-आर्थिक अवस्थाहरूको सुक्ष्म रूपमा अध्ययन गरी स्थानीय सरोकारवालाहरू नित आयोजना कार्यान्वयन गर्दा हुन सक्ने सकारात्मक र नकारात्मक

Ministry of Water Supply and Sanitation
Subhaghat, Kailali

Engineer

Ministry of Water Supply and Sanitation
Subhaghat Project and Sanitation
Project Management Centre

प्रभावहरूका बारेमा छलफल गरिएको छ । यी अध्ययन विशेषत आयोजनाको प्रत्यक्ष रूपमा निर्माणका काम हुने ठाउँहरू - प्रत्यक्ष असर पर्ने क्षेत्र र त्यसको वरिपरि नजिकको क्षेत्रमा गरिएको छ ।

आयोजनाका मुख्य संरचनाहरू

प्रस्तावित शुभघाट खानेपानी तथा सरसफाई आयोजना सतही (सब-सर्फेस) जलस्रोतमा आधारित प्रणाली हो । यसका दुईवटा कम्पोनेन्टहरू छन्: खानेपानी वितरण र सरसफाई । खानेपानी वितरण अन्तर्गत सम्प वेल, प्रसोधन प्रणाली, पानी भण्डारण ट्याङ्की निर्माण, वितरण प्रणालीको निर्माण, पाईप विछ्याउने कार्य, घरधारा जडान एवं कार्यालय भवन निर्माणका कार्यहरू हुनेछन् । यस आयोजनाबाट वडा नं. ६ का सानो नक्कले, ठूलो नक्कली, बडा खोली, कपासे, गैले, सातमूले, तातापानी, निमारे, तोरी बारी, जाकोटे; त्यसै गरी वडा नं. ७ का कुप्ची, चिसी, खोली, श्रीवानी, गोकुलपुर, मानिके, नैधी; र वडा नं. ८ का पवित्रा बजार, खटाङ्ग, सुन्दर खाली, गँगटे, सिमाना टोल, कुमालपानी, पुलचोक, घरीघरे टोल, बादी समुदाय टोल, भुराल टोल, भेरी नदी किनारा टोल; र वडा नं. ९ का भोटेचौर, सिमघाट, भालु खोला, काप्रे खोला, माघ खँडे, चिसापानी बस्तीहरू गरी जम्मा ३२५१ घरधारा जडान मार्फत पानी वितरण गरिनेछ । दोस्रो पाटोमा सरसफाई कार्यक्रम छ, जस अन्तर्गत घरधुरीहरूमा सरसफाईको प्रवर्धन र सार्वजनिक शौचालयको निर्माण प्रस्ताव गरिएको छ । यस आयोजनाको खानेपानी संरचनाका लागि लागत रु ७१,१३,१८,६३२/- र सरसफाई तर्फको लागत रु ७९,७८,४७७/- गरी कूल लागत रु ७१,९२,९७,११०/- रहेको छ ।

वातावरणको वर्णन

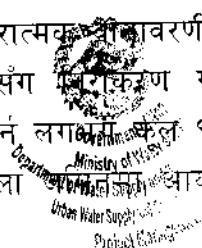
आयोजना क्षेत्र समुन्द्री सतहबाट ४७८ देखि ७९७ मिटरको उचाईमा रहेको छ । आयोजना क्षेत्रमा खेतीजन्य भूभाग, बजार क्षेत्र, खुला चौरहरू तथा वन क्षेत्र पनि रहेको छ । श्री तोरीवारी सामुदायिक वन, श्री राधादेवी सामुदायिक वन, र मूलपानी सामुदायिक वन यस आयोजना क्षेत्र भित्रका प्रमुख सामुदायिक वनहरू हुन् । आयोजना क्षेत्रमा साल, सल्ला, खरी, सिसौ र कर्मा आदि प्रजातिका रुखहरू पाईन्छन् । घाँसे मैदान र खोलानालाको आसपासमा पाइने वन पनि आयोजना क्षेत्र वरिपरि देखिन्छ । आयोजनाको निर्माण कार्य क्षेत्र भित्र कुनैपनि किसिमको सिमसार तथा संरक्षित क्षेत्रहरू छैनन् ।

गुर्भाकोट एक शहरोन्मुख बस्ती हो जहाँ आर्थिक कारोबार बढ्दो क्रममा छ । आयोजना क्षेत्रमा बजार क्षेत्रहरू पनि पर्दछन् । आयोजना क्षेत्रका घरधुरीको औसत मासिक आय करिब रु २६,५४७/- रहेको छ । बाहिरका बस्तीहरूबाट बसाई सरी आएका बासिन्दाहरू तथा भाडामा बस्ने मानिसहरूको बढ्दो जनसंख्याका कारण आयोजना क्षेत्रको जनसंख्या बृद्धि उल्लेखनीय रहेको देखिन्छ । विद्यमान खानेपानी प्रणालीको क्षमता नपुग देखिन्छ । विद्यमान खानेपानी प्रणालीको क्षमता हालको जनसंख्या मध्ये ३०% का लागि मात्रै पुग्ने देखिन्छ । अधिकांश घरहरूमा चर्पीको व्यवस्था छ तर ५.२% अझै चर्पी बनाउन बाँकी रहेको छ । बजार क्षेत्रमा अतिरिक्त सार्वजनिक शौचालयको आवश्यकता देखिन्छ ।

वातावरणीय प्रभाव, तथा वातावरणीय व्यवस्थापन योजना

यस आयोजनाको कार्यान्वयनले धेरै महत्वपूर्ण नकारात्मक वातावरणीय प्रभाव पर्ने देखिदैन र संभावित नकारात्मक प्रभावहरू पनि स्थानीय र सजिलै सँग नियन्त्रित गर्न सकिने प्रकारका रहेका छन् । आयोजनाका विभिन्न भौतिक संरचनाहरू निर्माण गर्न लगभग कूल ९,४०० वर्ग मिटर क्षेत्रफल भित्रको जग्गा प्रयोग हुनेछ । निर्माणको किनारका खुल्ला क्षेत्रमा आयोजनाका धेरै संरचनाहरू पर्नेछन् ।

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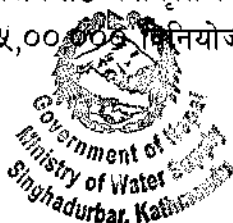


वडा नं. ६ को मेहेल्कुना-बड्खोली प्रणालीका लागि आवश्यक ४४० वर्ग मिटर नीजि जमिन प्रयोग हुनेछ। उक्त जमिनका मालिकले राजीखुशी उक्त जमिन आयोजनाको प्रयोजनका लागि उपलब्ध गराएका छन्। अन्य स्थानहरु सार्वजनिक जग्गाहरु पर्दछन्। आयोजनाको मुख्य संरचना स्थानको छनौट उपभोक्ता समितिको सल्लाह र सुझाव अनुरूप गरिएको छ र त्यसको लागि कुनै पनि संरचना र जनसमुदायलाई विस्थापित वा पुनर्स्थापना गर्नु नपर्ने देखिन्छ। आयोजनाका लागि आवश्यक पर्ने जग्गाका लागि उपभोक्ता समितिले स्वीकृति र सहमति हाशील गरिसकेकोछ। खानेपानी वितरण प्रणालीका मुख्य वातावरणीय मुद्दा निर्माणसंग सम्बन्धित क्रियाकलाप जस्तै पानी संकलन गर्न सम्प्वेल निर्माण, प्रशोधन इकाई निर्माण, भण्डारण ट्याङ्की निर्माण र पाइप लाइन बिछ्याउँदा जमीन तथा सडकको सतह खुकुलो हुदाँ हुने भूक्षय हुन सक्ने, पहिरो आउन सक्ने जस्ता प्रभावहरु रहेका छन्। छोटो समयको लागि हावा, पानी तथा ध्वनी प्रदुषण हुन सक्ने देखिन्छ। त्यसै गरी कामदारहरुको सुरक्षा पनि एउटा चासोको विषयको रुपमा हेरिएको छ। समग्र रुपमा हेर्दा प्रस्तावित आयोजनाबाट सो क्षेत्रका जैवीक, भौतिक, आर्थिक, सांस्कृतिक तथा सामाजिक वातावरणमा कुनै गहन प्रभावको सम्भावना निकै कम देखिन्छ।

प्रारम्भिक वातावरणीय परिक्षण प्रतिवेदनको एउटा मुख्य अंशको रुपमा वातावरणीय व्यवस्थापन योजना बनाईएको छ, जसमा निम्न कुराहरु समेटिएका छन् : (क) आयोजना कार्यान्वयन चरणमा पर्ने सक्ने नकारात्मक वातावरणीय प्रभाव न्यूनीकरणका उपायहरु सुझाउने र सकारात्मक अवसरहरु अभिवृद्धिका उपायहरु दिने, (ख) जिम्मेवार निकायद्वारा वातावरणीय अनुगमन तथा न्यूनीकरणको प्रतिवेदन तयार गर्ने, (ग) सूचना सम्प्रेषण तथा सार्वजनिक छलफल गर्ने, र (घ) गुनासो सम्बोधन गर्ने संयन्त्र बनाउने। डिजाईनमा सुधार एवं संशोधन गरेर धेरै जसो वातावरणीय नकारात्मक असरहरुलाई न्यूनीकरण गरिएको छ।

वातावरणीय व्यवस्थापन योजना अन्तर्गतका महत्वपूर्ण केही कार्यहरु मध्ये खटाइ क्षेत्रमा सम्प्वेलको सुरक्षाको लागि भेरी नदी किनारमा सुरक्षा संरचनाको निर्माण; खानीडाँडाको पानी ट्याङ्क साईटमा सुरक्षा संरचनाको निर्माण; हरियाली प्रवर्धन; कुनै पनि क्षति भएका निजी वा सार्वजनिक संरचनालाई पहिलेकै उचित अवस्थामा पुनर्स्थापना गर्ने; बाटो वा अन्य सुख्खा धुलो उड्ने ठाउँमा पानी छर्किने; निर्माण कार्यका कारण निस्कने ढुङ्गा-माटो र फोहर नगरपालिकासितको समन्वयमा निश्चित स्वीकृत ठाउँमा मात्रै फाल्ने, र खोलानालामा फाल्न बन्देज गर्ने; तथा स्थानीय सरोकारवालाहरु सित समन्वय गरी वातावरणीय संरक्षणका विषयमा जनचेतनामूलक कार्यक्रमहरु संचालन गर्ने जस्ता कार्यहरु रहेका छन्।

वातावरणीय व्यवस्थापन योजनालाई निर्माण कार्यको ठेक्का सम्झौताको एउटा अंशको रुपमा समावेश गरिएको छ। नकारात्मक प्रभाव न्यूनीकरणको कार्यान्वयन राम्रो संग भएको वा नभएको जाँच गर्न निर्माण र संचालन अवधिमा हुने क्रियाकलापहरुलाई समेटेर एउटा बिस्तृत अनुगमन कार्यक्रम तयार पारिएको छ। आयोजना शुरु गर्नु अगाडि निर्माण व्यवसायीद्वारा नकारात्मक प्रभाव न्यूनीकरणका उपायहरुको कार्यान्वयन गर्नका लागि बिस्तृत वातावरणीय योजना बनाई आयोजना व्यवस्थापन कार्यालयबाट स्वीकृति लिनुपर्नेछ। यस प्रस्तावित वातावरणीय व्यवस्थापन योजना कार्यान्वयनका लागि रु १५,००,००० विनियोजन गरिएको छ।



Engineer

यस आयोजनाबाट स्थानीय जनताहरूले पक्षस्त सकारात्मक फाईदा प्राप्त गर्नेछन्, जसमध्येका मुख्य फाईदाहरू निम्नानुसार छन्: (क) सुधारिएको खानेपानीको सुविधामा जनताको पहुँचमा वृद्धि हुने एवं सरसफाईको क्षेत्रमा सुधार, (ख) आयोजना क्षेत्रमा रोजगार बढ्नु र सीप अभिवृद्धि हुनु र (ग) शुभघाट शहरका बासिन्दाहरूको जीवनस्तरमा सुधार आउनु ।

स्थानीय सहभागिता, सूचना सम्प्रेषण र गुनासो सम्बोधन

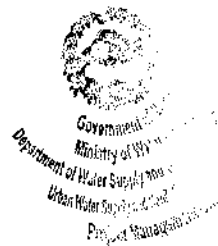
प्रारम्भिक वातावरणीय परिक्षणको प्रतिवेदन लेखन क्रममा समुदायसंग छलफल गरिएको छ । यस्ता छलफलहरूलाई पुरै आयोजना निर्माण चरणसम्म निरन्तरता दिइनेछ । मिति २०७५ पौष ३ गतेका दिन आर्थिक अभियान राष्ट्रिय दैनिकमा प्रारम्भिक वातावरणीय परिक्षणका लागि राय सुझाव पेश गर्ने सम्बन्धमा १५ दिने सार्वजनिक सूचना जारी गरियो । उक्त सूचना विभिन्न सरकारी कार्यालय तथा सार्वजनिक स्थानहरूमा टाँस गरी सोको मुचुल्का गरियो । स्थानीय निकाय तथा सरोकारवालाहरूको उपस्थितिमा यस आयोजनाका बारेमा र प्रतिवेदनमा उल्लेख गरिएका वातावरणीय पक्षहरूका बारेमा जानकारी तथा छलफल पनि गरिएको छ । समुदायका कुनैपनि गुनासाहरूलाई तुरुन्तै सम्बोधन गर्ने हेतुले प्रारम्भिक वातावरणीय प्रतिवेदनमा गुनासो सम्बोधन प्रक्रिया विस्तृत रूपमा वर्णन गरिएको छ ।

निष्कर्ष

यस आयोजना बाट स्थानीय बासिन्दाहरूले चौविसै घण्टा आवश्यकता अनुसार सुरक्षित खानेपानी पाउनेछन् र सरसफाईको अवस्थामा सुधार हुनेछ जसले गर्दा प्रदेश नं. ६ को यस आयोजना क्षेत्रका बासिन्दाहरूको जीवन स्तरमा सुधार आउनेछ । यस आयोजनाको प्रकृति, आयोजना क्षेत्रको वातावरण एवम् आर्थिक सामाजिक अवस्था र स्थलगत निरीक्षण एवम् सरोकारवाला संगको सरसल्लाहलाई मध्यनजर गर्दा यस परियोजनाबाट आयोजना क्षेत्रमा न्यून नकारात्मक वातावरणीय असर पर्ने देखिन्छ । संभावित प्रभावहरू धेरै जसो स्थानीय प्रकारका छन् र सुझाइएका प्रभाव न्यूनीकरणका उपाय कार्यान्वयन गरिएमा र नियमित अनुगमन गरिएमा यी प्रभावहरूलाई सजिलै एवम् कम खर्चमा न्यूनीकरण गर्न सकिनेछ । यस आयोजना कार्यान्वयनका लागि प्रारम्भिक वातावरणीय परिक्षण मात्रै गरे पुग्ने देखिन्छ र त्यसकारण वातावरणीय प्रभाव सम्बन्धी अतिरिक्त अध्ययन गर्नु नपर्ने देखिन्छ ।



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EXECUTIVE SUMMARY

Background

The proponent of the proposed Subhaghat Urban Water Supply and Sanitation Project is the Project Management Office of Urban Water Supply and Sanitation Sector Project (UWSSP) under the Department of Water Supply and Sewerage Management, Government of Nepal. The project is focused on improvement of water supply and sanitation service delivery in small-scale urban and semi-urban centers across Nepal. The project will support the GoN to achieve the targets of Sustainable Development Goals (SDG-6). The project will serve the beneficiaries of ward numbers 6, 7, 8 & 9 of Gurbhakot Municipality, Surkhet district of Karnali Province. The major settlements / toles of the service area are Sano Nakkale, Thulo Nakkale, Bada Kholi, Kapase, Gaile, Satmule, Tatapani, Nimare, Tori Bari, Jarkote of ward number 6, Koopchi, Chisi Kholi, Shreebani, Gokulpur, Manike, Nanghi of ward number 7, Pabitra Bazar, Khatang, Sundar Khali, Gangate, Simana Tol, Kumalpani, Pulchowk, Gharighare Tol, Badi Samudaya Tol, Bhural Tol, Bheri Nadi Kinara Tol of ward number 8, and Botechaur, Simghat, Bhalu Khola, Kapre Khola, Magh Khande, Chisapani of ward number 9. Under sanitation component, the project will support the ultra-poor households to upgrade their toilets into water sealed sanitary toilets. The total contribution of the user committee will be 30% of the project cost out of which 5% will be upfront cash and 25% will be load from TDF; and 70% will be project grant.

Objectives of IEE

The prime objective of IEE is to identify the potential environmental impacts associated with the project, and to propose benefit augmentation measures as well as negative impact mitigation measures along with an environmental management plan so as to avoid such impacts or to limit any such impact/s within the levels acceptable as per environmental standards and thresholds of the GoN.

Purpose of IEE, ADB Policy, GoN Acts and Rules

The purpose of this Initial Environmental Examination (IEE) is to examine the environmental implication of proposed project and its activities to ensure that it will not damage the environment and to provide measures to remove or reduce those impacts into acceptable limits.

GoN's Legal Requirements, and Categorization

This Initial Environmental Examination (IEE) report has been prepared as per Schedule-1 of Environment Protection Rule (1997), GoN. Procedures and reporting format has been followed as per the requirements of the EPR, 1997. Subhaghat Urban Water Supply and Sanitation Project is classified as Environment Category B as per the SPS- 2009 as no significant impacts are envisioned.

Methodology Adopted

The present Initial Environmental Examination report has been prepared based on the Terms of Reference (ToR) approved by the Ministry of Water Supply, GoN, on 15th November 2018. The study has followed the provisions outlined in the Environment Protection Act, 1997 and Environment Protection Rules, 1997, and Safeguard Policy Statement, 2009 of the Asian Development Bank (ADB). The major activities undertaken during the preparation of IEE are Desk Study, Literature review, Field study, Data processing, Impact Prediction and Evaluation, and Public Consultation. Publication of public notice, collection of feed or inquiry of pasting of

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the notice in the locality, continuous public consultations, and conducting of a formal public consultation to collect opinions and suggestions from the locals was also conducted during the IEE study period. Study of the physical, biological and socio-economic environmental aspects was conducted in relation to the project activities and potential impacts of those activities. The study has focused in the Core Area of project as well as its Surrounding Area.

Components of the project

The proposed project is surface water source based system. It has two major components; namely - (i) water supply component, and (ii) sanitation component. Under water supply component, there are activities like excavation, establishment of treatment units, water storage tank construction, guard house, laying of transmission & distribution network pipelines, connection of household taps, and construction of a office building of WUSC. The sanitation component comprises of household sanitation promotion works and construction of a public toilet. An office building for functional operation of User's Committee will also be built. The cost of water supply component is NRs 711,318,632 and that of sanitation component is NRs 7,978,478; and the total project cost is NRs 719,297,110.

Description of the Environment

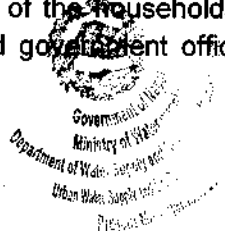
Altitudinally, the project area extends from 478 to 797 m above the mean sea level. The project location is situation in the plains along Bheri river, nearby elevated lands where major settlements are porsent, and gradually extends to low hills with thin settlements. The major components of this project lie in the public land. The water distribution pipelines will be within the Right-of-Way (RoW) of public roads. There are some community forests like Shree Toribari Namuna Community Forest (Mehelkuna - 9), Shree Radhadevi Lekhaaul Community Forest (Mehelkuna - 7), and Mulpani Community Forest (Khanidanda - 8) within the project area. There are no designtated wetlands or protected areas within or in close vicinity of the project area.

Subhaghat is one of the emerging towns of Surkhet district. The economy of the area is agricultural economy. However it is gradually shifting to business and service based economy. 57.9% of the households have agriculture as main occupation. Almost 12% of the households have business as occupation. Service is another main occupation of 12.9% households. As in the other parts of Nepal remittance has been playing noticeable role in local economy of the service area. The average monthly income of the households of the project area is NRs 26,546. The growth in population of the project area is also contributed by the increasing trend of urban immigration and rental population.

The existing water supply scheme covers parts of wards 6, 7, 8 and 9 of Gurbhakot Municipality, which supplies water through nearly 79 private taps, and 152 public/community taps. Others use sources like dug wells and river or spring sources. It implies significantly lesser households are enjoying adequate and potable water. Due to high in-migration ratio and increase of rented population, WUSC is unable to serve enough water supplies. The level of services in terms of quality, quantity, coverage is quite insufficient. In general the overall sanitation condition of the project area was observed satisfactory. Almost all of the households in the market area have permanent type of private latrine and hospital and government offices have toilets. However, there is need of public toilet in the market areas.



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Environmental Impacts and Environment Management Plan

The implementation of this project will not have major significant impacts on the environment, and the potential impacts are also local in extent and those can be mitigated with applicable mitigation measures. A total of 9,400 square meters of land will be required for construction of different project components. Most of the land area is public land. Open land parcels near the banks of Bheri river will be used for most of the structures. There will be need of acquiring a parcel of private land of around 440 square meters, the owner of which has already agreed in written to provide the land for the project. The sites required for the construction of the project units have been selected in close consultations with the WUSC, and there is no need of relocation of any structure, and there is no any resettlement needs. The WUSC has obtained the permissions and agreements for the use of the required land. Degradation of land surface and possibility of landslides due to excavations works to be carried out for reservoir construction, and laying of the pipelines is one of the major concerns of the project works. There will be short term concerns of ambient air pollution, noise nuisance and water pollution in relation to the project works. The concerns of occupational, health and safety (OHS) along with community health and safety are among the major socio-economic concerns.

Some of the major environmental mitigations proposed include protection works along the Bheri river to protect the sumpwell site at Khatang area; protection work in the reservoir site of Khanidanda site; greenery promotion works; reinstatement of any damaged public or private property to acceptable state; sprinkling of water at dry sites/roads under dry conditions to reduce dust nuisance; prohibition of disposal of spoil or waste onto water bodies, and disposal only in designated sites in coordination with the municipality office; and conducting environmental awareness activities in coordination with local stakeholders.

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 and cost of EMP implementation will be included in civil works bidding and contract documents. The indicative cost for EMP implementation is NRs 1,500,000.

The major benefits for the local citizens due to implementation of this project will be; (i) improved access to the quality drinking water supply and sanitation services, (ii) increased employment opportunities and skill enhancement in the project area, and (iii) improvement in quality of life of the citizens of Subhaghat service area of Karnali Province.

Public consultations, Information Disclosure, and Grievance Redress Mechanism

Local communities were informed and consulted during the field study period. A 15 days public notice was published on 18th December 2018 in a national daily *Arthik Abhiyan* seeking written opinions from concerned local bodies, schools, health posts and related local organizations and concerned people. A copy of the public notice was also affixed in the notice boards of the above mentioned organizations in the project area and a deed of enquiry (*muchuka*) was collected. A public consultation was conducted and opinions, concerns and suggestions of the local stakeholders were gathered through a consultation process. A Grievance Redress Committee (GRC) will be formed at Municipality level before the start of the project construction activities,

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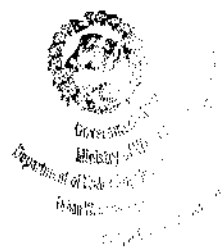
and any person with a grievance related to the project works can contact the project team to file a complaint.

Conclusions

Subhaghat Urban 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 project is unlikely to cause significant adverse impacts. Based on the findings of IEE, there are no significant adverse impacts and the classification of the project as Category "B for Environment" is confirmed. No further special study or detailed Environmental Impact Assessment (EIA) needs to be undertaken.



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1. NAME AND ADDRESS OF THE PROPONENT AND INSTITUTIONS PREPARING THE REPORT

The name of the proposal is 'Initial Environmental Examination (IEE) of Subhaghat Urban Water Supply and Sanitation Project'. It lies in Surkhet District of Karnali Province.

1.1. Name and Address of the Proponent

The project falls under the Urban Water Supply and Sanitation Sector Project (UWSSP). The Department of Water Supply and Sewerage Management (DWSSM) is the proponent of the project. DWSSM will be the responsible agency for the implementation of the proposal. The name and address of the proponent is given below;

Name of the Proponent

Project Management Office
Urban Water Supply and Sanitation Sector Project
Department of Water Supply and Sewerage Management
Ministry of Water Supply, Government of Nepal.

Address of the Proponent:

Panipokhari, Kathmandu, Nepal
Phone: 977 1 4423848, 977 1 4412348
Fax: 977 1 4413280
email: info@uwssp.gov.np, website: www.uwssp.gov.np

1.2. Consultant Preparing the Report

BDA/PEA (JV) has worked on behalf of the proponent for conducting IEE studies and preparing IEE report using all the prevalent guidelines, acts, policies and regulations. The name and address of the consultant is given below;



Building Design Authority (P.) Ltd.

Architectural, Engineering & Planning Consultants

P.O. Box: 2882, Kamaladi, Kathmandu, Nepal
Tel: 4-227393 / 4-248200 / 4-247708 / 4-247939
Fax: 977-01-4223936, E-mail: bda@bda.com.np

JV

Plush Engineers & Architects

Engineering & Architectural Design, Project Planning

& Evaluation, Socio Economic Survey etc.
P. O. Box : 2882, Kamaladi, Kathmandu
Tel : 4247708, 4227393, 42477939, 4248209

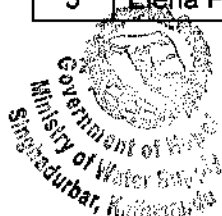


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The following team completed this IEE study;

Table 1.1: Study Team for IEE Study of the Project

SN	Name of Expert	Designation	Expertise field/Qualification
1	Yogesh Shakya	IEE Team Leader	Environmental Management/ M.Sc.
2	Giri Bahadur Sunar	Social Safeguards Specialist	Socio-economist /M.A.
3	Manoj Kumar Sharma	Engineer	Contract Management/B.E.
4	Sheela Sharma / Rocky Mitra	Asst. Environmental Specialist	Environmental Science/ M.Sc.
5	Elena Pudasainee	Support Staff	



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2. SUMMARY OF THE PROPOSAL

2.1. Introduction (General Information of Proposal)

Along with the Third Small Towns Water Supply and Sanitation Sector Project, the Urban Water Supply and Sanitation Sector Project (UWSSP) will support the Government of Nepal (GoN) in providing water supply and sanitation facilities and services to around 22 additional small towns in Nepal. Asian Development Bank (ADB) has already supported the GoN through successful implementation of earlier two phases of projects in over 50 towns. Drawing experience from the past projects, the new phase project will fund physical investments in water and sanitation infrastructure in selected small towns in Nepal and non-physical investments in institutionalizing sector reforms, capacity building, project management and service delivery improvement. UWSSP will be funded by a loan using a sector lending approach of ADB. The Executing Agency is the Ministry of Water Supply (MoWS) and the implementing agency is the Department of Water Supply and Sewerage Management (DWSSM).

The outcome will be inclusive and sustainable water supply and sanitation service delivery in selected small towns in Nepal. The project will have 3 outputs; (i) Improved water supply and sanitation infrastructure in selected small towns; (ii) Strengthened sector policy, institutional framework, service delivery and project implementation; and (iii) Improved project implementation and financing platform. The IEE is based on an assessment of these components, focused on output (i), within the project area.

2.2. Objective of the Proposal

The objective of the proposal is to ensure adequate and safe drinking water to the targeted population of the project area. It is envisioned that the project implementation will also improve the condition of women and all beneficiaries in terms of water fetching, family hygiene and sanitation; and as a whole - the project will improve the quality of life.

2.3. Relevancy of the Proposal

The present water supply and sanitation situation is not satisfactory. The existing water supply systems serve only slightly over 30% of the project area population and the capacity of the existing water supply structures is too much undersized. Extension of the sources and expansion of the systems is not feasible. On the other hand, Subhaghat is emerging town with increasing water demand. Thus to meet the current as well as growing future demand of Gurbhakot municipality, a well-managed water supply system is felt needed. The Subhaghat Urban Water Supply and Sanitation Project is a good opportunity for the community to fulfill their water supply and sanitation need.



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2.4. Rationality of IEE

The proposed water supply and sanitation project is need to be studied from the environmental point of view as per Rule 3 of Environment Protection Act 1997, and Clause H of Schedule 1 of the Environment Protection Rules, 1997 (including amendments). Relevancy of environmental assessment of water supply projects is defined basically based on the population of the beneficiaries as it determines the scale of the project and its activities. Hence IEE is relevant in terms the population of the people to be served by the project as indicated in criteria 8 of of Schedule 1 of EPR as mentioned in Table 2.1 below;

Table 2.1: IEE requirement threshold limits as per EPR 2054, and project conditions

SN	Condition described in the Act and Rules	IEE Required as per the EPR Schedule 1, H	Conditions in this Project
Clause H, Subclause 8	Supply of water to a population of	5,000 to 50,000	The design population is 33,418 in 2039

The design year population of the project is 33,418. As the design population of the proposed project is within the threshold of 5,000 - 50,000 population for new water supply project (*Schedule 1, Clause H, sub-clause 8, EPR 1997*) for which IEE is needed, IEE is required and sufficient for the proposed project.

2.5. Objectives of IEE

IEE is a tool for incorporating environmental concerns at the project level and is carried out as a part of the detailed study. The objectives are:

- To establish baseline environmental status of the project area
- To identify, predict and evaluate the potential beneficial and adverse impacts of the project on the physical, biological and socio-economical resources in the project area
- To suggest enhancement measures to augment the benefits of the project and to propose suitable mitigation measures to avoid, minimize and compensate the adverse impacts of the project
- To prepare appropriate Environmental Management Plan (EMP) with monitoring aspects
- To inform public about the proposed project and its impact on their livelihood
- To prepare an IEE as per the EPR, 1997

The present IEE has been conducted for the water supply and sanitation project proposed for Subhaghat Urban Water Supply and Sanitation Project of Gurbhakot Municipality of Surkhet district. It discusses the environmental impacts, mitigation measures and monitoring provisions relating to the location, design, construction and operation & management of the scheme.

2.6. Scope of the Study

The scope of the study is to study and prepare the IEE report as per the format indicated by EPR (1997) together with the instructions provided by the project management office. The task during the preparation of this report included description of the project with reference to the physical, biological and social environment, and identification of potential impacts, mitigation measures

and monitoring plan and related topics. However, the study does not limit itself only here, but has strived to completeness and objectiveness.

The study focused in the zone of influence of the project. Its impacts zones were studied with respect to the activities related to the project. Physical, biological and socio-economic aspects of the environment and the associated concerns were studied.

The current studies were conducted as per the ToR of Subhaghat Urban Water Supply and Sanitation Project which has been approved by MoWS. The environmental issues identified by the ToR have been looked into in detail and EMP and has been designed to address these issues. The impacts of providing infrastructure in the areas were assessed and the Initial Environmental Examination (IEE) Report and Environmental Monitoring Plan prepared. Studies are conducted fulfilling the requirements of ADB's Safeguard Policy Statement 2009 and GoN's Environment Protection Rules (1997 and amendments).

Discussions with the locals, consultations with the key persons, coordination with related stakeholders, surveys and specific studies with related stakeholders are the range of activities of this IEE study.



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3. DESCRIPTION OF THE PROPOSAL

3.1. Type of Proposal

Subhaghat Urban Water Supply and Sanitation Project is a basic infrastructure development project with motive of gender strengthening in the long run. The project has been conceptualized as sub-surface water based water supply system integrated with sanitation improvement in the project area. The focus of outputs is on water and sanitation status improvement in household level under a community owned water supply system management approach. This is not an upgradation project, and is a new project.

3.2. Salient Feature of the Proposal

The project is under detailed design phase. Design of the overall system, and site-specific project components have all been finalized. Table 3.1 provides the project's salient features;

Table 3.1: Salient Features of Subhaghat Urban Project

SN	Items	Description
1	Name of the Project	Subhaghat Urban Water Supply and Sanitation Project, (Subhaghat, Surkhet) Urban Water Supply and Sanitation Sector Project, DWSSM
2	Type	Pumping scheme; New Project
3	Location Area	
	Province/District	Karnali Province/ Surkhet
	Municipality/Wards	Gurbhakot Municipality; Parts of Wards 6, 7, 8 and 9
4	Available Facilities	
	Road	Chhinchu-Jajarkot Highway
	Nearest Airport	Surkhet
	Existing Water Supply System	Partially covered by piped water supply system. Spring sources are used
	Electricity/Communication	Available
	Health Services/Banking Facilities	Available
	Chhinchu- Botechaur distance	21 km
5	Source Characteristics	
	Source Name	Sump Well; Mehelkuna 4 Nos. new; and Botechaur 1 No. new & 1 No. existing
	Source Type	Groundwater (sub-surface flow)
	Source Location	Mehelkuna Ward # 7 and Botechaur in Ward # 9, Gurbhakot Municipality
	Proposed Tapping yield (lps)	Mehelkuna CW : $4 \times 8.9 = 35.6$ lps (Pumping) Botechaur CW : $2 \times 6.4 = 12.8$ lps (Pumping)
6	Project Components	
	New Sump wells	5



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	Service Reservoirs (OHT/ RVT, Valve Chambers and surface valve box, etc.)	RCC Ground Tank 50 Cum : 1 # (Proposed) RCC Ground Tank 80 Cum : 1 # (Proposed) RCC Ground Tank 100 Cum : 1 # (Proposed) RCC Ground Tank 100 Cum : 1 # (Existing) RCC Ground Tank 120 Cum : 1 # (Proposed) RCC Ground Tank 140 Cum : 1 # (Proposed) RCC Ground Tank 300 Cum : 2 # (Proposed) Total 1190 Cum
	Treatment facility subcomponents:	
	Aeration units	3 units; 1.25 - 1.5m diameter
	Pressure Filters	6 units; 1.7m - 2.0m diameter
	Disinfection Units	3 units; Mixing tank - 1000 L 2 dosing tank - 250 L
	Water Quality Testing Laboratory	1 Room
	Distribution Network.	113.340 Km
	Transmission Mains.	17.769 Km
	Pumps (including related accessories, electrical panels, generators, etc.)	29 nos.; 3 kw, to 30 kw pumps
	Fire Hydrants	22 numbers
	House Connections of Taps	3251 for base year
	Water supply	24 hour supply of potable water as per NDWQS
	Office Building	1 no. with footprint of 170 sq. m.
	Guard House	9 nos. with footprint of 21 sq. m. each
	Generator House	3 nos. with footprint of 20 sq. m. for each
	Standby Electrical Generator	1No. 200 KVA; 1No. 100 kVA; 2Nos. 50 kVA
	Public Toilet	1 no. (37 sq. m.)
7	Social Status	
	Survey Year Population (2017)	15,854 (permanent) 292 (floating) [Total 16,146]
	Base Year Population (2019)	16,876 (permanent) 321 (floating) [Total 17,197]
	Design Year Population (2039)	32,603 (permanent) 815 (floating) [Total 33,418]
	Adopted Annual Growth Rate %	3.36 (Average)
	Household Numbers	3,052 in 2017; 3,307 in 2019; and 6,269 in 2039
	Average Family Sizes	5.2
8	Total Water Demand	
	Base year 2019 (m3/day)	Total 1,883.73
	Design year 2039 (m3/day)	Total 4,163.15
9	Total Cost of the Project (NRs.)	719.297 million with 15% contingencies & 13% VAT
	Water Supply Sector	NRs. 711.319 million
	5% upfront cash; 25% loan	NRs. 35.566 million; and NRs. 177.829 million
	Sanitation Sector	NRs. 7.979 million
10	Per capita Investment (for water supply sector)	Base Year: NRs. 40,053.87 Design Year: NRs. 20,611.84
11	Project Status	Detailed Design Phase

3.3. Location of Proposal

Subhaghat, a growing and urbanizing town in Surkhet district. The location of the project area is 28°26' North Latitude and 81°51' East Longitude. Subhaghat town is located about 48 km away from Birendranagar, the headquarters of Surkhet District.

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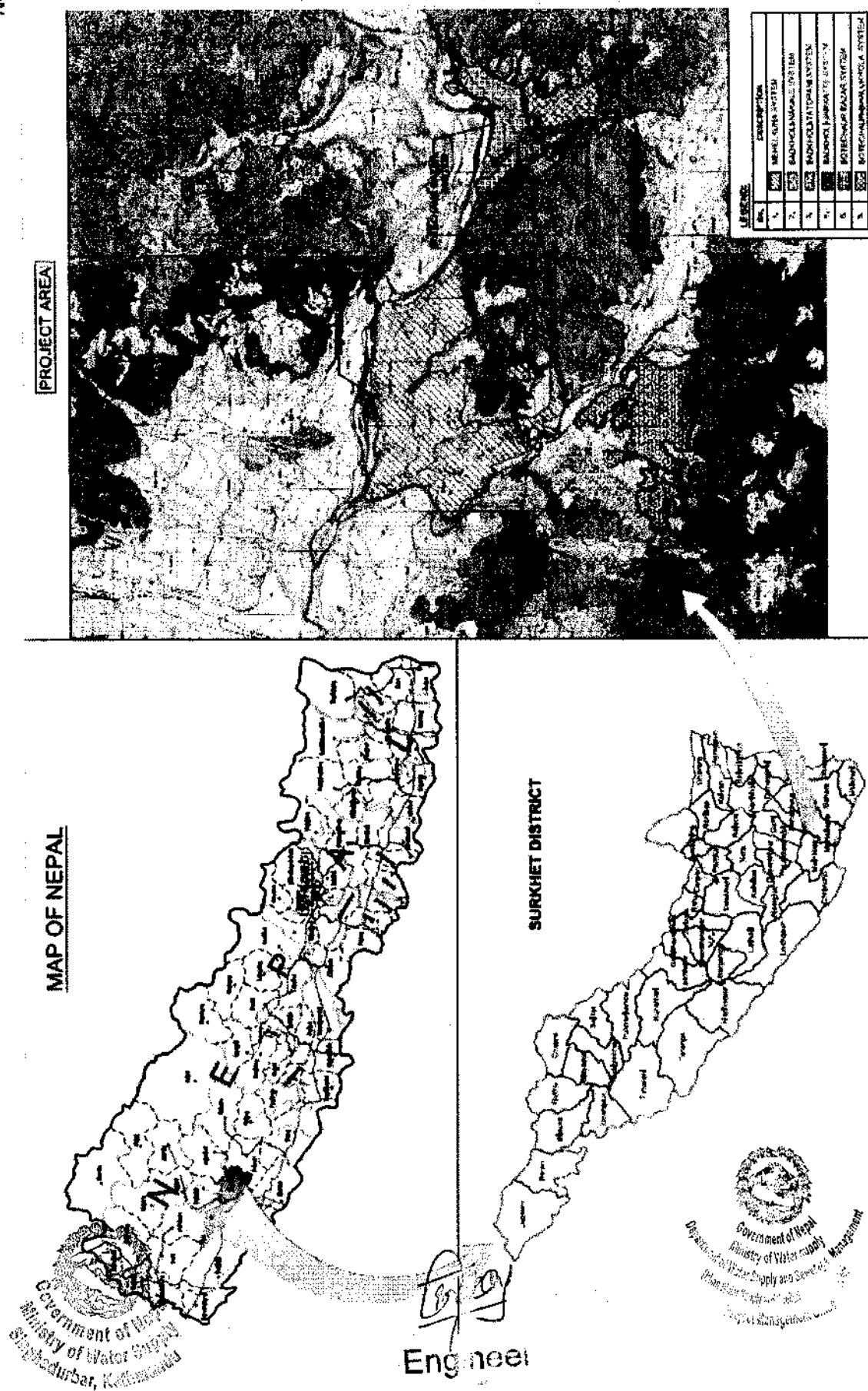


Figure 3.1: Project Location Map



Figure 3.2: Project Layout Map with Core Area and Surrounding Area

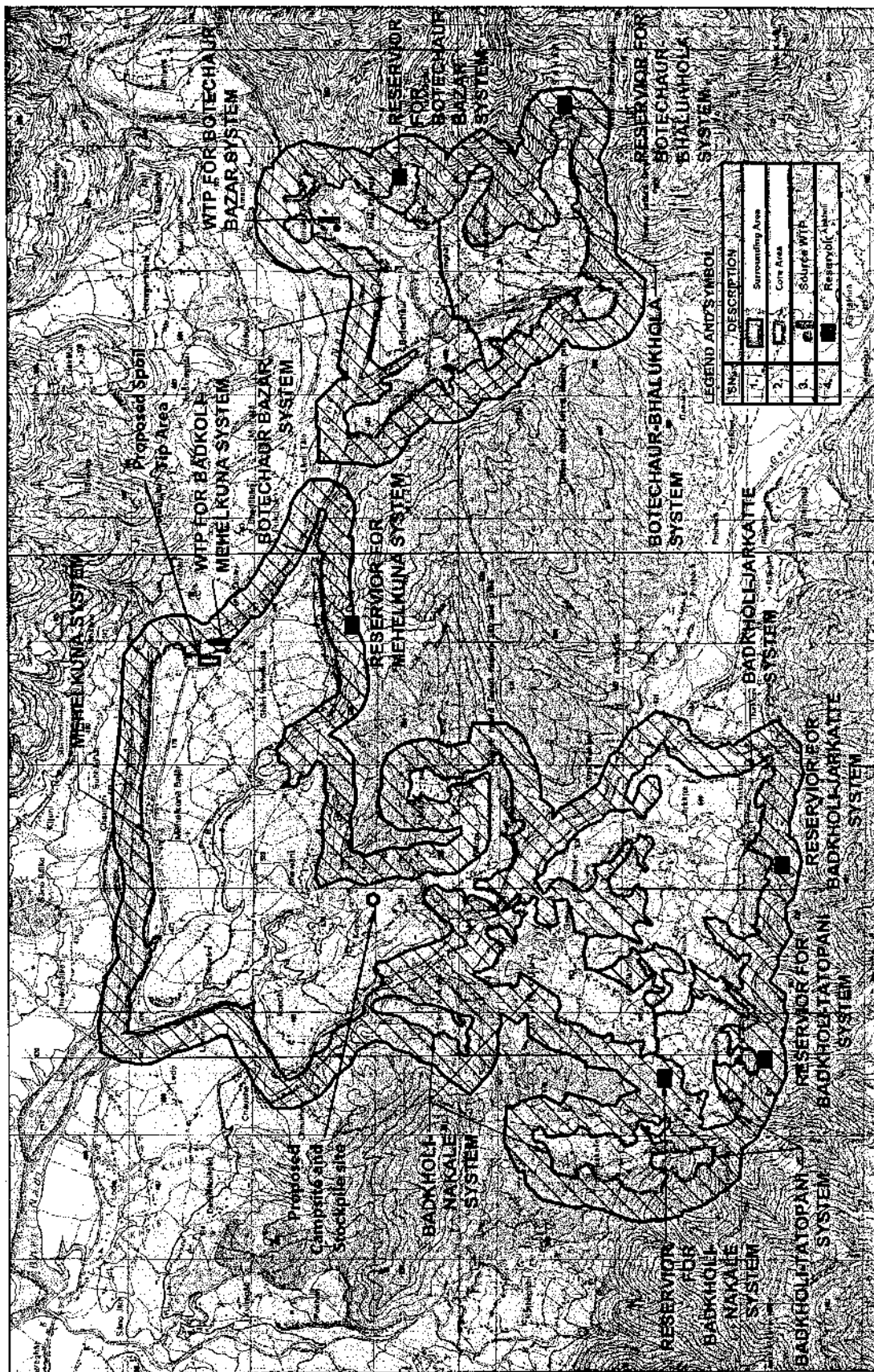


Figure 3.2: Project Layout Map with Core Area and Surrounding Area



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3.4. Impact Area Delineation

In order to specify the area that would be covered by the assessment, the geographical boundary of the influence area was delineated on the topographical map. Depending upon the nature and extent of the expected impact area, the Zone of Influence (ZOI) was categorized into Core Area and Surrounding Area.

(a) Core Area

The project areas directly affected by the project activities are demarcated as Core Area. Project component sites of wards no. 6, 7, 8 and 9 of Gurbhakot municipality, i.e. the service area, come under the Core Area.

(b) Surrounding Area

The area around the Core Area that could be indirectly affected due to project construction and implementation activities such as mobility of people, equipment, vehicles, noise, dust, vibration are demarcated as the Surrounding Area. Thus, the areas within 200m of buffer around the Core Area are delineated as Surrounding Area.

3.5. Materials To Be Used

The required materials have been divided into two categories; (1) Local materials and locally manufactured products, and (2) Imported manufacture products. The materials as aggregates, sand, stone, timber, bricks are considered to be local materials and locally manufactured products are considered as GI pipes and fittings, HDPE (PE) Pipes and fittings, cement and reinforcement bars. The materials as DI pipes and fittings, water meters, electrical equipment including generators, mechanical equipment, and all kinds of valves are considered as imported manufactured products. It is estimated that there will be need of around 2,000 m³ of gravel, 11,000 bags of cement, 1,000 m³ of sand and 235 tons of rod for the construction works.

3.6. Energy To Be Used

Diesel and petrol for vehicles and generators, LPG for cooking in the campsites, and electricity for lighting and motors are the basic needs during construction phase. Regular electricity from national grid will be required for the operation phase. Generators will be in place for power back-up.

3.7. Human Resources Requirement

The proposed Subhaghat Urban Water Supply and Sanitation Project, entails both skilled and unskilled laborers for its construction and operation in the proposed site. The numbers of skilled and unskilled labours required per day are not yet decided. However, the labourer's estimation was made on the basis of rate analysis and as far as possible they will be hired from the local market and its adjoining area. The wage rate of skilled labour is considered non-distortive and hence no shadow wage rate is assumed and considered nominal. Cost of unskilled labour is estimated at a shadow wage rate of 0.7 (i.e. 70 percent of the wage rate of unskilled labour estimated for the Project). As such for this work a total of 7500 man-days of skilled labors and 45,500 man-days of unskilled labors person days are required. The laborers estimation was made on the basis of rate analysis and as far as possible they will be hired from the local market and its adjoining area.



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3.8. Methods Adopted During Study

The present Initial Environmental Examination report has been prepared based on the Terms of Reference (ToR) approved by the Ministry of Water Supply, Government of Nepal on 15th November 2018. The study has followed the provisions outlined in the Environment Protection Act, 1997 and Environment Protection Rules, 1997 and Safeguard Policy Statement, 2009 of the Asian Development Bank (ADB). The major activities undertaken during the preparation of IEE are outlined below;

3.8.1. Literature Review

Available primary and secondary literature in the form of reports and maps; topographic maps, land use maps, aerial photographs, cadastral survey maps etc were collected and reviewed. Feasibility studies of the subproject conducted at various times were the key documents collected and reviewed to determine the nature and scope of activities of the subproject that influences the environmental conditions of the proposal area. Similarly, published and unpublished reports pertaining to environmental standards, acts, regulations etc were collected and reviewed. Published and unpublished literatures of the subproject area pertaining to biological, social, chemical, physical, and cultural environments were collected from various sources and reviewed to get information on the coverage of the studies and fulfill the data gaps.

3.8.2. Desk Study

Existing secondary data relevant to the proposed project was collected from various published and unpublished sources from different governmental and non-governmental organizations. Municipality profile of Gurbhakot Municipality, Feasibility report of the project, Detailed Engineering Design Report of the project, toposheet of project area, EPA 1997 and EPR 1997, Environmental Assessment Review Framework for Urban Water Supply and Sanitation (Sector) Project 2018 - ADB were specifically reviewed. Policies, legislations and guidelines relevant to the project were also referred. Specifically, water supply, sanitation, urban aspects and biodiversity aspects were considered.

The desk study also involved the preparation of questionnaires/checklists/matrices for detailed field study to collect primary data in order to specify the area that would be covered by the assessment, the geographical boundary of the influence area was delineated on the topographical map. Depending upon the nature and extent of the expected impact area, the Zone of Influence (Zoi) was categorized into Core Area and Surrounding Area.

3.8.3. Field Work

Field studies were conducted in project site areas in an extensive manner by a multidisciplinary team, which comprised of an environmentalist, biologist, socio-economist, and civil engineer. During the visits, baseline information on physical and cultural, chemical, biological, and social conditions of the project's direct and indirect impact areas was collected using checklists (Annex 6). The paragraphs below present briefly the various approaches and methodological tools used during the field exploration;

Physical Assessment

An extensive Physical Environment survey was carried out by delineating the project impact area to collect the baseline information on physical environment using checklist forms. In-situ measurements and samplings were carried out for field assessment of physical environment. Topographic and geomorphic features were observed and documented. Physical features such

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as climate & meteorology, air quality, erosion and land stability & land use pattern were observed and recorded. Similarly, data on rainfall and other meteorological conditions were collected. Consultations with local communities were carried out in coordination with the users committee in the project sites.

Biological Assessment

The vegetation survey was carried out by walkthrough survey throughout the project direct impact areas. Type of vegetation and forests were identified based on the species composition. Ethno-botanical information was obtained. Checklists were used during field study. Wildlife biodiversity in the indirect impact areas was studied in the field interacting with local people (for habitat continuity) methods to identify linkages between wildlife habitats and proposal activities. The indicator wildlife and threatened or endangered species (as per IUCN Red Book, CITES Appendices, and GoN list) in the area were discussed with the local communities.

Socio Economic Assessment

Household survey with questionnaires was conducted by interviewing to obtain information on socio-economic and cultural environment like demography, ethnicity, education, health, and sanitation, drinking water condition of the subproject area, irrigation facility, local traditions, religion, land holding pattern, income and expenditure and to acquire their perception towards proposed subproject, etc. The survey covered 100% of the total HHs during the design phase. Consultations meetings were held at Subhaghat Water Users Group Office to interact with local people and stakeholders in order to collect information on migratory pattern of local people, settlements, agriculture, information on project affected families, land availability for project components, and to obtain suggestions and comments from all relevant stakeholders regarding environmental and socio-economic concerns. Direct observation (walkthrough survey) was done to collect information on the cultural sites, and public institutions such as temples, cremation grounds, and festival sites, historical and archaeological sites, school, and health post within the direct project affected areas. Consultation with village elites and key person interviews were conducted to assess the current situation of these facilities and the general water/sanitation status of the communities of the project area using key respondent interview questionnaire. Focus Group Discussions (FGDs) were also carried out.

3.8.4. Stakeholder Consultations

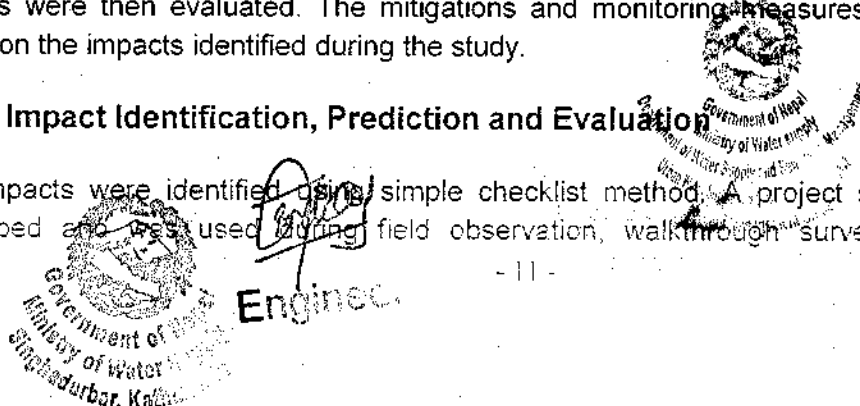
Stakeholder consultations were conducted regarding demarcation of project service area and the beneficiaries. The land availability of project components and location of these components were also discussed in the consultative meetings. The user committee and local authorities supported for preparation and initiation of the project. The positive response of local people made the public consultations more interactive.

3.8.5. Data processing

The information obtained from the desk study and field works were processed in a standard format to maintain consistency. The data were tabulated and maps were interpreted. The impacts were then evaluated. The mitigations and monitoring measures were then proposed based on the impacts identified during the study.

3.8.6. Impact Identification, Prediction and Evaluation

The impacts were identified using simple checklist method. A project specific checklist was developed and was used during field observation, walkthrough surveys, and during key



respondent interviews. The impacts were predicted based on probabilistic approach, and based also on expert judgements.

The impacts were evaluated based on their impact levels, coverage of area and duration of the impacts. The evaluation will be supportive to emphasize the need to address the concerns. Magnitude, geographical extent and duration of impacts are defined below;

Magnitude: This can be low-L (minor), medium-M (moderate), and high-H (major), depending on the scale or severity of change.

Geographical extent: If the action is confined to the sub-project area, it is referred as site specific (Ss), if it occurs outside area but close to sub-project area, the extent of impact is local (Lc), if it occurs far away from the sub-project, it is referred as regional (R).

Duration: It can be short term (St - i.e. less than 3 years), medium term (Mt - i.e. 3-20 years), and long term (Lt - i.e. more than 20 years).

For the Impact evaluation the matrix method with numerical ranking is used for the quantitative ranking of the predicted impacts. The numerical scale mentioned in the National EIA Guidelines 1993 has been adopted for this project. The numerical scale is as;

Magnitude		Extent		Duration	
High	60	Regional	60	Long Term	20
Moderate	20	Local	20	Medium Term	10
Minor	10	Site Specific	10	Short Term	05

3.8.7. Consultation and Information Dissemination

Public consultation and information dissemination process is necessary to inform the local people and concerned agencies about the project and to obtain their concerns, issues and suggestions. The methods adopted for conducting public consultations included holding meetings with district officials, concerned departments, institutions and NGOs. Key informant consultations and meetings were also held with the stakeholders within the project area.

A 15 days' public notice was published on 18th December 2018 in a national daily newspaper *Aarthik Abhiyan* seeking written opinions from Municipality office/ward offices, DCCs, schools, local health centers and related local organizations as well as concerned people. A copy of the *Public Notice* was also posted in the notice board of Municipality office, ward offices and other public areas in the project area and the deed of inquiry was collected. A public consultation was carried out on 19th March 2019 in the municipality office with formal participations. The minutes of public consultation is provided in Annex 5. The major concerns raised during the public consultations were;

- Selection of best sites - e.g. for the WUSC building site
- Possible land instabilities associated with construction works,
- Spoil management, and
- Coordination with the stakeholders

It was discussed that the selection of WUSC building site will be based on technical feasibility, land availability and least environmental impacts. Similarly, regarding the land instability issues, it was discussed that pipeline works are the major concerns along the slightly sloping areas besides a case of reservoirs at Khanidanda where there are natural drains. Hence, protection works have been suggested. It was discussed that there could be generation of around 1,500 m³ of spoil, and the the spoil generated will be managed in grading the open land at Khatang area, and unused land parcel under ownership of Sunder Khani School in ward number 8.

It was agreed that there will be continuous coordination and consultation with the local stakeholders even during the project construction phase. A semi-formal reflection meeting was held with the municipality representatives and a recommendation letter from the municipality office has also been received.

The final IEE report, after incorporating the comments from the concerned ministry and ADB, will be made available in their respective websites and will be made available to anyone interested upon request.

3.9. Environmental Baseline Information

3.9.1. Physical Environment

Topography, Climate, Geology and Soils

The project is located in inner Terai belt. The project area extends from the banks of Bheri River to slightly elevated areas with fragile hill slopes. Most of the settlements are located in the flat lands. These settlements are surrounded by slightly elevated land, gradual slopes and small hills. The altitude of the town varies from 478 m to 797 m above the sea level.

The project area has subtropical type of climate. The maximum temperature varies from 35°C to 38°C in summer and 3°C to 10°C in winter. The relative humidity is in the range of 85 %. The average annual rainfall is estimated at approximately 2000 mm per year. About eighty percent of the total annual rainfall occurs during the monsoon season (June to September).

Geologically Subhaghat the project area consist of fine grained grey sand inter bedded with purple and chocolate shale, clay and conglomerate. The area also consist of medium coarse grained arkosic sand and fine, medium and hard massive grey sandstone. The fossils are also reported in the mudstone. The general soil type is silt clay. There are alluvium diposits. The terrace depositions consist of clay, silt and coarse sand.

Landuse pattern

The landuse type in the project area is predominated by agricultural landuse. There is around 5% forest cover and 1.5% surface water bodies in the project area. Settlements are found along the road-sides, and at flat lands of hill-elevations. Land instability is observed in Jarkatte and Khanidanda areas.

Air Quality and Noise Level

There are no major industries in the project area. There are 9 small cottage industries. Air pollution is caused by fugitive dust from vehicle movements particularly over unpaved roads, and by local small scale constructions activities. The roadway linking to the project area are not black topped, as a result area around the roadways are polluted by dust and smoke emitted by the vehicle that runs on the roadways. 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. From field observation, the ambient air quality of the area is considered to be under normal levels, and it was observed that air quality is not deteriorated.

The sources of noise in the project area are the local small scale construction activities and vehicle movements. The anthropogenic noise is confined in few clustered settlements and in marketplaces and only in the daytime. At nighttime, noise is generated with the arrivals and departures of buses at the bus park. From field observation, noise level in Subhaghat municipality is within the normal range, and there is no critical case of noise nuisance.

Surface Water

Bheri river is the major surface water source in the project area. Other surface flows include Gochhe khola and Jhonge Khola. The surface water sources do not have significant source of threat of pollution. However, disposal of waste onto water bodies is seen as a concern at some places. No case of ground water contamination is noticed.

3.9.2. Biological Environment

Flora in the Project Area

The project area is primarily agricultural and the settlement area is surrounded by the river banks and forest areas. There is only scattered tree cover and grassland within the project area. The surrounding forest area is mixed forest with predominant sal (*Shorea robusta*) and salla (*Pinus roxburghii*). Pine forests become denser as the surrounding areas extend towards the upper elevations. Sisau (*Dalbergia sisoo*), Karma (*Syzygium aromaticum*), Shag (*Carya ovate*), Jamun (*Mangifera indica*) and Teak (*Tectona grandis*) are also found in the forest covers. There are some community forests within the project area like Shree Toribari Namuna Community Forest (Mehelkuna - 9), Shree Radhadevi Lekhaaul Community Forest (Mehelkuna - 7), and Shree Mulpani Community Forest (Khanidanda - 8).

Fauna in Project Area

Many species of mammals and birds are observed in the project area. Both large and small mammals including Leopard (*Panthera pardus*), Indian Fox (*Vulpus bengalensis*), Deers (*Cervidae*), Wild Boar (*Sus scrofa*), Langoor Monkeys (*Trachypithecus francoisi*), Common Mongoose (*Herpestes javanicus*), Squirrel (*Sciuridae*) etc are found in and around the project area. Weaver Sparrow (*Passer, Ploceidae* family), Peafowl (*Pavo cristatus*), Carrion crow (*Corvus corone*), Vulture (*Diumilis neophron*) and Red Junglefowl (*Gallus gallus*) are among the bird species found in the area. White-rumped Vultures are the endangered species.

NTFPs in the Project Area

The main NTFP species found in the project area are Majitho (*Rubia manjith*), Siltimur (*Lindera neesiana*), Lapsi (*Choerospondias axillaries*), Kantakari (*Solanum surattense*), Alainchi (*Amomum aromaticum*), etc. Harro (*Terminalia chebula*) and Barro (*Terminalia bellirica*) are endangered species.

Protected Areas

There are no protected areas within the project area. The project area doesn't fall within demarcated protected chure area.



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3.9.3. Socio-economic and Cultural Environment

Household and Population

Household survey within service area accounted the total households as 3,052 and permanent population as 15,854. The ward numbers and the cluster settlements including the survey year households and the population are presented in table 3.2. People from nearby rural areas have come to settle in the market centers of the municipality. The evidence of past few years indicates that immigration will be in growing rate. The data of municipality for the year 2073/74 BS shows that 74 households have come for immigration from nearby places. This aspect has been addressed during projection of population for estimation of demand for the design year.

Table 3.2: Service Area, HH and population (Survey year, 2017)

Municipality	Ward No.	Cluster / Settlements	HHs	Population		
				Permanent	Floating	Total
Gurbhakot	6	Sano Nakkale, Thulo Nakkale, Bada Kholi, Kapase, Gaile, Satmule, Tatapani, Nimare, Tori Bari, Jarkote	872	4716	20	4736
	7	Kopchi, Chisi Kholi, Shreebani, Gokulpur, Manike, Nanghi	624	3332	66	3398
	8	Pabitra Bazar, Khatang, Sundar Khali, Gangate, Simana Tole, Kumalpani, Pulchowk, Gharighare Tol, Badi Samudaya Tole, Bhural Tol, Bheri Nadi Kinara Tol	847	4211	104	4315
	9	Bhotechaur, Simghat, Bhalu Khola, Kapre Khola, Magh Khande, Chisapani	709	3595	102	3697
Total			3052	15854	292	16146

Source: Socio-economic Survey, May 2017

Caste and Ethnicity

The proposed project service area comprises different caste/ethnic groups. Each caste and ethnicity is characterized by its own customs, traditions, culture and nature of occupation with which they are associated. Dalit comprising 52.7% of total families are prevailing caste group in the service area. Brahmin/Chhetri is the next major group with 31.6%, followed by Janajati which constitutes about 15.6% as shown in table below;

Table 3.3: Caste / Ethnicity

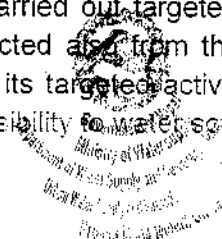
Ethnicity	Gurbhakot Municipality (Ward No.)				Total	Percentage
	6	7	8	9		
Brahmin/Chhettri	278	176	194	317	965	31.6
Janjati	119	109	103	145	476	15.6
Dalit	475	337	550	247	1609	52.7
Other		2	4		2	0.1
Total	872	624	847	709	3052	100.0

Source: Socio-economic Survey, May 2017

There are some instances of untouchability in the municipality, but these cases are negligible in the project area as the local authority has regularly carried out targeted activities to uplift the socio-economic status of the dalits. This can be reflected also from the fact that every year, Gurbhakot municipality allocated upto 15% to 20% of its targeted activity budget for dalit and janajati focused activities. There is no restriction in accessibility to water sources for dalits.



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Religion and Culture

Around 98.6% people follow hindu religion while fractions of people follow other religions like Buddhism, Christianity and others in the project municipality (*Municipality Profile of Gurbhakot municipality, 2074 BS*). There are temples of hindu gods like Shiva and Ram in and around the project area. At Mehelkuna alone, there are 15 hindu temples, and 2 churches. The project area is a culturally rich area with historic and touristic significances.

Occupation

Although, the economy of the area is gradually shifting from rural agricultural economy to trade/business and service based, majority of the households are still dependent on agriculture. As the socio-economic data shows, nearly 58 percent of the households have agriculture as main occupation. Service is another main occupation of 13 percent households followed by business 12 percent. The Ward wise households by occupation are presented in table below;

Table 3.4: Occupation of Households of the Project Area

SN	Occupation	Gurbhakot Municipality (Ward No.)				Total	Percent
		6	7	8	9		
1	Agriculture	722	357	247	442	1768	57.9
2	Business	32	77	117	135	361	11.8
3	Services	79	111	116	87	393	12.9
4	Industry			1		1	0.0
5	Foreign Employment	19	53	142	28	242	7.9
6	Wages	11	14	202	14	241	7.9
7	Others	9	12	7	2	30	1.0
8	Do Nothing			15		15	0.5
	Total	872	624	847	708	3052	100

Source: Socio-economic Survey, May 2017

Economic Characteristics

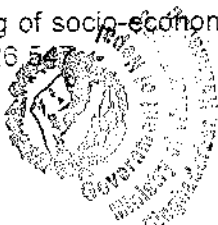
Economic condition of the families in service area is satisfactory in terms of their monthly income level. The distribution of households by income range is shown in Table 3.5, which indicates that 55.3 percent of them have income range NRs. 20001-50000 per month. Likewise, 28.7 percent of households fall under the income range NRs. 7501-20000 categories. As the data shows 11 percent of households have highest income level (more than NRs.50,000 per month), whereas 1.9 percent of the households have lowest income level i.e. less than NRs. 5,000 per month

Table 3.5: Monthly Average Income Range

SN	Income Range (NRs.)	Ward No.				Total	%
		6	7	8	9		
1	<5000	48	8	1		57	1.9
2	5000-7500	56	20	16	3	95	3.1
3	7501-20000	283	190	338	66	877	28.7
4	20001-50000	417	337	431	503	1688	55.3
5	>50000	68	69	61	132	330	11.0
	Total	862	872	624	708	3052	

Source: Socio-economic Survey, December 2015

Finding of socio-economic census survey depicts that the household average monthly income is NRs. 26,547



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Access to Drinking Water

Jutpani water supply scheme serves through 80 public taps. Botechaur Scheme serves through 35 public taps. Badkholi Scheme serves through 37 public community taps. Only 79 households are using private taps, 1700 households fetching water from public taps, 840 households using shallow dugwells and many are still using water from spring, streams and rivers.

Access to household latrine

Most of the households in the market area have permanent type of private latrine and others have temporary type of private latrine. It was reported that all the colleges/schools, hospital and government offices have toilets. In total 94.8 percent (2892 out of 3052) of the households have proper household toilet. Among the households with access to household latrine, 85.6 percent of them have ventilated type of latrine, 11.5 percent have pit latrine and 2.5 percent have water-seal type. The following table shows ward-wise the access to household latrines;

Table 3.6: Access to Household Latrine

Toilet	Ward No.				Total	Percent
	6	7	8	9		
Standard	808	583	823	678	2892	94.8
Not Proper	64	41	24	31	160	5.2
Total	872	624	847	709	3052	100.0

Source: Socio-economic Survey, May 2017

It is to be noted that 5.2% of them lack proper toilet facilities and need upgrading of their household toilets into water sealed type.

Existing Health Situation

The oldest hospital in Surkhet district is the District Hospital and it has 35 beds providing medical facilities. There are two health posts and one private clinic in the project area. Most of the people visit District Hospital for general health treatment. However local people visit Nepalgunj or even Kathmandu for treatment of complicated health problems. Field observations of records show that water borne diseases are prevalent in the project area. Waterborne diseases can have a significant impact on the local economy. People who are infected by a waterborne disease are usually confronted with financial burden. This is especially the case in poor households.

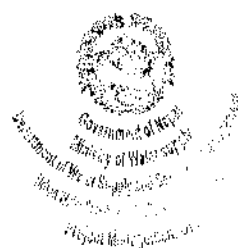
Most people are found aware in health and hygiene. People are aware about hand washing before touching and eating food, and after defecation etc.

Institutions

There are 10 government offices, 13 financial institutions like banks/cooperatives, 18 educational facilities including government school/private schools and a college, 5 NGOs and 6 cottage industries within and in near proximity of the project area.



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3.10. Review of Policies and Legislation

Various national and local legal and institutional framework within which the environmental assessment was carried out are listed below:

3.10.1 Nepal's Environmental Policy and Legal Framework

Most of the national policies and laws of the Government of Nepal (GoN) are in favor of environmentally sound economic development and growth. Followings are the summaries of the relevant policies, acts and regulations and guidelines that have been reviewed during the preparation of the IEE report;

The Constitution of Nepal

The Constitution defines that each person shall have the right to live in a healthy and clean environment (Clause 1 of Article 30). The victim of environmental pollution and degradation shall have the right to be compensated by the pollutant as provided for by law (Clause 2 of Article 30). It prescribes for the State to give priority to the protection of the environment and prevention of its further damage due to physical development activities. Proceeding from, and conformable to, the Constitution, the Government of Nepal has passed a series of environmental laws, policies and implementing regulations and standards. Among these, the basic legislation that provides the framework within which environmental assessment is carried out in Nepal.

Third Three Year Interim Plan/14th Periodic Plan of Nepal (2073/74 - 2075/76)

The interim plan provides the most recent guidance for development sector priorities highlighting, in particular, the need of environment friendly planning and technology. It proposes the strategies also for internalization of environmental management in development projects. It calls also for a stronger partnership among developmental agencies, including the local stakeholders, for implementation of environmental activities.

Fifteenth Plan (2076/77-2080/81) Approach Paper, 2076 BS (2019 AD)

Fifteen Plan Approach Paper (2076 BS) has forced its objective to extend road network keeping the net transportation cost at minimal level, and continue upgrading as well as maintenance work to ensure regular road connectivity. This policy has established multiple working area based on five major strategies. It has planned to ensure balanced development in considering provincial level balanced infrastructures based on master plan. It has also ensured to award contract only after completion of all designed reports as well as demarcation of the ROW of the road. Furthermore, it has also planned to promote modern infrastructure construction through adoption of modern technology as well as providing surplus input on activities like Bio-engineering.

National Environmental Policy, 2076 BS (2019 AD)

The policy has versioned for the management of pollution, waste maintenance of greenery to ensure people's right to live in hygienic and healthy environment. Similarly, the policy has objective of mainstreaming the environmental concerns in developmental activities. It has emphasized to promote reuse and recycle of the waste. To prevent, control and minimize the pollution has proposed following policies and strategies:

Efficient structure will be formed to prevent, control and minimize the pollution

- Promotion of environment friendly vehicles.
- Waste segregation as well as promotion of reuse and recycle technique similarly; proper disposal of the remaining solid waste has to be ensured.
- To maintain the hygienic aquatic environment direct release of polluted water, sewage and solid waste to the water body will be prevented.

While managing the solid and liquid waste, appropriate mitigation measures will be imposed to the source and minimize the potential adverse impacts on downstream area.

National Policy on Rural Drinking Water Supply and Sanitation, 2004

The policy provides guidance on water and sanitation service provision in rural areas using community led participatory approaches. While partially relevant to the urban context, particularly around the integration of inputs and local capacity building, it generally fails to address the complex operational challenges to be faced by municipal authorities in implementing and managing urban services.

National Urban Policy (2007)

The policy gives importance to environment conservation while carrying out urban development works and natural resource use; thus, supporting the required environmental conservation and protection in donor-assisted development projects.

National Urban Water Supply and Sanitation Sector Policy, 2009

The policy is formulated to provide the overall policy support and guidance towards achieving equity in service delivery by ensuring that the financially marginalized households within the system areas are mainstreamed as valid customers of service through design and implementation of financial incentives where so required. It aims to ensure that the roles and responsibilities of central and local government bodies, external development partners, private sector including NGOs and user groups are clearly defined in scheme implementation and regulation and performance management in accordance with national decentralization policy.

Land Use Policy 2072 BS (2015 AD)

The strategy 3 of Policy 2 has taken into account to maintain a balance between physical infrastructure development and environment. The strategy 3 of Policy 10 focusses on adoption of principle of sustainable development in view of the impact of climate change during any construction and/or development works in order to keep balance between land, environment and development.

Land Use Act 2076 BS (2019 AD)

The Land Use Act, 2019 has come into force in Nepal. As per the act, land has been classified into 10 categories: agricultural; residential; commercial; industrial; mining and mineral; forest; river, stream, pond and wetland; public use; cultural and archaeological; and others. The land classification is based on the composition and use of the land. The classification has not clearly pinpointed religious land in the name of temples or shrines.


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National Forest Policy (2075 BS)

The policy focuses on coordination and partnership between all the three levels of government in Nepal - the federal government, the provincial government and the local government for sustainable and participatory management of the forests, protected areas, watersheds and biodiversity. Conservation of the forest area and its multiple utility has been taken as one of the eleven objectives of the policy. Active role of the local government in forest management and compensatory plantation works have also been pronounced in this policy.

National Climate Change Policy, 2076 BS (2019 AD)

National Climate Change Policy, 2076 BS has focused its area to comply the development areas coping with the climate change as well as protecting the biodiversity and livelihood together with ecosystem persistence at holistic approach. It has targeted to develop forest as degraded land as well as river banks through plantation. Generation of greenhouse gases shall be mitigated with proper measures. Similarly, road design should include climate change risk mitigation measures.

3.10.2 Nepal's Environmental Legal Frameworks

Environment Protection Act (EPA), 2053 B.S. (1997 A.D), which requires a proponent to undertake IEE or environmental impact assessment (EIA) of the proposed project and have the IEE or EIA report approved by the concerned sector agency or Ministry of Forests and Environment (MoFE), respectively, prior to implementation. The EPA: (i) sets out the review and approval process of IEE and EIA reports, that involve informing and consulting stakeholders; (ii) stipulates that no one is to create pollution that would cause significant adverse impacts on the environment or harm to public life and health, or to generate pollution beyond the prescribed standards; (iii) specifies for the Ministry in charge of environment (currently the MoFE) to conduct inspection of approved projects to ensure that pollution prevention, control or mitigation is carried out according to the approved IEE or EIA report; (iv) provides for the protection of objects and places of national heritage and places with rare plants, wildlife and biological diversity; and (v) states that any person/party affected by pollution or adverse environmental impact caused by anybody may apply to the prescribed authority for compensation to be recovered from the polluter/pollution generator.

Environment Protection Rules (EPR) 1997 (and its amendments), define the implementing rules and regulations of the IEE/EIA process, elaborating the provisions in the EPA. The preparation, review and approval of IEE and EIA reports are dealt with in Rules 3 to 7 and 10 to 14. Schedule 1 and Schedule 2 list down the projects of activities that are required IEE and EIA, respectively, as amended in 2007. Other environmental acts, rules, plan, policies, guidelines that are relevant to the project are presented in Table 3.7;



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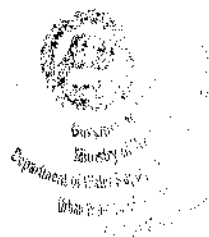
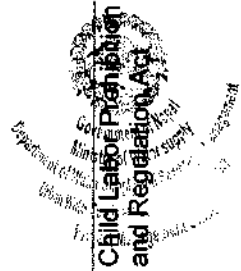


Table 3.7: The Relevant Environmental Policies, Laws and Guidelines of Nepal

Constitution of Nepal	2072	The Constitution of Nepal made the provision to every person has the right to live in a clean environment. It also made provision 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.
Water Resources Act	1992	A comprehensive law on the development, use and conservation of water resources in Nepal, it aims to minimize damage to water bodies by requiring the conduct of EIA & preparation of EIA Report before granting license to use water resources for any purpose. Proponents shall make sure that the beneficial use of water resources does not cause damage to other water uses/users (Article 4).	GoN IEE has been approved. Use of water resource has been granted by the District Office.
		Article 17 requires proponents to apply for any necessary land acquisition accordingly.	Sites for main structures have been acquired accordingly.
		Article 18 requires the compliance to quality standards in making use of water resources. Article 19 prohibits the pollution of water resources. Under the Act are two regulations for drinking water purposes: (i) Water Resources Regulation, 1993, setting out the implementation procedures for the Act; and (ii) the Drinking Water Regulation, 1998, which specifies compliance with the drinking water quality standards and control of water pollution (or sanitation) as it affects drinking water.	EMP prescribes the compliance with NDWQS and its Directives during operation.
Child Labor Prohibition and Regulation Act	2001	The section 3 of the act prohibits a child from engaging in work, sub clause 1 of the clause 3 states "Nobody shall engage in work a child who has not completed fourteen years of age as a labor and sub clause 2 states "Nobody shall engage a child in a risk full occupation or work set forth in the Schedule".	The section 4 states "Child not to be engaged in work against his will by temptation or fear or pressure or by any other means


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Labour Act Labour Rules	2017 2018	The Act emphasizes OHS Policy; Safety & Health Committee; OHS arrangements including child care center; workplace safety; environment of work place; and specific Labour Audit	Additional rest period for certain female employees, Specific provisions relating to the safety of the works having health hazards are also there in the Act
	2011	Article 4 provides that the management of hazardous, medical, chemical or industrial waste rests upon the generators of such wastes. Management should be as prescribed in the Act. Article 5 provides that individuals and entities have the duty to reduce the amount of solid waste generated while carrying out work or business.	It also stipulates to make arrangements such as removal of waste accumulated during production process and prevention of dust, fume, vapor and other waste materials, which adversely affect the health of workers. EMP prescribes eco-friendly management of solid and hazardous wastes.
Drinking Water Rules	1998	The Rules: (i) gives the procedure for the settlement of dispute on use of water sources; (ii) requires water supplier to maintain the quality of water as prescribed in the Water Resources Act; (iii) prohibits water supplier to construct structures and conduct activities that would pollute the water source and cause significant environmental effects	Monitoring of the quality of supplied water is prescribed in the NDWQS Directives. GoN has approved the Project's IEE Report.
Local Government Operations Act	2017	The Local Government Operation Act, 2017 empowers the local authority for the conservation of local natural resources and implementation of environmental conservation activities along with prime responsibility of conducting development projects which includes water supply, sanitation and awareness activities.	Provides basis for Local Government to monitor the environmental performance of the projects. EMP provides the responsibilities of LGs in EMP implementation.
Land Use Act 2076 BS	2019	The Land Use Act, 2019 has come into force in Nepal. As per the act, land has been classified into 10 categories: agricultural; residential; commercial; industrial; mining and mineral; forest; river; stream, pond and wetland; public use; cultural and archaeological; and others. The land classification is based on the composition and use of the land.	The project will focus to have least possible impacts on agricultural land and surface water bodies
National Environmental Policy and Action Plan (NEPAP)	1993	Of its five objectives, most relevant to the Project are to: (i) mitigate adverse environmental impacts; and (ii) safeguard national & cultural heritage & preserve biodiversity, within & outside protected areas.	Project will not impact on physical cultural heritage & biodiversity. EMP provides measures to mitigate impacts.
National Water Supply and Sanitation Policy	1998	The Policy requires the: (i) monitoring of water quality supplied by completed WSS projects; and (ii) evaluation of their benefits in improving health (e.g., reducing water-borne diseases) and in relieving the sufferings of women and other disadvantaged groups in carrying out their responsibilities over water collection and	Monitoring of the quality of supplied water is prescribed in the EMP following the NDWQS Directives.

maintenance of sanitation and hygiene.

Updated 15-Yr Development Plan for Small Towns Water Supply and Sanitation Sector	2009	The Plan defines the population threshold of "small towns" to be in the range of 5,000 to 40,000. Reference to Schedules 1 and 2 of the EPR, as amended in 2007, places water supply projects in small towns under Schedule 1 or within the threshold of water supply projects requiring only an IEE. The Plan emphasizes monitoring and evaluation as an important component to determine impacts	EMP prescribes environmental effects and performance monitoring.
Implementation Directives for the National Drinking Water Quality Standards	2005	It sets out the water sampling, testing, analysis, monitoring and surveillance procedures to certify that the quality of supplied drinking water conforms to the NDWQS.	Monitoring of the quality of supplied water is prescribed in eth EMP following the NDWQS Directives.
National Environmental Impact Assessment Guidelines	1993	In order to integrate the environmental aspects in development projects and programs, the government has developed the National EIA Guidelines (1993). The guidelines provide guidance to project proponent on integrating environmental mitigation measures, particularly on the management of quarries, borrow pits, stockpiling of materials and spoil disposal, operation of the work camps, earthworks and slope stabilization, etc.	National Environmental Impact Assessment Guidelines, 1993
Working procedure with standard for using national forest by national priority project	2074	This procedure requires that the proponent of a national priority project receives the approval of use of land from forestry ministry if the land required is of permanent nature. It also requires that environmental assessment of such projects is to be carried out.	
Consumer Protection Act	2075	Article 3 of the act states that every consumer shall have the rights to quality goods and services. Article 7 talks about compensation to the customer if any kind of damage is caused due to the manufacture of goods and service. Article 12 provisions that the service provider should provide services without any discrimination.	
Forest Act	2076	It stipulates that the GoN can develop a land use plan of a forest in order to maintain the balance of environment and development. It also provisions that the government can develop a specific forest conservation plan for a particular section of a national forest. It also states that the forest area can be used with approval for national priority projects.	
Environment Protection Act	2076	The act emphasis on new aspects like provisions of Preliminary Environmental Study, IEE and EIA under the jurisdiction of local authority, provincial government, and central government. Need of Strategic Environmental Assessment for policies/plans/programs, and considerations of climate change for projects are among the newly enforced aspects of this act.	

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3.10.3 International Conventions

Nepal is party to the following international environmental agreements that have broad relevance to works and environmental assessment of works under the Project: (i) World Heritage Convention, in 1978; (ii) Convention on Biodiversity, in 1992, and (iii) Basel Convention on the Control of Trans boundary Movements of Hazardous Wastes and Their Disposal, in 1997. The relevance of the aforementioned environmental agreements to the Project are on their emphasis for human activities (such as development projects) to: (i) take on/institute measures to protect the local, as well as global, natural resources and/or environment; (ii) prevent and/or reduce the causes of climate change; and (iii) anticipate and mitigate the adverse impacts of climate change.

The project does not and will not break or go against Nepal's commitment to these international agreements. It supports the country's effort to meet its committed target for SDG's sixth goal. Some of these policies relevant to the proposed project are described below.

3.10.4 Other Documents

ADB's Safeguard Policy Statement, 2009

ADB's Safeguard Policy Statement 2009 is to consider environmental issues in all aspects of the Bank's operations. ADB requires environmental assessment of all project loans, program loans, sector loans, sector development program loans, financial intermediation loans and private sector investment operations.

The nature of the assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project, the sensitivity, scale, nature and magnitude of its potential impacts, and the availability of cost-effective mitigation measures. Projects are screened for their expected environmental impacts and are assigned to one of the following categories:

Category A: A proposed project is classified as category A if it is likely to have significant adverse environment impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment (EIA) is required.

Category B: A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination is required.

Category C: A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed.

Category FI: A proposed project is classified as category FI if it involves investment of ADB funds to or through FI (Financial Intermediaries).

ADB has classified this project as of Category B.



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3.10.5 Relevant Standards

Environmental standards have been reviewed, and will be followed in the project. Table 3.8 specifies some of these standards and are detailed in Annex 2;

Table 3.8 Relevant Environmental Quality Standards

Particular	National Standard	International Standard
Ambient air quality	National Ambient Air Quality Standards, for Nepal, 2003	WHO Air Quality Guidelines, Global Update, 2005
Noise	National Noise Standard Guidelines, 2012	WHO 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.

3.11. Existing Conditions

Existing Water Supply

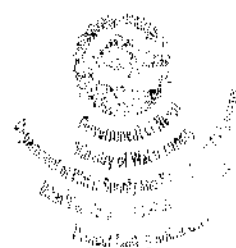
Jutpani water supply scheme covers part of ward 8 of Gurbhakot Municipality. Mehelkuna Scheme commenced its operation in the year 2052 B.S. It serves about 900 households of ward nos. 7 and 8 of Gurbhakot Municipality through 80 public taps. Botechaur Scheme serves about 500 households of Bhalukhola village in ward 9 of Gurbhakot Municipality through 35 public taps. Badkholi Scheme serves the service areas of ward 6 through 37 public community taps. Besides, the sources used in the existing schemes, there are many numerous small springs in the project area such as Satmule spring, Gachhe khola spring, Baisei spring, etc. The spring sources including the sources used in the existing schemes have very limited yields to meet the large demand of the project area.

Existing Sanitation Situation

In the core market and newly developed settlement areas, new buildings have been constructed with attached water sealed toilet or flush toilet with septic tanks. The newly constructed houses, offices and camps need to be monitored so as to ensure that there is no open defecation. The effort towards the initiation to adopt proper sanitation system can still be found because children at school are being made to practice it, since every school and college has at least one toilet.



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3.12. Size and Magnitude of Operation of the Project

The water supply system has been designed for a base year population of 17,197 for the year 2019. The system has been designed to extract ground water source from six numbers of sump wells for a total design year population of 33,418 for the year 2039. The design is targeted to supply 24 hours continuous supply with potable water as recommended by NDWQS guidelines. One existing and seven new reservoir tanks have been proposed at different locations considering in mind the locality and topography. Total water reserve capacity is of 1190 cubic meters. A total of 17.769 km of transmission mains and 113.340 km of distribution lines will serve house connection of drinking water taps to 3251 houses in the base year.

The project has been designed with the principle of active community participation from the design stage itself. The implementation strategy of the project is based on the community management approach, which includes encouraging the financial responsibility towards the improved facility. Therefore, user participation at the outset of the planning and design exercise is an essential requirement. The community has to contribute 30% of the total construction cost. Out of which 5% has to be deposited before implementation of the project as upfront cash. Another 25% is to be contributed taking the loan from TDF. The loan should be recovered within the time frame of 25 years with 5 years of grace period, along with the interest of 5% per annum through their affordable water tariffs. Tariff raised by the service has to support towards maintenance of the supply system of the water supply system.

3.13. Description of the Project

3.13.1 Water Source: Location & Yield

All the proposed sources are sump wells. The proposed sump well site for System A is along the bank of the Bheri River located at Mehelkuna, ward 7 of Gurbhakot Municipality. The proposed sump well site for System B is along the bank of the Bheri River located at Botechaur, ward 9 of Gurbhakot Municipality. There are no water right issues of the proposed water sources. The water is pumped from the sump well to the water treatment plant, from which water is pumped to the reservoirs of the various distribution subsystems. Table 3.9 provides the yields of sources;

Table 3.9: Yield of Proposed Water Source

System	Source Type	Expected Safe Yield per well (lps)	Well Number	Tapped Discharge per well (lps)	Source Location
System A	Sump Well	9.0	4	8.885	Mehelkuna, Ward 7
System B	Sump Well Malb	9.0	2	6.345	Botechaur, Ward 9

3.13.2 Water Quality Assessment

The water samples were collected from the existing sump wells located nearby Bheri River at Botechaur and Mehelkuna on January 10, 2017 and February 12, 2018 to assess the raw water quality of the sub-surface water in the project area. The physical and chemical parameters of the water samples were analyzed at a certified laboratory in Kathmandu. The water quality test

report obtained from the laboratory is attached in Annex 5. The water quality of the existing sump well in the project area along with National Drinking Water Quality Standards (NDWQS);

Table 3.10: Water Quality Assessment

SN	Parameters	Units	Observed Values				NDWQS, Nepal
			Mehelkuna		Botechaur		
			04/07/2017	12/02/2018	04/07/2017	12/02/2018	
1	pH at 18°C		7.8	7.8	7.9	7.8	6.5 – 8.5
2	Electrical Conductivity	µc/cm	611	464	393	384	1500
3	Turbidity	NTU	1	<1	<1	11	5
4	Color	Chromaicity	-	<0.05	-	0.07	5
5	Total Hardness as CaCO ₃	mg/l	322	298	208	256	500
6	Total Alkalinity as CaCO ₃	mg/l	310	303	215	275	-
7	Chloride	mg/l	13.41	10.85	0.99	4.44	250
8	Ammonia	mg/l	0.05	0.10	0.10	0.24	1.5
9	Nitrate	mg/l	33.21	23.98	4.06	2.58	50
10	Nitrite	mg/l	0.04	<0.02	0.37	1.37	-
11	Fluoride	mg/l	-	<0.05	-	<0.05	0.5 – 1.5
12	Sulphate	mg/l	-	<1	-	1.65	250
13	Calcium	mg/l	72.94	68.94	44.09	54.51	200
14	Magnesium	mg/l	34.03	30.62	22.82	29.17	-
15	Iron	mg/l	0.15	0.15	0.17	0.12	0.3
16	Manganese	mg/l	N.D. (<0.02)	N.D. (<0.02)	N.D. (<0.02)	N.D. (<0.02)	0.2
17	Arsenic	mg/l	N.D. (<0.005)	N.D. (<0.01)	N.D. (<0.005)	N.D. (<0.01)	0.05

Source: WQ test reports, July 2017 and February 2018

All the water quality the parameters were found comply with the NDWQS for drinking water. The water analysis report shows that the turbidity of water in Botechaur source was found higher than the standard values set by NDWQS on February 12, 2018. All other water quality parameters were found comply with the NDWQS for drinking water. However, the water quality report showed the total hardness of water to be considerably high. The total alkalinity is also present in significant amount. Although the water quality is found to be suitable as per NDWQS, the deposition of calcium in the pipe may be likely to occur due to high concentration of hardness and alkalinity. However, the deposition of calcium in the pipe was not found visible during the field survey.



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3.13.3 Project System/Sub-Systems and Project Components

3.13.3.1 Systems and Subsystems of the Project

Existing water supply structures which are in good conditions are proposed to be used under this project as well. One existing reservoir of 100 cum has been proposed to be used. Seven new reservoirs will be constructed. Service area has elevation difference in order of 319 m. Thus considering the topography, land use, settlement pattern and use of existing facilities; 2 separate systems are proposed and are briefly described below;

System A: This is a pumping system. The source of this system is collector well located nearby Bheri River at Mehelkuna in ward 7. The water is pumped from the sump well to the water treatment plant, from which water is pumped to the reservoirs of the four distribution subsystems. This system is proposed to serve service areas in wards 6, 7 and 8 of Gurbhakot Municipality through 4 subsystems as described below:-

Badkholi Nakalae subsystem: This subsystem serves Badakhola Bazar, Madhya Gaile, Mokare, Mom, Purba Gaile, Pashim Gaile, Wadakhola Bazar, Sano Nakale and Thulo Nakale areas of ward 6 of Gurbhakot Municipality. A 100 Cum RCC reservoir is proposed at Thulo Nakale in ward 6. The water from the reservoir is supplied to the service areas through gravity. This system is designed to cater 2,627 permanent and 25 rented (total 2,652) population.

Badkholi Tatopani subsystem: This subsystem serves Kapase, Kapasi and Tatopani areas of ward 6 of Gurbhakot Municipality. A 50 Cum RCC reservoir is proposed at Tatopani in ward 6. The water from the reservoir is supplied to the service areas through gravity. This system is designed to cater 1,272 permanent and 13 rented (total 1,285) population.

Badkholi Jarkate subsystem: This subsystem serves Satmule, Santichaur, Sotarkholi, Nimare and Toribari areas of ward 6 of Gurbhakot Municipality. A 120 Cum RCC reservoir is proposed at Nimare in ward 6. The water from the reservoir is supplied to the service areas through gravity. This system is designed to cater 3,828 permanent populations. There is no rented population in this subsystem.

Mehelkuna subsystem: This subsystem serves Aasapatal Line, Badhitole, Mehelkuna Bazar, Bhural, Gangate, Gharibehelkula, Gimaal, Karki Tole, Khatang, Kumalpani, Mulyal, Pabitra Bazar, Pulchowk, Sundarkhali, Simana Khotang, Simaha Khatanga ns Santi Chowk areas of wards 7 and 8 of Gurbhakot Municipality. Two RCC reservoirs, each of 300 Cum capacity is proposed at Sundarkhali in ward 8. The water from the reservoir is supplied to the service areas through gravity. This system is designed to cater 16,547 permanent and 482 rented (total 17,029) population.

System B: This is also a pumping system. The source of this system is sump well located nearby Bheri River at Botechaur in ward 9. The water is pumped from the sump well to the water treatment plant, from which water is pumped to the reservoirs of the two distribution subsystems. This system is proposed to serve service areas in ward 9 of Gurbhakot Municipality through 2 subsystems as described below;

Botechaur Bazar subsystem: This subsystem serves Botechaur Bazar, Chisapani, Dandagaon, Kopchi, Manjila, Singhhat, Nayabazar, Bairachaur, Singhhat, Sriwani, Tallo

Botechaur and Tallo Simghat areas of ward 9 of Gurbhakot Municipality. A 240 Cum RCC reservoir is proposed at Botechaur in ward 9. An existing RCC reservoir of 100 Cum capacity is also to be used in this system. The water from the reservoir is supplied to the service areas through gravity. This system is designed to cater 6,082 permanent and 272 rented (total 6,354) population.

Botechaur Bhalukhola subsystem: This subsystem serves Bhalukhola Gaon, Mathillo Bhalukhola, Nilukhola, Kaprekhol, Karki Tole, Majhe Khand, Khahare Khola, Patihalla and Simghat areas of ward 9 of Gurbhakot Municipality. An 80 Cum RCC reservoir is proposed at Bhalukhola Gaon in ward 9. The water from the reservoir is supplied to the service areas through gravity. This system is designed to cater 2,247 permanent and 23 rented (total 2,270) population.

The following table summarizes the subsystem-wise population projection up to the design year 2039;

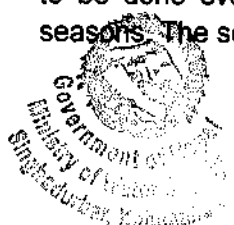
Table 3.11: Subsystem-wise Population Projection

Distribution System	Survey Year (2017)		Base Year (2019)		Design Year (2039)	
	Population		Population		Population	
	Own House	Floating	Own House	Floating	Own House	Floating
Badkholi Nakale	1488	13	1566	14	2627	25
Badkholi Tatopani	784	7	819	7	1272	13
Badkholi Jarkute	2444	0	2545	0	3828	0
Mehelkuna	7543	170	8079	187	16547	482
Botechaur Bazar	2284	93	2492	103	6082	272
Botechaur Bhalukhola	1311	9	1375	10	2247	23
Total	15854	292	16876	321	32603	815

3.13.3.2 Components of the Project

Since the water quality has been analyzed twice, it cannot be accurately reliable. The proposed sump well is located at different place than sampled sump well. The quality of water in the proposed sump well may not show exactly the same results as the existing sump well. From the consideration of the water quality of the existing sump well, the water treatment system consisting of, aeration towers, pressure filter, softening and disinfection is recommended. It is recommended to analyze the water quality from the proposed sump well once it is constructed.

Aeration tower made of mild steel is proposed to precipitate out dissolved iron using air blower. Pressure filter made of mild steel is proposed to remove precipitated iron and other suspended materials. Softner is proposed to remove hardness of water. The water treatment process has been selected based on the raw water quality. The proposed treatment process aims to remove the high concentrations of turbidity and hardness present in the raw water. It also kills pathogenic organisms present in raw water and ensures the presence of residual chlorine to kill the pathogenic organisms during the conveyance of treated water in pipelines. Backwashing is to be done every week, and backwash is to be carried out also as per need during rainy seasons. The schematic diagram of the proposed treatment plants is shown in figures below;



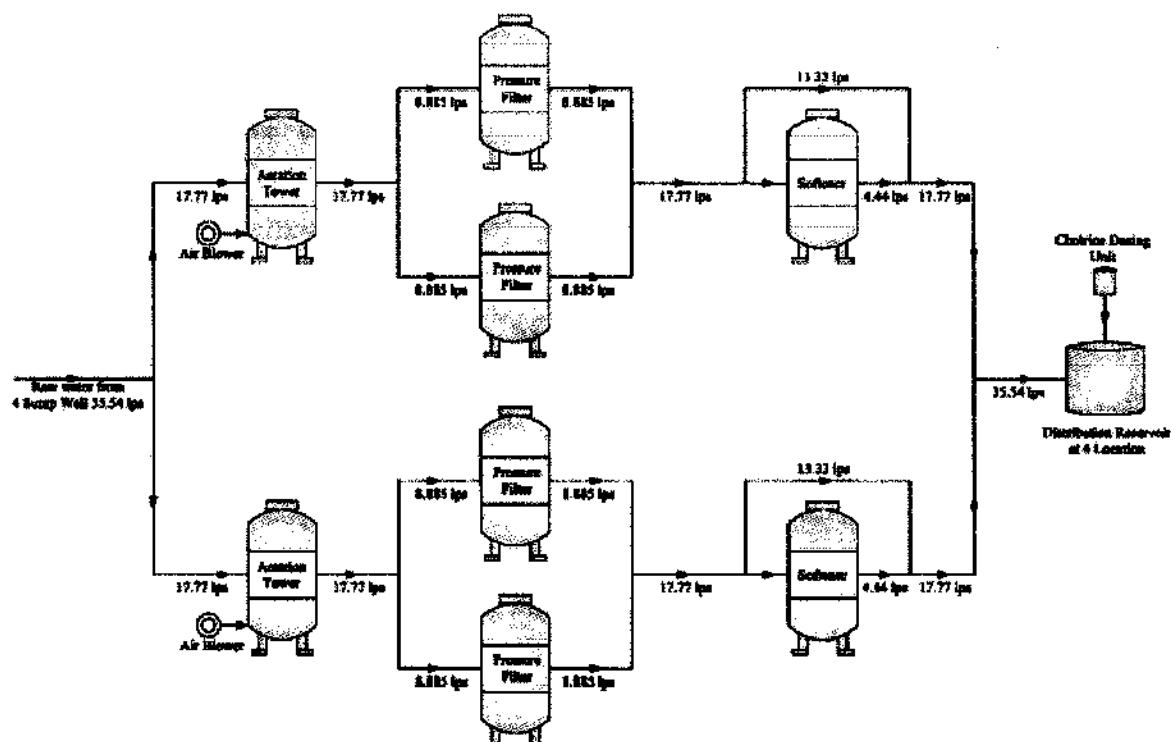


Figure 3.3: Schematic Diagram of Treatment Process for Mehelkuna System (System A)

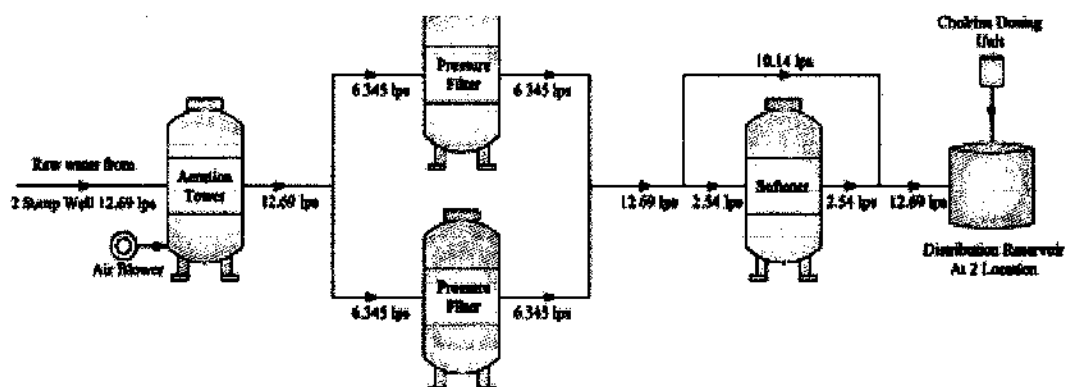


Figure 3.4: Schematic Diagram of Treatment Process for Botechaur System (System B)

The project components include transmission mains, distribution reservoirs, distribution networks, treatment units, guard house, office building and other temporary and permanent facilities. The details of the components are described below;

i. Transmission mains

The transmission main conveys the water from the sump well to overhead service reservoirs. Since the water is conveyed by pumping it is also known as pumping main. Pipe sizes are so selected that velocity of water within the pipes remain within the range of 0.5 m/s to 1.5 m/s. DI pipes are proposed to use in both the systems. The water is pumped from the sump well with

sufficient head so that the water passes through the water treatment plant and delivers it into the ground reservoir/sump well. The water is then pumped again from ground reservoir/sump well to overhead reservoir. The total transmission main pipe length of the proposed systems is 17.769 km. Thrust blocks are also provided to restrain the pumping mains in both the systems.

Table 3.12: Transmission/ Pumping Main

SN	System	Length of Pipes (m)		
		Proposed	Existing	Total
1	Mehelkuna	12467	-	12467
2	Botechaur	4264	1038	5302
Total		16731	1038	17769

ii. Distribution reservoirs

The service reservoir is required to store the water to meet the hourly fluctuation of consumers' water demand. This allows the peak flow in the distribution network. The total storage requirement for the system at the end of design period i.e. 2039 is calculated as 1200 Cum. Existing reservoirs are very small in capacity and have not been utilized in the proposed system except a 100 Cum capacity RCC reservoir located at Botechaur, ward 9. This reservoir is recently constructed and is in good condition. The reservoirs will be constructed of RCC and is designed as ground based tank as the terrain suggests. The following table summarizes the requirement of reservoir tanks for the various systems;

Table 3.13: Requirement of Reservoir

SN	Systems	Reservoir Size (Cum)	Type	Remarks
1	Badkholi Nakale	100	RCC	Proposed
2	Badkholi Tatopani	50	RCC	Proposed
3	Badkholi Jarkute	120	RCC	Proposed
4	Mehelkuna	600	RCC	Proposed, 2 nos. of 300 Cum
5	Botechaur Bazar	100	RCC	Existing
		140	RCC	Proposed
6	Botechaur Bhalukhola	80	RCC	Proposed
Total		1190		

iii. Distribution Network

The distribution system comprises of pipe network, which consists of mainly loops and branch. The water is supplied from the service reservoir to the consumers by the distribution pipe network. This network is analyzed using a design analytical software tool. Distribution pipes are laid both sides of the all metalled and major roads. Single line pipes are proposed in earthen and other roads. HDPE pipes are predominantly used. Pipe of class and size lesser than 6 kgf and 50 mm is not proposed. Existing pipes will not be used as these are leaking and found substandard (class of 4 kgf). The length of the distribution network pipes proposed for various systems is shown in the table below. The total distribution pipe length of the proposed systems is 113.340 km.

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Table 3.14: Distribution Pipe Network

SN	Systems	Length of Pipes (m)
1	Badkholi Nakale	13,435
2	Badkholi Tatopani	6,848
3	Badkholi Jarkute	15,658
4	Mehelkuna	50,523
5	Botechaur Bazar	14,121
6	Botechaur Bhalukhola	12,755
Total		113,340

iv. House Connections

The system has been designed, predominantly as house to house connections. The system has been analyzed for a design capacity of providing a total of 6269 house connections at the end of design period. However, initially during construction phase, only 3251 house connections are provided to satisfy the need for the base year population.

v. Appurtenances

These will primarily comprise of valve chambers or connector boxes to house in flow control valves for controlling flow in the pipeline and to the community taps etc. Altogether 118 valve chambers are expected in the system. Other appurtenances as air valves, scour valves, fire hydrants will be provided at suitable locations. Some road crossing has been initially provided. This will also facilitate for less road cuttings during the operational phase.

vi. Guard House/Office Building/Laboratory Room

Nine guard houses are proposed in the Subhaghat UWSSP Project. The guard house is one storey building with a guard room, toilet and bathroom. These guards are to be located at reservoir sites (one is each of the 6 reservoir sites), water treatment plant sites (one in each of the 2 treatment plant sites) and at one of the sump well sites (1 guard house). One office building consisting manager's room, cash counters is proposed. Similarly one laboratory room is also proposed to be set-up in a room in the office building. The building will be of two stories. The ground floor coverage will be around 1600 square feet.

vii. O&M Equipment and Tools

An assessment was done for the needed items. The UWSSP has also some guidelines on it. Besides the following equipment have been also considered in the project so that project works during construction period and for operational activities are effectively carried out;

- Leakage detecting equipment - 1 set
- Submersible sludge pump - 1 no.
- Electro-fusion machine for joining the PE pipes including portable Generator - 1 set
- Water quality testing laboratory equipment - 1 set
- Other Tools and Plants like electric pipe cutters, pipe wrenches etc.



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viii. Sanitation Improvement

This component comprises of support for improvement of household toilet situation of the ultra poor families in the project's service area, and it also includes construction of a public toilet. The sanitation part includes the following aspects;

a. Individual Household Toilet Improvement

It was learnt, some of the households have prepared pit latrines with bamboo, shrubs cover. The wall of pits is not found properly protected. Similarly toilets as such were also found made temporarily e.g. from bamboo, wooden post etc. Thus training programme in association with local bodies will be carried out for the proper construction of local material eg, cement plaster in bamboo woven to make wall, strengthening pit wall by locally available stone, use of RCC rings and cover and its molding methods etc. Accordingly awareness campaign is also carried out regarding public sanitation and health.

b. Design of Low Cost Latrine for Low Income Household

There are a few types of latrines that may be adopted for low income household and range from pit latrines to septic tank latrines. The type of latrines the people will construct depends largely on the financial capacity of the consumers. The other factors as culture, tradition of the people, ground condition, climate and availability of space also play a vital role. There are three distinct income groups in the project area. People with higher income tend to build better sanitation facilities with more contribution, people with medium income like to improve but with little contribution while low income people want to construct latrines but do not want to contribute.

3.14. Land Availability and Requirements

All the structural components of the project will be built on the land acquired by the WUSC. These lands are selected on the basis of technical feasibility and it is kept in mind that potential environmental impacts are minimized. The distribution lines will be through the RoW of public roads. Around 9,400 square meters of land is required for the project components.

Table 3.15: Distribution Pipe Network

SN	Site	Components	Required Land Area	Ownership
1	Sump Well site at Khatang on the bank of Veri River, Mehalkuna, Gurbakot-8	-Sump Well -Treatment unit -Generator Operator / Guard House	254.46 square meters	Gubhakot Municipality
2	Sump Well site at Ghughutikhola on the bank of Veri River, Gurbakot-9	-Sump Well -Treatment unit -Generator Operator / Guard House	763.38 square meters	Gubhakot Municipality
3	RVT site at Nakale, Gurbakot-6	-100 cum R.C.C -Ground Reservoir with Guard House	408.00 square meters	Community Forest/ Land use permission granted
4	RVT site at Toribari Jarkatte, Gurbakot-6	-120 cum R.C.C -Ground Reservoir with Guard House	623.00 square meters	Community Forest/ Land use permission granted
5	RVT site at Badkhori, Tatopani Gurbakot-6	-50 cum R.C.C -Ground Reservoir with Guard House	350.00 square meters	Gubhakot Municipality

6	RVT site at Khanidanda, Gurvakot-8	-2x300=600 cum R.C.C Ground Reservoir with Guard House	1440.00 square meters	Community Forest
7	RVT site at Botechaur, Gurvakot-6	-Sump Well 140 cum R.C.C Ground Reservoir 100 cum R.C.C - Exiting Ground Reservoir	660.00 square meters	Gubhakot Municipality
8	RVT site at Botechaur Thulo Bhalukhola, Gurvakot-9	-80 cum R.C.C Ground Reservoir with Guard House	408.00 square meters	Gubhakot Municipality
9	Mahelkuna-Badkholi System, Gurvakot-6	-Sump Well -Generator Operator House	440.00 square meters	Private/ Donated land
10	Mahelkuna-Badkholi System	-Source Sump Well (4X161.75) -WTP -Sump Well for Pumping	2,796.92 square meters	Gubhakot Municipality
11	Office Building site at Khairani on the bank of Veri rier, Mehalkuna, Gurvakot-8	-Office Building with Laboratory	500.00 square meters	Gubhakot Municipality
12	Sanitation component	Public Toilet	763.20 square meters	Gubhakot Municipality
Total			9,403.52 sq. m.	

3.15. Construction and Operation Activities of the Project

The construction phase will include following activities;

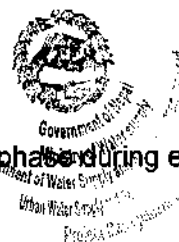
- Surface clearing activities, boring works, and excavation
- Earthworks for construction of treatment plant, reservoirs and pipeline extension, foundation works
- Trench works for pipelaying works will be 90cm deep
- Machinery works like cutting of iron-rods, mixing of concrete; operation of generators as per need
- Mechanical works like vehicle operations, maintenance of vehicles and equipments
- Equipment assisted manual works; masonry works, casting, pipeline laying, plumbing
- Transportation activities for construction materials
- One main campsite, and two temporary campsites will be constructed. The main stockpile will be within the main campsite for stocking construction materials and fuel. Other stockpile sites will be of short term as per needs near the major project component sites
- Storage and disposal of extra spoil and solid waste

The operation phase will include following activities;

- Operation of electrical pumps
- Operation of diesel generator sets during operation phase during electric power failure
- Disinfection of water
- Water Quality Laboratory operation



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- Backwash of treatment plant
- Drying and disposal of slurry/sludge

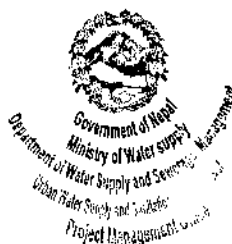
3.16. Sustainability Aspect

One of the major financial objectives of the project is to encourage the financial responsibility of the consumer for the improved facilities and its sustainable operation. While 70% of the cost will be contributed by GoN, the WUSC needs to collect minimum 5% of the civil works contract in the form of upfront cash contribution. The remaining 25 % to be borrowed from the TDF as a loan at an interest rate not exceeding 5% per annum with a maturity of 25 years including a grace period of five years.

There are quite a few clubs and local NGOs in the project area doing social programs. They will be effective for future use especially in awareness generating programs provided they are given training. School children and community social workers will be used in awareness generating programs. Commitment for contribution and participation is found high for the project. All surveyed household samples are willing to contribute for the development of the water supply project. The works of collecting cash is already commenced. During the field visit, contribution aspects were also discussed. It has been said that there would not be any problem for collecting cash from the community.



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4. IMPACTS OF THE IMPLEMENTATION OF THE PROPOSAL ON THE ENVIRONMENT

The potential impacts of the proposed Subhaghat Urban Water Supply and Sanitation Project are physical, biological, and socio-economic & cultural in nature. These impacts are likely to occur at various phases of the project such as design, preconstruction, construction and operation and maintenance phases. The magnitude of these project related impacts can be small, moderate, or high depending upon its severity, and can be temporary or long term, reversible or irreversible, local or wide. The impacts need not necessary be limited to negative ones but can be positive as well. Objective of Environment Management is to attempt augment positive impacts and minimize negative impacts through sustainable mitigation measures.

4.1 Beneficial Impacts and Augmentation Measures

4.1.1 Construction Phase

i. Employment Generation and Increase in Income

An important direct beneficial impact of a construction project is the generation of employment opportunity to the local communities and its nearby places. For the construction of this project around 7500 man-days of skilled labors and 45,500 man-days of unskilled labors in person days will be required. The socio-economic study shows that around 8% of the household heads within the project area are involved in daily wage-based works. Employment opportunity remains open to all, but the priority will be given to the locals. It is expected that the income amount will directly enhance various economic activities and enterprise development with multiplier effect in Subhaghat. In order to augment the impact, the local people particularly poor, dalits, ethnic minority and women will be given priority for employment. Badi samudaya/community of ward 8 will be given priority in local employment.

ii. Skill Enhancement

The local people will be given on-the-job trainings. The onset of project construction phase is likely to enhance their skills in plumbing, fittings and other construction works. Working skills acquired from this project will be useful for the locals to secure employment opportunities in similar projects in coming days. If required, the locals will be given trainings on plumbing, bathroom fittings, and other construction activities so that the interested and potential ones can adopt it as a profession. Since Subhaghat is itself a growing town, and also the fact that it is close to Birendrangar-Surkhet, the skilled ones will easily get better employment opportunities.

iii. Enterprise Development and Business Promotion

During the construction period, different types of commercial activities will come into operation in order to cater the demand and requirement of workers. As money flow begins, they will regularly demand different food items, beverages and other daily needs. To meet these demands, small shops and restaurants around the vicinity of the construction sites are likely to open. Various farm based enterprises including wide range of agricultural and livestock products will also gain momentum as a result of increased demand by labors. At present almost 12% of the households are involved in business. This shows that the locals will be more motivated and promoted to expanding their business and in opening new potential business as hardware shops, etc which will be in increasing demand once the town gets better water and sanitation facilities.

4.1.2 Operation and Maintenance Phase

i. Improvement in health and saving of time

After the water supply and sanitation project is complete, the people living within the project area will benefit from the supply of sufficient quantity of water, good quality water and improved sanitary conditions. Women and girls will be directly benefited as they have to spend less time in fetching water and thus have more time for study, other household and income generating activities. The impact will be augmented through regular maintenance of the water supply system by the user committee. Water Safety Plan (WSP) will be developed under an active WSP monitoring team. Development of a WSP can be an effective means to ensure functionality of the system and hence leading to its safe water supply and sustainability. Along with this, hygiene sensitization activities will also be promoted.

Women and girls will be directly benefited as they have to spend less time in fetching water and thus have more time for study, other household and income generating activities. The time savings of households is taken as time in collecting households' daily water requirements. It has been estimated that every household will save in an average of 114 working days of time value after the service from the project has started. Table below shows the annual economic value to time saved based on shadow labour price;

Table 4.1: Economic Benefits from Time Saved in Collecting Water

Time Savings per Household per year (Working Days)	Shadow price of labor per day (Rs)	Economic Value: Benefit/year (Rs)
114	350	39,744

Source: Socio-economic Survey 2017

This shows that in average, a household of service area will save time worth NRs 39,744 per year with the reduced time for water fetching after the implementation of the project. The impact will be augmented through regular maintenance of the water supply and sanitation system by the users group (WUSC).

ii. Development of Market centers

The availability of adequate supply of drinking water in the project area will accelerate the rate of development of Subhaghat as a growing market centre. At present, there are locals who are earning by selling products like milk, ginger, turmeric, timur and other agricultural products in Birendranagar, Dhangadi, Nepalgunj and even in Kathmandu. After attraction of settlements and investments in the town, these products will have increased market value, better market-chain and increased opportunities of sales.

iii. Appreciation of Land Value

One of the benefits of the project is that land price will increase due to the availability of reliable safe drinking water and sanitation system. Subhaghat has fertile land and has irrigation facilities too. Upon completion of the present project, migration from nearby places is expected. In order to promote land development in the area, the local people will be made aware that high value lands are acceptable to the banks and microfinance institutions to provide loans for them to start their own economic/social ventures.

iv. Women Empowerment

Women will largely benefit from this project, as they are the ones who spend a great deal of time in fetching water. With the operation of the water supply scheme, time will be saved. As contaminated water can lead to diseases the women of the family also have to spend a good deal of their time to care for the sick family members. With the improvement of water supply, there will be marked reduction in the occurrence of infectious disease in the area. This will provide more time to spend on other economic and social activities leading to empowerment. In order to augment the impact, the water supply system will be regularly maintained so that it operates smoothly and health and awareness programmes will be given to the local people.

v. Quality of Life Values

The project will provide good quality water and improved sanitation facilities. It is likely to bring improvement in personal, household and community hygiene practices. This will result in good family health and community health. These improvements in lives of the locals will bring about overall improvement in quality of life of the locals in the long-run.

4.2 Adverse Impacts

4.2.1 Pre-construction Phase

The pre-construction works involves field survey and investigation, development of design & detailed drawings, carrying out cost estimate etc. This also includes discussion with WUSC and revision of design if necessary. As there will be no construction activities involved; there will be no construction related adverse impacts. The Rapid Environmental Assessment (REA) Checklist for water supply and sanitation was used to identify potential impacts/issues/concerns of the project as per design. REA identified the issues and concerns that were considered during design phase are listed in Table 4.2 below;

Table 4.2: REA Identified Impacts & Mitigation Measures Taken During Project Preparation Phase

REA identified Impacts/Issues/Concerns	Measures taken during FS/DED to mitigate impacts/issues/concerns
Unsatisfactory raw water quality	During the detailed engineering design stage, water sample from existing tubewells was tested. This information has guided design of water treatment.
Delivery of unsafe water to the distribution System	Design proposes basic treatment using pressure filter, softening and disinfection. This IEE proposes "hands on" training by a licensed & accredited laboratory for the first few years of operation under the Water Safety Plan included in the project design & continuing training thereafter.
Health hazards arising from inadequate design of facilities for receiving, storing and handling of CI & other chemicals	Design has included a "housed" dosing unit.
Delivery of water to distribution system which is corrosive due to inadequate attention of feeding of corrective chemicals	Design has proposed DI, and HDPE pipes. The PE pipes of class 6kgf is chosen to avoid any leakage issues
Contamination of drinking water source and other environmental receptors from household and public toilets	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 down-stream of the drinking water source.

4.2.2 Construction Phase

A: Physical Environment

i. Land surface disturbance, erosion and land instability

Around 9,400 square meters of land will be used for project structures. Excavation and digging of trenches during construction are likely to lead to erosion and caving thereby causing soil erosion, silt runoff, and unsettling of street surfaces. Haphazard disposal of the excavated earth is likely to disturb the road surface. The activity as such will be a nuisance and discomfort to the road users and inhabitants. Accordingly water stagnation in the construction area especially during the rainy season may occur. Construction works will take place at Badkholi Nakale, Badkholi Tatopani, Badkholi Jarkute, Mehelkuna, Botechaur Bazar and Botechaur Bhalukhola. Protection works for slope stabilization is seen required at the reservoir site of Khanidanda in ward 8 as the land pattern shows slopes and fragile pattern with natural drains in these areas. The construction sites are public lands and are unused lands. Pipe-laying works are proposed through existing public road RoWs as far as possible. Hence, disturbance is minimal. There is need of road crossing at one stretch in Mehelkuna.

ii. Surface water concern

Due to the continue extraction of sub-surface water, there may be concern of use of water by the locals. As the water is proposed to be extracted from the sump-wells in the banks of Bheri river, there shall be insignificant effect to the existing water uses and users.

iii. Damage to the Existing Facilities

During the construction time, while excavating the earth, existing water supply distribution pipe lines, side-drains and compound walls may get damaged in few places particularly in the bazaar area. Mehelkuna market area and Botechaur market area are prone to such damages. Both these sites are rapidly urbanizing areas where road works are going on. Hence it is likely that road furnitures are damaged if proper timing and coordination is not carried out.

iv. Air Pollution and Noise nuisance

The construction activities like laying of transmission and distribution pipelines, construction of storage reservoirs, transport and installation of pumps, construction of sump wells will produce some extent of air pollution and noise for a certain period of time. There will be some activities such as transportation, loading/unloading of construction materials, stockpiling of construction materials, disposal of spoil, and earthworks. These will cause effect into air quality due to dust generation and vehicular emissions. Use of power horns and movement of heavy vehicles can cause serious disturbance to the community, educational institutes, hospitals/health posts and residences. The proposed stockpile and campsite area is around 500 meters from the school area under ownership of Sundar Khani School in ward number 8. Although this land is not used by the school, there is possibility of dust nuisance to the students due to operation of this stockpile and campsite area.



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v. Impact on water bodies

There will be some impacts on water bodies located within the project area during the construction phase. Possible activities, which may influence the water quality, are listed below.

- ✓ Haphazard disposal of solid waste in the vicinity of water bodies
- ✓ Sediment and excavated materials may be transported to water bodies during rain
- ✓ Leakage and disposal of oil and grease from construction equipment.

The excavation works will cause turbidity in water up to a certain extent. However the quantity is limited with respect to the discharge of water in Bheri River, and the impact will be there for short period of time. There are river crossings at 5 different points; however, there will be no any impact of this activity as per the project design.

vi. Waste Disposal

Haphazard disposal of solid waste from workers' campsites in the vicinity of water bodies and at open spaces could be a concern. Chances of open defecation by outside workers will also be a concern to local environment. Construction waste from campsites and construction sites are also sometimes disturbing the local environment. With theoretical assumption of per capita waste generation of a worker to be 0.25 kg/day, and expecting that there will be around 35 to 50 workers/persons in a campsite including the labourers, helpers and supervisors, it is expected that there will be generation of around 8.75 kg to 12.5 kg of waste per day. Though this waste is not a big volume, if not managed, it will deteriorate the local environmental sanitation conditions.

B: Biological Environment

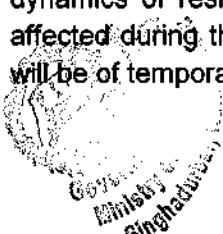
The major project structures will be built on un-used and vacant land parcels. These will be constructed on land owned or acquired by Subhaghat WUSC. However, transmission and distribution lines may pass through agricultural land and private lands. The significantly large stretches of pipelines make it more prone to unwanted damaged. Thus minor impacts are anticipated during the construction period. Most of the pipe lines pass along the roadside (RoW). The potential environmental impacts of the project on local flora and fauna during construction and post construction phases will be low as it involves no tree felling along the distribution line, minimum loss of grazing land, and no loss of agriculture lands. Some of the impacts that may likely to occur are described below;

i. Loss of vegetation cover

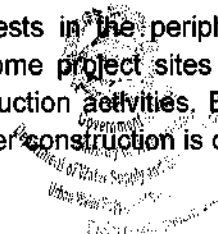
The loss of vegetation cover and species diversity due to earthwork primarily in the construction sites of reservoirs and treatment units is likely. However, the impacts will be minimized as these sites are selected at open grassland and barren lands. During the construction phase, there will be loss of only shrubs cover and some small plants. Some of the topsoil and vegetation may also be lost during pipe laying works. Since the pipelines need to cross the sal forests, there is possibility of disturbance to the forest areas especially of Shree Mulpani Community Forest of Khanidanda of ward 9. The project components require a small area of land in a particular site, and thus the environmental impacts on the vegetation and natural eco-system will not be significant.

ii. Impact on Fauna

The project site is within the built up area with some forests in the periphery. Population dynamics of resident and migratory birds and reptiles at some project sites are likely to be affected during the construction period due to various construction activities. But these effects will be of temporary in nature. The condition will be normal after construction is over.



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iii. Impact on aquatic life

Some of the construction activities and protection works are proposed at the bank of the river. These construction activities will physically disturb the water quality for a certain period of time and may cause adverse impact on aquatic life. Aquatic lives in Bheri river, Gochhe khola and Jhonge Khola are likely to be affected. But these effects will be temporary in nature.

C: Socio-economic Environment

i. Disturbance to community activities

Construction activities, particularly construction works on roads will cause disturbances to the community activities, festivals and social events. The free movement of vehicular traffic and pedestrians will be affected. Noise produced due to the operation of machines may disturb the neighbourhoods in construction areas. Mehelkuna bazaar area and Botechaur are likely to face such disturbances throughout the project's construction phase.

ii. Social Dispute and Dissatisfaction

There is a possibility of influx of outside workforce and with them money from the construction work and unwanted communities can cause problems with the local community. The local population may not get employment benefits from the project causing dissatisfaction and conflicts in the area. There is a possibility of social dispute in the community due to irresponsible behaviour of the workers such as gambling and drinking.

iii. Occupational health and safety (OHS)

Life and health of workers particularly of those involved in concreting, trench cutting, formwork and rebar fixing in the overhead tank is of prime concern. To mitigate or minimize the hazards adequate safety instructions should be provided to the contractor and monitored by the project.

iv. Community Health and Safety

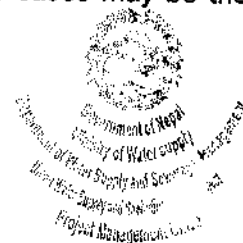
Since some of the construction works take place near the settlements, and the pipe-laying works will be through the settlements, there are chances that the local people may face small accidental cases. This is critical primarily for children and old-aged people. Chances of communicable diseases are also a concern. Stock-piles sites, spoil disposal sites and movement of vehicles for construction activities are some of the aspects of construction works which may pose threat to health and safety of the community.

v. Crop Loss

It is estimated that including the pipelines to be laid in different trenches of different subsystems, around 1200 m of pipelines may need to pass through agricultural land at different stretches. The project team will choose the timing of laying of pipelines in consultation with the locals so as to avoid any loss of crops. However, some unavoidable cases may be there as the laying of pipelines may continue for over six months.




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vi. Resettlement, relocation and compensation issue

The major structures are to be constructed on land belonging to WUSC. Similarly, the distribution system network falls within the public property line/RoW. However, a private land parcel needs to be used for the purpose of construction of project components of Mehelkuna-Badkholi subsystem. Mr. Bhimraj Gharti Magar has donated a piece of his land with area of 440 square meters in ward 6 of Subhaghat Municipality. Therefore resettlement or relocation is not required. However some cases of damage to compound wall may arise in terms of crop compensation. These will be avoided as far as possible.

4.2.3 Operation & Maintenance Phase

i. Risks from exposure to chemicals

Chlorine and Bleaching Powder are toxic, and the workers will have to deal with it during the operation of the system. Ingestions, inhalations, application to body parts, especially to the eyes, nose, and mouth are of extreme hazard to the workers handling chlorine and bleaching powder. Haphazard disposal of effluents and sludge from the treatment plant will not only be a nuisance to the public but also will affect the aquatic life by eventually finding its way to nearby water bodies.

ii. Impact on water bodies and aquatic life

The effluent produced from the periodic backwashing of the filter plant, if discharged directly to the river course may cause harm to the water bodies and aquatic life especially during the dry season when the flow will be less.

iii. Impact of use of diesel generators

Use of generators is foreseen to be likely. The use of diesel generators will have some noise nuisance, and air pollutant emissions. This will be a nuisance for the locals within the close vicinity. However, this impact has been predicted to be of low significance.

4.3 Indirect, Induced and Cumulative Impacts

4.3.1 During Construction

4.3.1.1. Indirect and Induced Impacts:

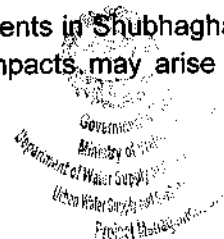
The vehicular movements that will be generated from the simultaneous construction of different components in different sites will create choke points at the narrow access roads and slow down mobility of people, goods and services, particularly in the market area. Coupled with disruption of economic activities and social services the local socio-economy may be negatively affected.

4.3.1.2. Cumulative Impacts:

There are no known ongoing or proposed large scale developments in Subhaghat town as yet. Extension of the main road is proposed. Hence, cumulative impacts may arise in case of air pollution, and labour interactions.



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

4.3.2 During Operation

4.3.2.1. Indirect and Induced Impacts:

The indirect and induced impact of a reliable and sufficient water supply would be increased generation of wastewater and sewage. If inadequately managed, this situation would lead to contamination of supplied water through leaks or broken pipes in the distribution system.

With reliable and sufficient access to safe and potable water, the indirect positive impacts will be improved public hygiene and sanitation, leading to overall improvement in public health and quality of life. Enhancement measures include ensuring the quality of supplied water meets NDWQS through implementation of quality monitoring as prescribed in the EMP. Induced impacts of improved water supply system include rural-urban migration, more land conversion from rural to urban uses.

4.3.2.2. Cumulative Impacts:

The cumulative impact would be the increment in urban growth that will be driven by the availability of a reliable water supply system. The land use pattern will gradually be modifying towards urban settlements pattern which might reduce the available agricultural land.

4.4 Evaluation of the Impacts

The impacts are evaluated based on their impact levels, coverage of area and duration of the impacts. The evaluation will be used to emphasize the need to address the concerns. Magnitude, geographical extent and duration of impacts are defined below;

Magnitude: This can be low-L (minor), medium-M (moderate), and high-H (major), depending on the scale or severity of change.

Geographical extent: If the action is confined to the sub-project area, it is referred as site specific (Ss), if it occurs outside area but close to sub-project area, the extent of impact is local (Lc), if it occurs far away from the sub-project, it is referred as regional (R).

Duration: It can be short term (St - i.e. less than 3 years), medium term (Mt - i.e. 3-20 years), and long term (Lt - i.e. more than 20 years).

For the Impact evaluation the matrix method with numerical ranking is used for the quantitative ranking of the predicted impacts. The numerical scale mentioned in the National EIA Guidelines 1993 has been adopted for this sub-project. The numerical scale is as

Magnitude

High
Moderate
Minor

Extent

Regional 60
Local 20
Site Specific 10

Duration

Long Term 20
Medium Term 10
Short Term 05

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The combined score less than 45 is termed as insignificant impact; 45-75 is termed as Significant and beyond 75 is termed as very significant impact. Following table summarizes the evaluations of the impacts.

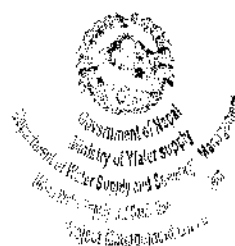
Table 4.3: Evaluation of the Environmental Impacts

Impacts	Nature	Magnitude	Extent	Duration	Total score and significance
Beneficial Impacts					
Construction stage					
Employment Opportunity and Increase in Income	Direct	M (20)	Lc (20)	St (5)	Significant (45)
Skill Enhancement	Direct	M (20)	Lc (20)	Mt (10)	Significant (50)
Enterprise Development and Business Promotion	Direct	M (20)	Lc (20)	Mt (10)	Significant (50)
Operation Stage					
Improvement in health and saving of time	Direct	M (20)	Lc (20)	Lt (20)	Significant (60)
Development of Market Centers	Indirect	M (20)	Lc (20)	Lt (20)	Significant (60)
Appreciation of land value	Indirect	M (20)	Lc (20)	Lt (20)	Significant (60)
Women Empowerment	Direct	M (20)	Lc (20)	Lt (20)	Significant (60)
Quality of Life Values	Indirect	M (20)	Lc (20)	Lt (20)	Significant (60)
Adverse Impacts					
Construction stage					
<i>Physical Environment</i>					
Land surface disturbance, erosion and land instability	Direct	H (60)	Ss (10)	Mt (10)	Very Significant (80)
Surface water concern	Direct	L (10)	Ss (10)	Lt (20)	Insignificant (40)
Damage to existing facilities	Direct	L (10)	Ss (10)	St (5)	Insignificant (25)
Air Pollution and Noise nuisance	Direct	L (10)	Lc (20)	St (5)	Insignificant (35)
Impacts of water bodies	Direct	M (20)	Lc (20)	Mt (10)	Significant (50)
Waste disposal	Direct	M (20)	Lc (20)	Mt (10)	Significant (50)
<i>Biological Environment</i>					
Loss of vegetation cover	Direct	M (20)	Ss (10)	Mt (10)	Insignificant (40)
Impacts on fauna	Direct	L (10)	Lc (20)	Mt (10)	Insignificant (40)
Impacts on aquatic lives	Direct	L (10)	Lc (20)	Mt (10)	Insignificant (40)

Impacts	Nature	Magnitude	Extent	Duration	Total score and significance
<i>Socio-economic Environment</i>					
Disturbance to community activities	Direct	M (20)	Ss (10)	St (5)	Insignificant (35)
Social dispute and dissatisfaction	Indirect	M (20)	Ss (10)	St (5)	Insignificant (35)
Occupational health and safety	Direct	H (60)	Ss (10)	Mt (10)	Significant (80)
Community health and safety	Direct	H (60)	Ss (10)	Mt (10)	Significant (80)
Crop loss	Direct	M (20)	Ss (10)	St (5)	Insignificant (35)
Resettlement, relocation and compensation issues	Direct	L (10)	Lc (20)	St (5)	Insignificant (35)
Operation & Maintenance Stage					
Risk of exposure to chemicals	Direct	M (20)	Lc (20)	Lt (20)	Significant (60)
Impact on water bodies and aquatic life	Direct	L (10)	Lc (20)	Mt (10)	Insignificant (40)
Impact of use of diesel generators	Direct	M (20)	Ss (10)	Mt (10)	Insignificant (40)



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5. ALTERNATIVE ANALYSIS

5.1 With- and Without-Project Alternatives

The project area is a major junction and booming marketplace. It lies in close connection to the East-West Highway. Though the trend of urbanization is increasing, the town is facing increased problems to water supply. The overall sanitary condition of the project area is reasonably satisfactory, but still improvements are required.

Doing nothing about these challenges would be allowing the subproject rural municipality to further develop as "under-serviced" area, 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 of project rural 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. Hence, do-nothing or without-project alternative is not chosen.

5.2 With Project's location alternatives

The project area is a very needy area in terms of safe water needs. Strategically, the investment in water and sanitation in this belt will improve the overall socio-economic aspects of the Province as it serves as a market junction to the surrounding rural municipalities and it also lies close to the Birendranagar Municipality of Kamali Province.

The project components are selected at technically safe site where there is no social dispute as well. Minimization of loss of vegetation cover is also considered. Avoiding tree clearance and damage to cultivated land has also been considered in site selection.

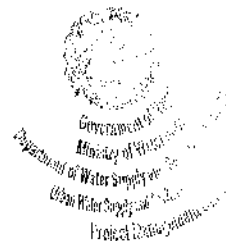
Since the settlements in Subhaghat are scattered, 6 separate District Management Areas (DMAs) are established. This is based on the principle of managing a large water network into a number of areas, typically of between 500 and 3000 connections, each established area having a defined and permanent geographical and/or hydraulic boundary. With other possibilities as well, the proposed sub-systems will be an easy-to-operate and cost effective option for the scattered location of the settlements.

5.3 Alternatives Related to technology, materials and implementation procedure

The proposed system is a medium scale project. Since the yield of the proposed sump wells is reliable, it is expected that the water supply will be smooth. The major component of a subsurface water based water supply system consists typically of sumpwells with pumps, treatment unit, reservoirs 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. All water supply components will be constructed on the land owned by WUSC.



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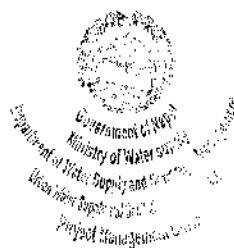


The work involved is labor intensive and with some use of mechanical equipment. Most of the construction work will be done manually, avoiding heavy equipment which will produce minimum environmental impacts. Trained human resources will be employed.

The working procedures proposed are participatory one and the beneficiaries will be actively participating in all the phases of the project. Most of the raw materials used will be local in nature. Similarly, as far as possible, local people will be employed for the project so that the chances of conflict are minimal.



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6. MITIGATION MEASURES FOR THE ANTICIPATED IMPACTS

Precautionary measures and the mitigations with respect to the project development activities have been considered, and are already mentioned in section 4.2.1 and Table 4.2. This chapter focuses on the mitigation measures for the anticipated impacts during project's Construction Phase, and project's O&M Phase.

6.1 Construction Phase

6.1.1 Physical Environment

i. Land surface disturbance, erosion and land instability

During execution of construction works, precautionary measures will be taken. Protection works for slope stabilization is seen required at the reservoir site of Khanidanda in ward 8. Proper backfilling of excavated trenches will be done timely and the excavated soil will be stacked properly. Major construction activities will be avoided during the rainy periods. Open land at Khatang area, and unused land parcel under ownership of Sundar Khani School in ward number 8 is planned to be used for spoil disposal as it doesn't lie within school premises. Protection works along the banks of Bheri river at Khatang area is a priority protective measure. The project area is agricultural belt, hence topsoil is very important. Efforts will be made to save the topsoil. The topsoil of about 20 cm thick will be placed at a separate place and the remaining excavation will be done. After placing the pipes in trenches and backfilling with other soil and compaction, the topsoil will be replaced to its original position and compacted. At one site where there is need of road crossing, a 30 cm hume pipe will be used.

ii. Damage to the Existing Facilities

Considerations have been made during design phase to avoid these damages. However, a repair team will be on standby for the repair of water supply pipe line for immediate repairs. To avoid any such damage, prior coordination will be established with other local authorities. Layout drawing will be at the site to avoid any kind of possible damage. All the electric poles will be relocated meeting the standard requirements. Tole lane organization of Mehelkuna and Botechaur will be consulted timely and in prior.

iii. Air Pollution and Noise nuisance

Use of power horns and movement of heavy vehicles can cause disturbances to the community, educational institutes, hospitals/health posts and residences. Mitigating measures to reduce air and noise pollution are:

- Providing information to the public about the work schedule,
- Allowing the use of vehicles only complying with NVMES 2069 or vehicles having green stickers meeting Vehicle Emission Standards 2057 during the construction period,
- Limiting the speed of vehicles, and prohibiting the use of power horns,
- Equipment and vehicles will be regular maintained,
- Prohibiting the operation of plants and construction vehicles between 7 PM to 6 AM in residential areas,
- Avoiding work at culturally sensitive times (during religious festivals in the area),

- Increasing the work force in sensitive areas so as to finish the work quickly,
- Burning of solid wastes will be prohibited &
- Use of firewood as fuel will be prohibited in the work-camps.

iv. Impact on water bodies

So as to mitigate this potential impact, the worker's camp will be located away from the vicinity of water bodies. Disposal of debris and waste into *Bheri nadi* will be totally prohibited. Regular monitoring of the workers camp will be scheduled. In addition to this, the excavated soil will be stacked. Backfilling of trenches will be done timely, and before the rainy season. A separate area shall be allocated for the stacking of construction materials. Open land at Khatang area, and unused land parcel under ownership of Sundar Khani School in ward number 8 is planned to be used for spoil disposal. Blocks will be used to provision for river crossings of the pipes.

Fuel and lubricants will be stored in containers over well concealed surfaces which are at safe distance from any water bodies. Absorbent pads/mats will be placed at the stockpiles, workshops and campsites to control seepage during accidental spillage.

v. Waste Management and Disposal

Waste generated from the workers' camps will be properly disposed off. Organic waste like food waste and others will be used for composting. Pit composting and bin composting will be promoted. Inorganic waste will be collected in a bin. Plastics, paper and bottles will be segregated. Reusables will be reused or sold, and the residue will be disposed off into municipal waste stream. 3R Principles will be regulated. Waste like excess grease, lubricants will be collected in plastic containers and will be sold to scrap dealers. Solid waste and other construction waste will be deposited in designated sites near by the campsite at open land under ownership of Sundar Khani School ward number 8 and will be cleared after the completion of the construction works. After decommissioning, the reusables will be reused or sold, and only the residue waste will be disposed at the designated waste disposal site of the municipality. Regular monitoring of the workers' camps will be carried out.

6.1.2 Biological Environment

i. Loss of vegetation cover

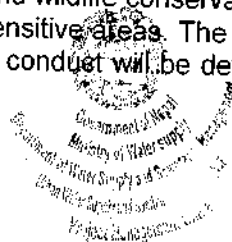
To protect the topsoil and vegetation, the topsoil will be kept separately and replaced in its original position after laying the pipes. Greenery promotion will be carried out in the user committee building premise in an open land in elevated area near Khatang area of ward number 8 and also around the treatment units. For any unpredicted and unavoidable felling of trees, the compensatory plantation at the ration of 1:10 per tree cut will be carried out along with provision for cost of care-taking of the planted trees for 5 years. Revegetation will be carried out in coordination with the community forests of wards 8 and 9.

ii. Impact on Fauna

The workforce will be sensitized on importance of forest and wildlife conservation. Horns will not be used unnecessarily in the areas close to any wildlife sensitive areas. The workers will not be allowed to conduct any kind of hunting activities. Code of conduct will be developed, explained to the workers and will be implied strictly.



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iii. Impact on aquatic life

Washing of vehicles and clothes directly on rivers will be discouraged. Disposal of waste and spoil on to water bodies will be strictly regulated. Fishing by workforce in the local rivers will be strictly restricted.

6.1.3 Socio-economic Environment

i. Disturbance to community activities

In order to minimize the disturbance to the community activities, a detailed Traffic Management Plan will be developed by Contractor during the early stage of construction phase for areas along the construction works to minimize traffic flow interference from construction activities. Local public will be notified about project construction activities in advance and schedules, routings and affected areas including road closures will be shared well ahead of time and discussed with the locals. Stockpiling or temporary stacking will be covered or barred using temporary facilities. Sign-boards in Nepali and English languages will be placed at properly visible sites. Tole land organizations of Mehelkuna and Botechaur will be coordinated with priority as these are the major growing and market focused centers.

ii. Social Dispute and Dissatisfaction

Code of conduct will be developed and applied for the workforce. An employment policy will be prepared so that the local people may not be deprived of employment opportunities. Local people and women above the age of 16 will be given preference for employment. Wages will be settled based on DWEC (District Wage Evaluation Committee) with the list of employees.

iii. Occupational health and safety (OHS)

To mitigate or minimize the health risks for workers and to avoid any health hazards of the workers, adequate safety instructions will be provided to the contractor and monitored by the project. Following mitigation steps will be taken;

- Health and hygiene in the camp site (against unsafe working conditions, accidents, transmission of communicable diseases etc) will be given top priority. Potable drinking water and clean fuel for cooking will be made available for the workforce as needed
- Regular health checkups, proper sanitation and hygiene, health care will be provided. Awareness programs concerning human trafficking and the possibility of spread of STDs and HIV/AIDS will be conducted during focus group discussions.
- Personal protection equipment (PPE) viz., safety helmets, safety belt, boots, gloves will be provided to all construction workers.
- Provision of sanitary toilets at the rate of 1 toilet unit for 15 workers, and number of toilets meeting the maximum number workers accommodated in the camps during the peak construction period
- The loss of life or any type of injuries will be compensated and insurance to the workers will be provided. First aid kits, standby vehicle, and fire extinguishers will be provided in camp sites.

To avoid risks from accidents on site due to the movement of the public and workers, health and safety measures of the contract will also prohibit entry at construction sites to the public and the area will be barricaded and warning signs will be placed.

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iv. Community Health and Safety

Placing of safety and warning sign boards in local languages to avoid any incidents in relation to construction works; sharing schedules of construction works with the locals at least 2 days prior to starting of the construction works in settlement areas; preparing a traffic management plan for managing the flow of project vehicles and local vehicles; and assigning of a safety focal person during peak construction periods are the measures planned for addressing the concerns of community health and safety. Special considerations for safety of elderly and children will be provided through close coordination with the local land organizations and WUSC members.

v. Crop loss and compensation

Compensation of crops will be provided if the pipe laying works damage standing crops in significant amount. This will be processed through User's Committee and compensation provision will be based on mutual understandings with the affected land owner. Any unintended damage of public or private property will be restored to its original or better state. Although there is no such foreseen damage, the contractor will be required to meet this obligation.

6.2 Operation & Maintenance Phase

i. Risks from exposure to chemicals

Exposure and ingestion of Chlorine and Bleaching Powder are harmful, and the workers will have to deal with it during the operation of the system. The storage procedures, in-plant handling and dosages of chlorine (bleaching powder) will be addressed. Procedures and guidelines will be developed for its handling. These procedures and guidelines will be prepared by the contractor during the last period of construction phase and will be approved by the consultant. The cost will be included in contract document. First aid measures will be introduced for emergencies. Training on handling and on dosage of chemicals will be given to the staff.

ii. Impact on water bodies and aquatic life

The measures to be taken are to mitigate the impacts are as follows:

- The effluent produced from the periodic backwashing of the filter plant, if discharged directly to the river course may cause harm to the water bodies and aquatic life especially during the dry season when the flow will be less.
- As the backwash water mainly contains suspended solids a small pond of 20,000 litres capacity will be constructed for decantation and will be drained off to river/stream course.
- To avoid the impact to aquatic life, the effluent and sludge will be disposed off only in designated areas and regular monitoring of the river or stream water quality will be done.
- Septic tanks will be built as per design of public toilets, and standard designs will also be provided to the household latrines.

iii. Impacts of operation of diesel generators

To mitigate the concern, under suitable condition governed by location of water source, the electro-mechanical components will be placed as practicably far as possible from the major settlements, say more than 200 meters far from the major settlement or market area. In addition to this, the specifications of pumps and generators have been worked out so as to meet also low noise and pollution emissions.

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6.3 Mitigation measures for Cumulative Impacts

Measures to mitigate the adverse impacts during construction phase are based on source based monitoring of pollution sources, and coordination among offices while working in communities.

Mitigation measures of potential impacts of land use pattern and rapid urban growth would be rational land use planning of the municipality and the district, incorporating environmental management for sustainable growth.

6.4 Implementation of Mitigation Measures

Most of the mitigation measures specified will be incorporated as part of the contractual obligations during the project construction and therefore will be integrated into the project design and tender documents. By including mitigation measures in the contract monitoring and supervision of mitigation implementation will be covered under the normal engineering supervision provisions of the contract. The mitigation measures implementation will be monitored through direct observation, records of contractors, consultation with people etc weekly or daily as required.

a. Project Design for implementation

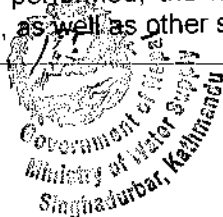
For most of the adverse environmental impacts likely to occur during project construction and operational phase, mitigation measures will be integrated in the design of the project itself so as to strengthen the benefits and sustainability of the project. This will enhance the mitigation measures in terms of specific mitigation design, cost estimation of the mitigation measure, and specific implementation criteria. The proponent will ensure that the mitigations measures are included in the design of the project.

b. Project Contract

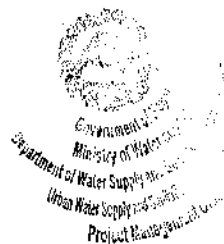
The project contract will clearly specify the mitigations measures that are part of the project construction and the contractor will be bound by the parameters identified in the environmental assessment pertaining to specific mitigation measures. The proponent will ensure the compliance of the proposed measures from the contractor and the final acceptance of the completed work will not occur until the environmental clauses have been satisfactorily implemented.

c. Bill of Quantities

The tender instruction to the bidders will explicitly mention the site-specific mitigation measures to be performed, the materials to be used, labour camp arrangements, and waste disposal areas, as well as other site specific environmental requirements.




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The environmental impacts related to different project activities and its corresponding mitigation measures are tabulated in Table 6.1;

Table 6.1: Impacts and Mitigation Measures

Detailed Design		Included in Detailed Design cost
Selection of water supply source	Concerns over unsatisfactory raw water quality	
Design of alignment for pipe-laying	Disturbance/damage to communities structures/facilities	Water quality sampling/testing, and its reconfirmation Place water pipes away from existing utilities during design. Under unavoidable cases, identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction phase Consultation with local authorities, offices like Division Road Office Provide budget for restoration/replacement of damaged utilities, and require construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services
Designing of source/sumpwells & reservoirs	Risk of tapping of contaminated water, and Seismic risks like cracking of reservoirs	Choosing of treatment unit with comparative analysis of the treatment options Preparation and implementation of WSP to be planned Design all reservoirs and structures under the project as per appropriate seismic resistance
Designing of treatment units	Health hazards arising from inadequate design of facilities for receiving, storing and handling of Cl & other chemicals	Design has included a "housed" dosing unit. Standard operation methods has been prescribed in design
Apply for relevant permits	Delay in project due to absence of necessary statutory permits and approvals	Obtain Letters of Approval and agreement for:
		(i) temporary acquisition/easements of land and properties;
		(ii) disruption of water supply and other utilities;
		(iii) required permits from relevant authorities (e.g., Municipality office, etc.) prior to construction works;
		(iii) avoid tree cutting, and establish a requirement that if necessary, cut only trees that are marked and have been agreed from relevant authorities for removal; and compensatory tree plantation to be carried out at the rate of 25 saplings for each felled tree.

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Construction			
Workforce camp establishment (1) main labour camp; (2) small camps at Khanidanda and Botechaaur)	Haphazard camps resulting in social stress and degradation of local environment	Establish workforce camps in designated sites only and in consultation with local community. All camps are to include sanitary facilities for men and women.	Civil works contract
Excavations, and trenching	Land instability; soil erosion	Protection of Bheri river banks; Slope stabilization/protection works in Khanidanda; Surface leveling and Land reclamation	Civil works contract NRs 350,000
Employment	Local people may be deprived of opportunities, minors may be employed	Employ locala (& women in jobs; follow labor standards)	
Transportation of materials	Traffic congestion and public annoyance	Equal pay for men and women Prepare and implement traffic plans to prevent traffic jams and annoyances to the public in coordination with relevant local authorities and communities.	Civil works contract
Disposal of waste	Water and land pollution; and	Provide designated areas with collection bins for wastes.	
Construction of toilets in the camps		Provide toilet facilities and prohibit open defecation.	
Storing of materials in the project area	Spillage/leakage concerns	Prohibit washing of vehicles next to rivers and streams. Proper storage of construction aggregates, hazardous and toxic materials, lubricating oils and used batteries in safe areas and the proper segregation and disposal of chemical containers, package materials, plastic bags etc. Fuel and lubricants will be stored in containers over well concealed surfaces which are at safe distance from any water bodies. Absorbent pads/mats will be placed at the stockpiles, workshops and campsites to control seepage during accidental spillage.	Civil works contract
Handling of toxic materials		Provide training to workforce on safe handling of toxic materials and OHS measures during construction.	Civil works contract
Dumping of excess material			
Movement of vehicles	Air quality deterioration, and damage to existing road/s	Dust suppression on roads or at open sites by sprinkling water as required at regular intervals. Routine monitoring of dust (total suspended particulates) to meet air quality standards; and limit vehicle speed. See that vehicles comply with the National Vehicle Mass	Civil works contract 100,000

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Earthworks and excavations Stockpiling of construction waste and construction materials	Emission Standards, 2056	Regular maintenance of vehicles; reinstatement of damaged roads.	
		Provide proper ventilation in confined working areas.	
		Covering of stacked spoil and soil Limit the time of temporary stacking of construction materials in residential and market areas Stockpiles to be maintained only at designated sites	
		Monitoring of noise levels regularly at site to meet the noise standards.	25,000
Movement of Vehicles Operation of construction machines and equipment Horn honking	Noise and vibration	Fit mufflers in vehicles to control noise.	
		Limit the speed of vehicles and decreasing drop-heights	
		Regular maintenance of equipment.	
		Compensate and repair damages caused by vibration during construction activities.	
Pipe laying	Slope instability	Maintaining the slope	
		Construction of Gabion walls in case instable slopes	
		Vegetation protection, greenery promotion	
		Pipe-laying will be conducted in coordination with Division Road Office	270,000
	Vegetation clearance	Avoid tree cutting.	
		Obtain necessary tree cutting permits, if at all needed under unforeseen conditions, and if cut, will plant tree saplings at the rate of 10 saplings for each felled tree. Will also compensate all private trees and community forests if affected	
		Prior to construction, hold community meetings to inform them of construction works. Distribute project information.	
		Advanced notice should be provided at least 1-2 weeks in advance.	25,000

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	Place WUSC phone hotline on signs in visible areas. Make community fully aware of grievance mechanism and provide contact info of PMO and ICG unit. Maintain access to avoid disturbance to residents and businesses by providing planks and leaving spaces for businesses and residents to maintain access. Manage traffic flows, conduct work at night where possible. Trenches open for only 1-3 days & works should be quickly completed. Avoid full street closure to fullest extent possible. Businesses losing income due to disturbance are compensated as per the resettlement plan. Temporary sites to be restored to natural and stable conditions as per agreement with land owner Proponent report in writing that temporary areas have been vacated and restored to pre-project conditions before acceptance of the works Provide employment opportunity to the affected people to the extent possible Assist vendors in shifting prior to construction and to return to original location when construction is complete in relevant sections Avoid disturbance to tourist areas	325,000
Construction of project components	Reinstatement of community services and infrastructures	Compensate or reinstate/relocate community assets that are disturbed such as irrigation canals, electricity poles, telephone lines, drinking water pipes, sewerage lines, roads, etc. to the satisfaction of the people. Avoid disturbance to any historic/heritage buildings or structures by taking necessary precautions (work away from any heritage buildings, hand digging, no heavy equipment, etc.)
Influx of outside workforce, money and unwanted activities	Increase in crime and community stress	Greenery promotion Prohibit gambling and alcohol consumption in contractors' campsites. Instruct the outside workforce to respect the local cultures, traditions, rights etc.

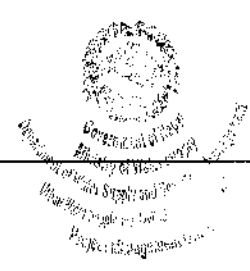
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			Provide security in contractors' camps, and implement code of conduct for the workforce	
Project activities relating to health and safety issues at work areas		Health and hygiene (unsafe working conditions, accidents, fire hazard, transmission of communicable diseases etc.)	Ensure measures (fencing and/or barriers) to protect public from construction site. Provide regular health check-ups, proper sanitation and hygiene, health care, and control of epidemic diseases to the workforce.	
			Launch awareness programs concerning human trafficking and the possibility of spread of STDs and HIV/AIDS using brochures, posters, and signboards	50,000
			Make available first aid kits, and fire extinguishers in campsites	Civil works contract
			Make available protection gears to all construction workers and compensate for the loss of life or any type of injuries	
			Provide insurance to the workers and training in OHS and community health and safety.	
			Ensure all work areas are clearly demarcated and marked and protect public from getting near to the trenches.	
			Provide alternate potable water supply during maintenance works and notify the public in advance.	
Traffic management at construction sites		Traffic congestion (temporary disruption to local access due to open trenches, excavation across roads or road closures due to construction).	Develop and implement a traffic plan and road safety plan to minimize traffic flow interference from construction activities	
			Coordinate with local authorities (police, municipality, local area committees, etc.) to manage traffic during construction period	
			Provide advance public awareness and public notification of construction activities, schedule, routing, and affected areas including road closures	
			Erect alternative routing signage in Nepali and English.	
			Arrange for night time construction for activities in congested/ heavy daytime traffic areas	
			Arrange for onsite "grievance handling" through use of liaison officers	
			Undertake trench closure and facilitate surface rehabilitation or paving as quickly as feasible	

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Employment opportunities, project activities in settlement and market areas	Social disharmony; Sanitation issues, and gender issues	Awareness activities for environmental conservation; WASH trainings; social safeguards meetings	25,000
Operational Phase			
Operation of the system; Operation of treatment units	Health and hygiene (unsafe working conditions, accidents, fire hazard, etc.)	Provide regular health checkups, proper sanitation and hygiene, health care, and control of epidemic diseases to the staff. Make available first aid kits in worksites Provide insurance to the workers and training in OHS and Community Health and Safety.	WUSC to manage for the provisions
Operation of the system	Health risks due to contaminated water	Conduct regular monitoring of water quality from treatment plants to ensure water delivered to public meets national standards Conduct regular O&M of the system; provide alternate potable water supply during maintenance works and notify the public in advance	75,000 WUSC to manage for the provisions
		Develop and Implement Water Safety Plan and promote Total Sanitation practices	WSP cost is incorporated in the Civil contract

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7. ENVIRONMENT MANAGEMENT PLAN

7.1 Objectives of Environment Management Plan

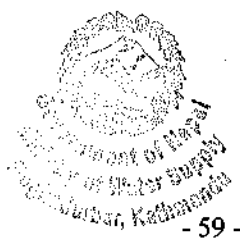
The purpose of the Environmental Management Plan (EMP) is to ensure that the activities are undertaken in a responsible, non-detrimental manner with the objectives of: (i) providing a proactive, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on-site; (ii) guiding and controlling the implementation of findings and recommendations of the environmental assignment conducted for the project; (iii) detailing specific actions deemed necessary to assist in mitigating the environmental impact of the project; and (iv) ensuring that safety recommendations are complied with. This EMP will be included in the BoQ of 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. The contractor will be required to conduct the Prior Site Assessment in regards to the safety and actual site conditions, and need to take records of site conditions as soon as contractor's mobilized and before start of construction work. The contractor needs to prepare a site specific EMP (S-EMP) by its own, and as per the EMP of the IEE report. The contractor will have to submit the S-EMP to the RPMO/consultant, and needs to have approval of the same. A copy of the S-EMP and EMP will be kept at the project office of the contractor at all times. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

The basic objectives of the EMP are to;

- to ensure that all mitigation measures and monitoring requirements will actually be carried out at different stages of project implementation and operation - pre-construction, construction and operation and maintenance;
- to recommend a plan of action and a means of testing the plan to meet existing and projected environmental problems;
- to establish the roles and responsibilities of all parties involved in the project's environmental management;
- to describe mitigation measures that shall be implemented to avoid or mitigate adverse environmental impacts and maximizing the positive ones;
- to ensure implementation of recommended actions aimed at environmental management and its enhancement; and
- to ensure that the environment and its surrounding areas are protected and developed to meet the needs of the local people, other stakeholders and safeguard the interests of the common people.

A Safeguards Unit within the project should be established and be headed by a senior environmental expert, a sociologist and a legal expert with adequate support staff.


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7.2 Institutional Arrangement

Executing and implementing agencies:

The Ministry of Water Supply will be the executing agency with responsibility of project execution agency with responsibility of project execution delegated to the Department of Water Supply and Sewerage Management (DWSSM). Water User's and Sanitation Committees of participating towns are the implementing agencies. The key responsibilities of the executing and implementing agencies are as follows;

Prior to construction

- The MoWS will deputize a qualified staff to act as the Environmental Safeguard Officer of the Project management office (PMO).
- The MoWS will establish the grievance redress mechanism, including setting up the Grievance Redress Committee.
- The Water Supply and Environmental Division of the MoWS will be responsible for reviewing the IEE Report prior to submission to the Ministry.
- The DWSSM will review the IEE Report prepared by the Design and Supervision Consultant's Team's Environmental Safeguard Expert (DSMC-ESE) prior to forwarding this to MoWS.

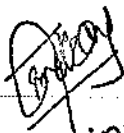
The DWSSM will prepare the ToR for the Environmental Safeguard Specialist that will engage to support the PMO and for the Environmental Safeguard Specialists of the two Design and Supervision Consultants that will be appointed to prepare the projects.

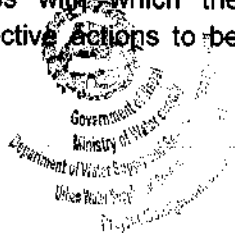
7.3 Safeguard Implementation Arrangement

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 Project Management Consultants (PMC) as specified below:

- Confirm existing IEE/EMP are updated based on detailed designs and that new IEE/EMP are prepared in accordance with the EARF and government rules;
- Confirm whether EMP are included in bidding documents and civil works contracts;
- Provide oversight on environmental management aspects of projects and ensure EMP is implemented by regional project management office (Western RPMO) and contractors;
- Establish a system to monitor environmental safeguards of the project including monitoring the indicators set out in the monitoring plan of the EMP;
- 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;
- Supervise and provide guidance to the RPMO to properly carry out the environmental monitoring and assessments as per the EARF;
- Review, monitor and evaluate the effectiveness with which the EMP is implemented, and recommended necessary corrective actions to be taken as necessary;


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- Consolidate monthly environmental monitoring reports from RPMO and submit semi-annual monitoring reports to ADB;
- Ensure timely disclosure of final IEE/EMP in project locations and in a form accessible to the public; and
- Address any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEE.

Regional Project Management Office (Western RPMO):

The regional DWSSM engineers and social development officers of the RPMO 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:

- Prepare new IEE/EMP in accordance with the EARF and government rules;
- Include EMP in bidding documents and civil works contracts;
- Comply with all government rules and regulations;
- Take necessary action for obtaining rights of way;
- Oversee implementation of EMP including environmental monitoring by contractor;
- Take corrective actions when necessary to ensure no environmental impacts;
- Submit monthly environmental monitoring reports to PMO, and;
- Address any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEE.

Civil Works Contracts and Contractors:

EMP document is to be included in bidding and contract documents and verified by the PMO and RPMO. 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, on (b) equal pay for equal work of equal value regardless of gender, ethnicity or caste, and on (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.

Contractors will only start the civil works activities in communities surrounding the project site. Contractors will only starts the civil works activities in the section/project sites that has IR/IPP impacts upon the completion of RP/IPP implementation and after receiving clearance from the WUSC and endorsed by RPMO's SDO.

Capacity Building:

The PMC safeguards experts (environmental and social) will be responsible for training the; (i) PMO's safeguards officers (environmental and social); (ii) RPMO' 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:

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Sensitization;

- Introduction to environment and environmental consideration in water supply and wastewater projects;
- Review of IEE and integration into the project detailed design;
- Improved coordination within nodal departments; and
- Monitoring and reporting system. The contractors will be required to conduct environmental awareness and orientation of workers prior to deployment to work sites.

Project Management and Quality Assurance Consultant (PMQAC):

The Project Management and Quality Assurance Consultants (PMQAC) will provide support to the PMO in the following areas:

- ensure that the quality of the designs and construction of all water supply and sanitation components implemented under the project are to the required standards; and
- assist the PMO with the overall planning, implementation and monitoring of the project during all stages of implementation including adherence to all environmental and social safeguards' requirements.

Water Users and Sanitation Committee (WUSC):

WUSC is the eventual operators of the completed project. The key tasks and responsibilities of the WUSC 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

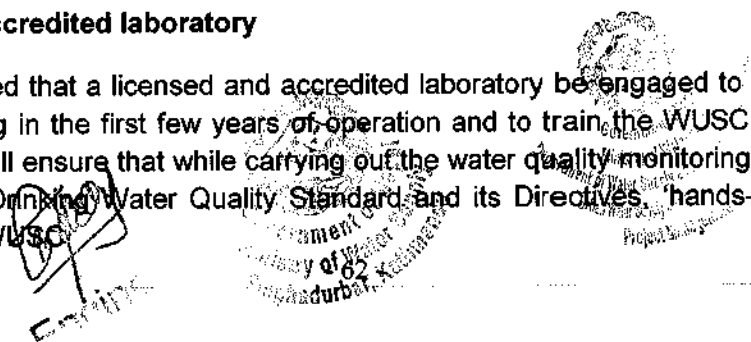
- Assist in the observance of the grievance redress mechanism.
- Actively participate in the monitoring of Contractor's compliance with the IEE and its EMP and the conditions set out with Government's approval of the IEE Reports.
- Facilitate public consultations, as necessary.

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.

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.



7.4 Environmental Management Plan

The mitigation measures for the potential impacts that are predicted in the Chapter 4 of this report need to be implemented at right time and to make it clear who does it. Its monitoring and its reporting is also very important. Thus this chapter will provide a mangament plan, and a monitoring plan. A total of NRs 15,00,000 has been allocated for implementation of activities under this EMP. Table 7.1 below presents the details EMP for this project. An Environmental Management Plan (EMP) is proposed for defining the mitigation activities, the responsible agencies for implementation of those mitigation measures and its effective monitoring;

Table 7.1: Environmental Management Plan of the Project

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, DSMC, RPMO &	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 - 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	DSMC, RPMO	List of affected utilities and operators; Bid document to include requirement for a contingency plan for service interruptions (for example provision of water if disruption is more than 24 hours).	During detailed design phase
Drinking water supply	Extraction of unsatisfactory raw water quality Delivery of unsafe water to the distribution system	- During the detailed engineering design stage, water sample from existing tube well was tested. Total hardness and total alkalinity are significant. Although the water quality is found to be suitable as per NDWQS, the deposition of calcium in the pipe may be likely to occur due to high concentration of hardness and alkalinity. - The water treatment system consisting of pressure filter, softening and disinfection is	PMO, DSMC, RPMO &	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
Sanitation (Toilets and septic disposal)	Contamination of drinking water source and other environmental receptors from household and community toilets Risk to public and environmental health due to inappropriate siting and design of septic disposal pit	The design of toilets includes septic tanks that are designed as per national standards and codes to allow for maximum retention of seepage. This includes ensuring septic tanks are sealed and water tight. Toilets will be established at least 30m downstream of the drinking water source. The septicage 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 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 septicage management shall be developed and followed.	PMO, RPMO, & DSMC	Incorporated in design and communicated to contractors	Prior to award of contract
Waste generation	Disruption to traffic flow and sensitive receptors	Determine locations prior to award of construction contracts Mechanism of safe disposal will be developed in the project site before the actual	DSMC, RPMO	List of selected sites for construction work camps, 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
	Generation of solid waste, wastewater from labor		Contractor	Contractor records, visual inspection	During detailed design phase

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Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
EMP Implementation Training	camp and other construction waste may cause pollution Irreversible impact to the environment, workers, and community	commencement of work 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 ; health & safety (H&S), Labor Act (2017), applicable environmental laws, etc.	PMO, RPMO and DSMC, Contractor's Environmental Supervisor	Record of completion (safety and Compliance Orientation)	During detailed design phase prior to mobilization of workers to site
2. During Construction Activities					
A. Physical Characteristics					
Topography landforms, geology and soils and/or river morphology and hydrology	Excavation works may degrade surface land state. Impacts are possible in the public land at Sidhanath tole beside the open space of Thapachaur where the core construction works are planned.	Excavations works should be carried out only after approval from the Supervision Consultant and after approval from the local authorities 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. Aggregates should be bought only from the authorized suppliers	Contractor	Records of potential areas of soil erosion; transmission mains and distribution pipelines core area	Monthly by RPMO Weekly by DSMC-ESE
Aggregates use Damage to existing facilities (like drains, compound walls and pavements) An open shed built for selling of local agricultural products will be relocated/compensated	Existing infrastructure (such as water distribution pipes, electricity pylons, etc.) shall be relocated before construction starts at the project 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	Contractor	Contractor	List of any public or private infrastructure disturbed by the project works Minutes with the locals	Weekly prior inspection to know if there could be any such cases As per need, field-inspection if any such case is foreseen

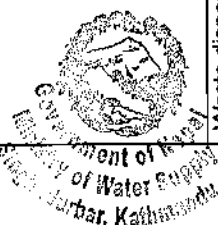
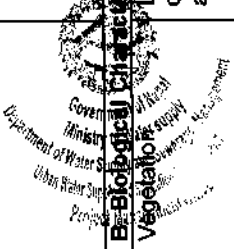
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Department of Water Supply
Kathmandu



Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Water bodies and water quality	Pollution of water bodies, contamination of water sources due to waste disposal, transport of sediments, effluent disposal, leakage/disposal of oil and grease from construction campsites	- conditions. - A new community block/unit will be built at suitable site nearby the existing location - 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 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. - 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 off in a manner that may block the flow of water of any watercourse	Contractor	Water quality of the surface and ground water sources for stockpiles Areas for fuels and waste storage of lubricants and materials; Number of physical measures (like silt traps installed along trenches leading to water bodies)	Visual inspection by RPMO and DSMC-ESS on weekly basis Weekly field monitoring, and quarterly water quality monitoring
Acoustic environment	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 sprinkling at 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 - Require trucks delivering aggregates and cement to have tarpaulin cover and maintain a minimum of 2 feet free board - Limit speed of construction vehicles in access roads to maximum of 30kph. - Ensure use of equipment and fuel complying with applicable emission standards - 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 so that activities with the greatest potential to generate noise are conducted during	Construction Contractor	Location of stockpiles; Number of complaints from sensitive receptors; Heavy machinery with air pollution control devices; Certification that vehicles are compliant with air quality standards.	Visual inspection by RPMO & DSMC-ESS on monthly basis Weekly field monitoring, and biannual air quality monitoring
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		Contractor	Results of monitoring noise levels (Maintain maximum sound levels not exceeding 80 decibels when measured at a distance of 10m or more	Inspection by RPMO & DSMC-ESS on monthly basis, as required additionally

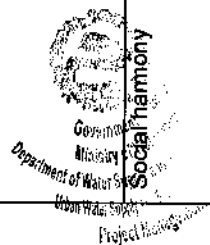
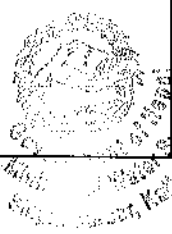
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Government of Nepal
Ministry of Water Supply
Singha Durbar, Kathmandu

Government of Nepal
Ministry of Water Supply
Department of Water Supply
Urban Water Supply
P. B. No. 1, Kathmandu

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
  Engineer	by excavation equipment, and the transportation of equipment materials, and people.	- periods of the day which will result in least disturbance. - Restrict noisy activities to daytime. - Minimize drop heights when loading and unloading coarse aggregates. - 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) - 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. - 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.		from the vehicle(s) Number of complaints from sensitive receptors;	
	Pollution of water and land resources, and cases of vector borne diseases due to haphazard waste disposal	- Waste minimization and waste segregation will be prioritized based on 3R principles - Practices of composting will be promoted - Containment of hazardous waste will be carried out - Prohibition of unwanted littering and discharge of waste. - Municipal disposal site will be used for final disposal	Contractor	On-site situation in campsites and its vicinity	Monthly monitoring by RPMO & DSMC-ESS
	 Biological Characteristics Loss of vegetation cover during construction works and laying of the pipelines	- Greenery promotion around the construction sites and road alignments where possible - Tree felling will be avoided, and if any such cases occur, prior approval from the local bodies will be received and compensatory plantation @ 1:10 will be carried out - Trees of local economic value and aesthetic significance will be planted under compensatory plantation - Locally demanded plants like Camphor trees	Contractor	Area of greenery that has been cleared Number of trees cut (only if unavoidable) Complaints or grievances by the locals	Weekly monitoring by RPMO & DSMC-ESS

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Impacts on Fauna	There could be some disturbances to local and migratory birds, reptiles and mammals No major impacts on animals area expected	- will be promoted - 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 - Code of conduct will be developed and implemented for the workforce to prohibit them from any wood logging, hunting - Other mitigation measures include: (i) installing clear signage to direct traffic movement in sites; (ii) designating stockpiling areas; (iii) providing alternative fuel to workers for cooking.	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 RPMO & DSMC-ESS on monthly basis
Water system	Disposal of slurry from treatment plant directly onto water bodies, disposal of waste on or nearby water bodies, sediment transport and leakage/disposal of hazardous waste may harm the aquatic lives in the rivers/streams of project area	- Only sedimented back-wash will be disposed to rivers - Washing of vehicles on local rivers (Dolai river and other surface water bodies) will be restricted - Disposal of waste of any kind on water bodies will be strictly prohibited - Fishing in rivers will be prohibited for workforce	Contractor	Local streams and rivers will be monitored; Any grievances from locals regarding disposal of waste onto water bodies will be referred	Visual inspection by RPMO & DSMC-ESS on monthly basis
C. Socioeconomic Characteristics					
Community activities	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 work schedule and possible 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 sign, signboards etc.	Visual inspection by RPMO & DSMC-ESS on weekly basis
Social harmony	Poor sanitation practices by workforce may cause pollution of surrounding environment. Social problems may arise due to bad behavior of the workforce such as gambling, alcoholism and disrespect to local people and culture	- A Code of Conduct will be developed for the workforce - Local people should be given priority to work (recommended that more than 60% local workers whenever available) in the project which helps to minimize the chances of cultural discrepancy and conflict due to increased labor from outside.	Construction contractor	Daily entry-sheet of the workforce in the campsites Number of local people versus outside workers in the project area will be regularly monitored	Inspection at campsites by RPMO & DSMC-ESS on monthly basis

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Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Occupational 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 (PPEs) such as mask, helmet, hand gloves and rubber boots. - The laborers will be insured for their health and safety. - Provide safe drinking water for labourers - Workers working at height above the ground especially during the construction will be provided with safety gears. - 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, Campsite standards, Record of H&S orientation trainings, Availability of personal protective equipment at construction site, Signage for storage and disposal areas, Condition of sanitation facilities for workers	Visual inspection by RPMO (monthly) and DSMC-ESS on weekly basis.
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; Chances of accidents, Communicable and transmittable diseases may potentially be brought into the community by construction workers	- Contractor's will maintain adequate space and adequate lighting, temporary fence, barriers and signage at campsites; - Construct gender friendly toilet for labourers - Children will be prohibited from active construction sites - Proper fencing of stockpile areas and campsites will be done - Awareness programs on communicable diseases and hygiene practices will be carried out - GRM will be formed & implementation of the GRM will be made mandatory - Coordination with School Management Committee (for placement of safety nets, safety sign-boards, barricades, etc)	Construction contractor	Number of permanent signs, barricades and flagmen on worksites as per Traffic Management Plan (Annex 2-C); Number of complaints from sensitive receptors; Number of walkways, signs, and metal sheets placed at project location	Visual inspection by RPMO & DSMC-ESS on weekly basis
Resettlement, relocation and compensation issues	There is no any resettlement or relocation issue. Unforeseen/unavoidable small-scale cases of compensation may arise for disturbance on existing facilities	- Any disturbance or damage to local facilities or properties will be well recorded - Any relocation needed will be addressed properly and timely - Any compensation required will be paid through WSUC's coordination	Contractor/WSUC	Records of any grievance from the locals regarding any disturbance or damage on public or private properties	During O&M of the system.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
D. Historical, Cultural, and Archaeological Characteristics					
Physical cultural heritage	Project area holds no archaeological, paleontological, or architectural sites of heritage significance A temple (Shivalaya temple) is situated nearby the proposed site. Disturbances may occur during construction period	- If by chance any such findings are spotted or suspected, the contractor will immediately stop work to allow further investigation - Proper fencing will be provided to isolate the project site from the temple area, and adequate route for the visitors and local passer-bys will be maintained so as to minimize any disturbance to local cultural practices	Contractor	Records of chance finds	Visual inspection by RPMO and DSMC-ESS on quarterly basis.
During Operation and Maintenance Phase					
Exposure to chemicals	Excessive exposure to chlorine, hypochlorous acid, and hypochlorite ion generally results in irritation of the oesophagus, a burning sensation in the mouth and throat, and spontaneous vomiting	- (i) 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	WUSC	Water quality test	
Water bodies	The effluent produced from the periodic backwashing of the filter plant, if discharged directly to the river course may cause harm to the water bodies and aquatic life especially during the dry season when the flow will be less.	- A settling tank is proposed for decanting of the slurry from the effluent during backwash	Contractor	Effluent status	For first year, DSMC After that WSUC every six months
Drinking water supply system	Delivery of unsafe water due to source contamination, leakage in pipes	- 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.	PMO, RPMO, DSMC and WUSC	Water Quality reports in the log book	During O&M of the system Quarterly monitoring

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7.5 Environmental Monitoring Program

Environmental monitoring will be done during construction on three levels:

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

In addition to regular monitoring onsite (at town level) by the ICG unit and DSC-ESS on the EMP implementation of the mitigation measures, monitoring of key environmental parameters is proposed. Monitoring of the environmental compliances will be source based monitoring, and monitoring of the environmental impacts will be sink based monitoring.

Table 7.2 presents the indicative environmental monitoring plan for the project which includes relevant environmental parameters, with a description of the sampling stations, frequency of monitoring, applicable standards, and responsible agencies.

Table 7.2: Environmental Monitoring Program

Source-based monitoring						
SN	Field and Source	Stages/Phases	Parameters	Location	Frequency	Standards
1	Campsite monitoring	Construction, Post-construction	OHS aspects; SWM; Drinking water quality; Provisions of space & light; Code of conduct; First aid facilities	Temporary campsites, rented rooms/flats of workforce	2 weekly	NDWQS 2005, WHO Guideline values
	Monitoring in work fronts	Construction	OHS aspects; Air quality; noise levels	All active working sites	Weekly	NAAQS 2003, WHO Guidelines
	Monitoring in access roads	Construction	Air quality; noise levels	All roads where project vehicles ply	Weekly	NAAQS 2003, WHO Guideline values
4	Stockpile/Disposal site monitoring	Construction		Designated stockpile area, informal stockpiles, designated disposal sites	Monthly	Contract Specifications
5	Workforce monitoring	Construction		All active working sites	2 weekly	Contract Specifications
						Joint Monitoring Team (Biannually by RPMO/PMO)

Sink-based monitoring						
SN	Field and Source	Stages/Phases	Parameters	Location	Frequency	Standards
1	Monitoring in residential areas	Construction	Air quality; noise levels	Residential areas along pipelines	Monthly	NAAQS 2003, WHO Guideline values
2	Monitoring in religious sites/markets	Construction	Air quality; noise levels	Religious sites/markets areas along pipelines	Monthly	NAAQS 2003, WHO Guideline values
3	Monitoring in surface water sources	Construction	Water quality SW disposal	Rivers/streams within 500 m of project components/units	Six monthly	NDWQS 2005
4	Monitoring in proposed drinking water sources	Pre-construction, Construction and Post-construction	Water quality	Source/s identified for the project	Quarterly	NDWQS 2005
5	Public/Open spaces	Construction	Greenery Promotion	Open spaces within the service wards	Quarterly	Contract Specifications
						Joint Monitoring Team (Biannually by RPMO/PMO)

Note: Joint Monitoring Team comprises of authoritative representatives at least from the Supervision Consultant, the Contractor, and the WUSC (at least 1 from each party).



7.5.1 Environmental Monitoring Cost

The cost of regular monitoring works will be inbuild in the EMP and the civil work's contract of the contractor. Other monitoring will works will have additional costs for involvement of an authorized team. The project level monitoring team will submit its report to MoWS. Total cost of environmental monitoring (field visits, observation, review of reports and report preparation) is estimated NRs. 425,000.

Table 7.3: Environmental Monitoring Cost

Manpower requirement	Duration (month)	Rate (NRs)	Amount (NRs)
Team Leader/Environmental Specialist	1	Lumpsum (L/S)	300,000
Water Resource Engineer	½		
Socio-economist	½		
Cost of Monitoring by MoWS	1		
Support staff	1		
Transportation cost		L/S	75,000
Report preparation & sampling/lab test		L/S	50,000
Total			425,000

7.5.2 Types of Monitoring and Monitoring Parameters

Monitoring is an ongoing component of the environmental assessment process and subsequent environmental management and mitigation activities. There are basically three types of environmental monitoring;

Baseline Monitoring - It is done if the project is not going to be implemented recently (in this project not required)

Compliance Monitoring - It verifies whether contract environmental clauses and the mitigation measures are properly implemented in the field.

Impact Monitoring - It confirms whether the environmental mitigation measures specified in the project design and contract are correctly formulated.

The nature and purpose of environmental monitoring will be different in the pre-construction, stage, construction stage and operation stage of the project.

Pre-construction Stage

Monitoring at this stage of project is to:

- Confirm that plan, route selection and design of the road has considered the recommendation made by IEE
- Judge the level of preparation for implementing the construction related mitigation, and
- Prepare up-to-date environmental status of specific site where the impacts are assessed to be significant

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Construction Stage

This stage of monitoring is to check compliance with the best practices, norms and standards and on implementation of the mitigation measures prescribed by IEE. The following parameters will mainly be focused on:

- i. Disposal of spoil and construction wastes and its consequences
- ii. Disruption of natural water courses, drainage work and its consequences
- iii. Slope protection measures
- iv. Loss, stratification or degradation of forest vegetation
- v. Care, sensitivity or disruption of community infrastructures
- vi. Loss or degradation or threat to private properties
- vii. Care, sensitivity or disruption to cultural sites

Operation Stage

- i. The monitoring in this stage is mainly related to road features, road induced activities and their impacts on receiving environment. The following parameters are mainly monitored during operation stage:
- ii. Drainage structures, their outfall and damage to private properties, community properties and natural resources
- iii. Effectiveness of the slope protection and soil erosion measures
- iv. Encroachment into road side, public land, forest or marginal land
- v. Status of waste disposal sites
- vi. Road accidents
- vii. Symptoms of emergence of road side settlements, changes in agricultural pattern
- viii. Activities of road neighboring communities
- ix. Illegal felling of trees and hunting of wildlife

7.6 Institutional Capacity Development Program

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.

WUSC does not have the capacity to monitor the quality of supplied water as prescribed in the NDWQS and its Directives. Albeit monitoring kits and laboratory rooms will be provided, this would not guarantee WUSC can handle monitoring appropriately. DWSSM has five regional laboratories; however some are not functioning fully due to lack of manpower. 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 the WUSC actively participating to develop WUSC capacity. The conduct of 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 capacity of the 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 the WUSC. A Water Safety Plan is included in project design and will oblige the operator to carry out water quality monitoring accordingly. There will

be sufficient fund to include training by the licensed and accredited lab, while monitoring water quality. The PMO-ESS will be responsible for trainings on environmental awareness and management in accordance with both ADB and government requirements. Specific modules customized for the available skill set will be devised after assessing the capabilities of the target participants and the requirements of the project. Typical modules would be as follows: (i) sensitization; (ii) introduction to environment and environmental considerations in water supply and wastewater projects; (iii) review of IEE 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. The proposed training project along with the frequency of sessions is presented in Table 7.4 below;

Table 7.4: Training Program for Environmental Management

Items	Pre-construction/prior to construction	Construction	
Training Title	Orientation workshop	Orientation program/ workshop for contractors and supervisory staffs	Experiences and best practices sharing
Purpose	To aware the participants 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	To share the experiences and best practices aimed at learning lessons and improving EMP implementation
	Module 1: Orientation	• Roles and responsibilities of officials/contractors/consultants on Safeguards	Experiences on EMP implementation – issues and challenges
Contents	• ADB Safeguards Policy Statement	• Environmental issues during construction	Best practices followed
	• GoN Environmental Laws and Regulations	• Implementation of EMP	
		• Monitoring of EMP	
	Module 2: Environmental Assessment Process	• Reporting requirements	
	• 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		
Duration	1 day	1 day	1 day on a regular period to be determined by PMO
Participants	Executing and implementing agencies, PMO, and PMO staffs (technical and environmental) involved in the project implementation	PMO RPMO Contractors	PMO RPMO Contractors

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Ministry of Water Supply
Kathmandu, Nepal

Government of Nepal
Ministry of Water Supply
Urban Water Supply and Sewerage
Project Management Unit

7.7 Staffing Requirement and Budget

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.

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.

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.

The operation phase for mitigation measures are good operating practices to mitigate the environmental impacts of this phase and the 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. Cost of awareness program & WSP during contract period is NPR 480,000.00 under provisional sum.

The indicative costs of EMP implementation are shown in Tables 7.5 (by source of funds). The total of NRs 1,500,000 will be allocated for EMP works directly through the contractor's contract.

Table 7.5: Indicative Cost of EMP Implementation and Its Monitoring

	Particulars	Stages	Unit	Total Number	Rate (NPR)	Cost (NPR)	Cost covered by
A	Mitigation Measures						
1	Protection and stabilization works					625,000	EMP budget
2	Reinstatement works and compensation costs					325,000	
3	Greenary management/ Promotion	Construction phase				250,000	EMP budget
B	Monitoring Measures						
1.	Air quality monitoring	- Pre-construction - Construction	Per location	4	25,000	100,000	EMP budget
2.	Noise levels monitoring	- Pre-construction - Construction	Per location			25,000	EMP budget

	Particulars	Stages	Unit	Total Number	Rate (NPR)	Cost (NPR)	Cost covered by
3.	Water Quality Test	Pre-construction - Construction	Per Location	15	5000	75,000	EMP budget
C	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 (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 - Upon completion of the project	lump sum	1 8 1	Module 1 – 300,000 Module 2 – 100,000 Module 3 – 200,000	300,000 800,000 200,000	Covered under DRTAC or DSMC contract
D	Administrative Costs						
1.	Legislation, permits, and agreements	Permit for excavation, tree-cutting permits, etc IEE preparation and MoWS presentation in	Lump sum	1	500,000	500,000	DSMC contract
E	Other Costs						
1.	Public consultations and information disclosure	Information disclosure and consultations including public awareness campaign, preparation for WSP	As per requirement	Lump sum		25,000	EMP budget
2.	Awareness, GRM implementation	Trainings, Meetings, consultations, communication, and information	Lump sum			75,000	EMP budget

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	Particulars	Stages	Unit	Total Number	Rate (NPR)	Cost (NPR)	Cost covered by
		dissemination					
3.	Any unanticipated impact due to project implementation	Mitigation of any unanticipated impact arising		Lump sum	Contractor's liability	As per insurance requirement	Civil works contract – contractor's defect liability period
F	Expert Monitoring Costs						
	Environmental Specialist			1 MM	100,000	100,000	PMO cost
	Sociologist			1 MM	75,000	75,000	
	Support staff			2 MM	25,000	50,000	
	Cost of monitoring visit by MoWS/DWSSM					200,000	
	Transportation and logistics					75,000	
TOTAL						3,800,000	

7.8 Implementation Schedule

Environmental management will be implemented from the detailed design phase through to procurement, construction and operation. Table 7.6 presents the indicative time frame of key EMP activities in relation to project implementation schedule.

Table 7.6: Environmental Management Implementation Schedule

PROJECT IMPLEMENTATION		
	Detailed Design & Bidding Documents	Q2 Y0
	Procurement	Q3 Y0
	Construction	Q4 Y0 – Q4 Y2
	Contractor Operating Period	Q3 Y2 – Q4 Y3
	Handover to WUSC for Operation	Q3 Y3 – Q1 Y4
	Defects Liability Period	Q3 Y2 – Q4 Y4
ENVIRONMENTAL MANAGEMENT		
Overall		
1	Design Review and Technical Audit Consultant (DRTAC)-Engagement of Environmental Specialist	Starting Q4 Y0 (5 yrs of intermittent inputs)
2	PMO's submission of Environmental Monitoring Report (EMR)	
	Monthly EMR for project's Monthly Progress Report	8 th day after effective month
	Semi-Annual EMR during construction for submission to ADB	8 th day after effective 6-month period
	Annual EMR for submission to ADB	8 th 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.	Q2 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	5 th day of the month following the effective month
	- Quarterly, by Contractor or by Licensed Laboratory	3 rd day of the month following the effective quarter
Operation Period (potentially could start even before DLP is over)		
1	Implementation of mitigation measures & monitoring activities as specified in the EMP	Starting anytime between Q3 Y3 & Q1 Y4
2	Submission of EMR	anytime between Q3 Y3 & Q1 Y4
	Monthly, by Operator	5 th day of the month following the effective month
	Quarterly, by Operator or (if applicable) by Licensed Laboratory	3 rd day of the month following the effective quarter

Note: Y0 = Design Year; Y1 to Y4 = Year 1 to Year 4 from start of Construction Contract

7.9 Monitoring and Reporting

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

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

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, with support from the PMC. Ministry of Forests and Environment (MoFE) will monitor the project as the third party monitoring the compliance and effectiveness of the EMP implementation in the project.

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Ministry of Water Supply and Sanitation
Project Management Unit

Ministry of Water Supply and Sanitation
Project Management Unit

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

- i. Conduct periodic 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 EA to ensure that adverse impacts and risks are mitigated, as planned and as agreed with ADB;
- iv. work with EA 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.

7.10 Information Disclosure, Consultation and Participation

Stakeholder consultations and local participation was an essential process in project preparation and IEE study. The process in engaging stakeholders and affected people involved key informant interviews, on-site discussions with WUSC, and random field interviews of stakeholders. Table 7.7 lists the persons consulted during the IEE Study.

Table 7.7: Lists of People and Institutions Consulted

SN	Name	Representation/Position
1	Hasta Pun	Mayor
2	Maina Bi.Ka	Deputy Mayor
3	Basudev Sharma	Representative, DCC - Surkhet
4	Chudamani Sharma	Senior Social Worker, Subhaghat
5	Chhatra Bahadur Thapa	Coordinator
6	Tulasi Sharma	Member, Main Committee
7	Sushila Karki	Member, WUSC
8	Dammar Kumar K.C.	Female Member, WUSC
9	Chandra Prakash Sharma	Coordinator
10	Kehar Sing Budha	Senior Social Worker
11	Birma Kala Karki	Volunteer
12	Hema Karki	Volunteer
13	Man Kumari Khum	Beneficiary
14	Gopi Kami	Female Member, WUSC
15	Chudamani Sharma	Beneficiary
16	Shiva Bhattarai	Beneficiary
17	Nandalal Sharma	Member, Ward Committee - WN 8
18	Bir Bahadur Khatri	Beneficiary
19	Dal Bahadur Sing	Beneficiary
20	Dammar Bi.Ka.	Beneficiary
21	Duri Bahadur Pariyar	Beneficiary
22	Govinda Shahi	Beneficiary
23	Nara Bahadur Bi.Ka.	Beneficiary

24	Dal Bahadur Chand	Beneficiary
25	Dil Bahadur Sunar	Beneficiary

During the IEE preparation, consultations were undertaken in compliance with GoN's EPR. A formal public consultation was conducted on 19th March 2019 in compliance with GoN's EPR requirements (Annex 5). Choosing of safe construction campsites (potentially Sundarkhani Secondary School of WN 8), suitability of Khatang area for spoil tipping, and employment opportunities for the locals were the major concerns raised during the public consultation.

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 Subhaghat 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:

- (i) 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;
- (ii) 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 Rural Municipality;
- (iii) During construction, regular random interviews will be conducted by the ICG-ESA every month to monitor environmental concerns of subproject communities;
- (iv) During operation, periodic random interviews will be conducted by the ICG and WUSC to monitor the environmental concerns of subproject communities;
- (v) The public consultations and information disclosure will be continuous throughout the project cycle. Women participation from beneficiary community will be insured. PMO and ICG will be responsible for designing and implementing such aspects on the ground.

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 in the ADB's and UWSSP website.



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7.11 Grievance Redress Mechanism

Context

As stipulated in SPS 2009, ADB requires the borrower/client to establish and maintain a grievance redress mechanism to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the Project's environmental and social performance. The grievance redress mechanism shall address affected people's concerns and complaints promptly, using an understandable and transparent process that is gender responsive, culturally appropriate, and readily accessible to all segments of the affected people at no costs and without retribution. The mechanism should not impede access to the country's judicial or administrative remedies. The affected people will be appropriately informed about the mechanism. Under Nepal's Environment Protection Rules 2054 (1997) and as amended in 1999 and 2007, any person/party affected by the pollution/emissions generated by a project/activity may lodge complaint with the concerned sector agency (CSA). If investigation by CSA confirms the lodged complaint, the Proponent will be issued notice to institute corrective actions within a prescribed timeframe. The CSA may carry out the cleaning activities of the affected area by itself at its own cost but to be recovered from the proponent with 25% surcharge (Articles 17, 18 and 20 of EPR 1997).

The Grievance Redress Mechanism

A Grievance Redress Mechanism (GRM) will be established to receive, evaluate, and facilitate the resolution of affected people's concerns, complaints, and grievances about the social and environmental performance of the project. The GRM aims to provide a trusted way to voice and resolve concerns linked to the project, and to be an effective way to address affected people's concerns. The GRM for the project is outlined below, and consists of three levels with time-bound schedules and specific persons to address grievances.

First level of GRM

The first level and most accessible and immediate contact for the fastest resolution of grievances are the contractors and supervision consultants on site. Prior to construction of any works, the community awareness consultants, DSMC, and contractors are to hold local community meetings to notify the local residents and businesses of the temporary disturbance, and to inform them of the project. If a local area committee (LAC) exists, they should also be informed. If any complaints arise, the contractors, DSMC, and PMO can immediately resolve the complaint on site. The PMO regional units namely RPMO; can also be involved in grievance redress at this stage. The DWSSM hotline and PMO office phone number will be posted in public areas within the project area and construction sites.

Any person with a grievance related to the project can contact the project to file a complaint. The RPMO is staffed with a consumer relations officer to field and resolve complaints. The consumer relations officer or branch manager will document the complaint, and immediately address and resolve the issue with the contractor within 1-2 days, if the complaint remains unresolved at the field level. The branch manager may seek the assistance of the DSMC safeguards specialists (the environmental specialist or social safeguards specialist) to help resolve the issue. The consumer relations officer or branch manager will notify the PMO safeguards unit that a complaint was received, and whether it was resolved. The branch manager will fully document the following information: (i) name of the person, (ii) date

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Engineer

complaint was received, (iii) nature of complaint, (iv) location, and (v) how the complaint was resolved.

Second level of GRM

Should the grievance remain unresolved; the branch manager will forward the complaint to the PMO safeguards unit. The person filing the grievance will be notified by the consumer relations officer or Branch Manager that the grievance was forwarded to the PMO safeguards unit. For resettlement issues, the resettlement officer will address the grievance; for environmental issues, it will be the environmental officer. Grievances will be resolved through continuous interactions with affected persons, and the RPMO will answer queries and resolve grievances regarding various issues, including environmental, social, or livelihood impacts. Corrective measures will be undertaken at the field level by the RPMO safeguards staff within 7 days. The relevant safeguards unit staff will fully document the following information: (i) name of the person, (ii) date complaint was received, (iii) nature of complaint, (iv) location, and (v) how the complaint was resolved.

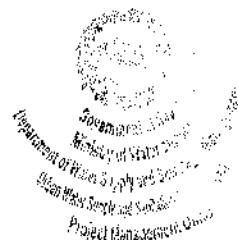
Third level of GRM

Should the grievance remain unresolved, the PMO 's project director will activate the third level of the GRM by referring the issue (with written documentation) to the local Grievance Redress Committee (GRC) of the DWSSM, who will, based on review of the grievances, address them in consultation with the PMO safeguards unit, project director, and affected persons. The local GRC will consist of members of the PMO, affected persons, and local area committee, among others determined to provide impartial, balanced views on any issues. The GRC should consist of around five persons. A hearing will be called with the GRC, if necessary, where the affected person can present his or her concern/issues. The process will promote conflict resolution through mediation. The local GRC will meet as necessary when there are grievances to be addressed. The local GRC will suggest corrective measures at the field level and assign clear responsibilities for implementing its decision within 15 days. The functions of the local GRC are as follows: (i) to provide support to affected persons on problems arising from environmental or social disruption, asset acquisition (if necessary), and eligibility for entitlements, compensation, and assistance; (ii) to record grievances of affected persons, categorize and prioritize them, and provide solutions within 15 days; and (iii) to report to the aggrieved parties developments regarding their grievances and decisions of the GRC. The PMO safeguards officers will be responsible for processing and placing all papers before the GRC, recording decisions, issuing, minutes of the meetings, and taking follow-up action to see that formal orders are issued and the decisions carried out.

Fourth level of GRM

In the event that a grievance is not addressed by the contractor, DSMC, RPMO, PMO or GRC, the affected person can seek legal redress of the grievance in the appropriate courts, the fourth level of the GRM, which is the formal legal court system. The grievance redress mechanism and procedure is depicted in Figure 5 below;


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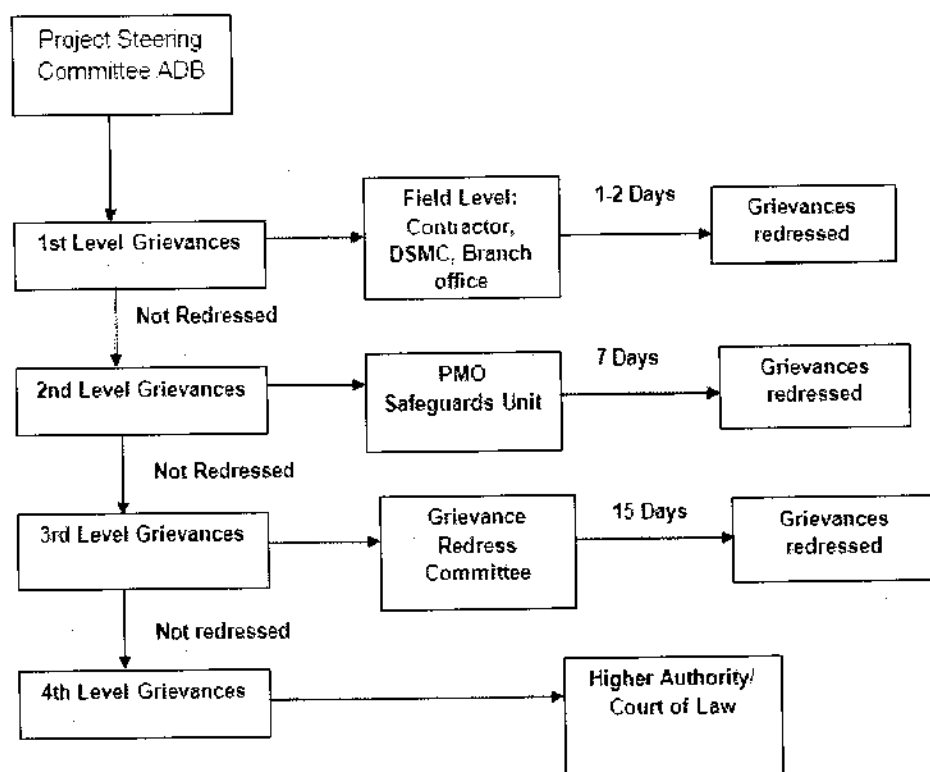


Figure 7.1: Grievance Redress Mechanism

Record Keeping and Disclosure

Records at the municipal-level will be kept by the concerned WUSC or local bodies member secretary, assisted by RDSMC, of all grievances received, including contact details of complainant, date the complaint was received, nature of grievance, agreed corrective actions and the date of the incident and final outcome. The number of grievances recorded and resolved, and the outcomes will be displayed/disclosed in the PMO office, WUSC, and on the web, as well as reported in the safeguards monitoring reports submitted to ADB on a semi-annual basis. For any grievance escalated to RPMO/ Municipality level, the RPMO's Engineer assigned as GRM focal person will be responsible for record-keeping, calling of GRC meetings and timely sharing of information with WUSC or municipalities. For grievances escalated to PMO and above, the PMO's SSO will be responsible for maintenance of records, sending copies to RPMO and WUSC for timely sharing of information with the person filing complaint.

Table 7.8: Suggested Format for Record Keeping of Grievances

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

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Department of Water Supply
Municipal Corporation, Kathmandu
Government of Nepal
Ministry of Water Supply
Urban Water Supply Project

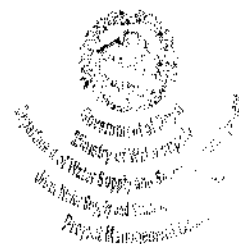
Periodic Review and Documentation of Lessons Learned

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

Costs

All costs involved in resolving the complaints (meetings, consultations, communication and reporting/information dissemination) at local (field/ward/town) level will be borne by the concerned focal organisations at each level: WUSC at town level; RPMO at regional level and PMO at central level. Cost estimates for grievance redress are included in resettlement cost estimates.

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8. CONCLUSIONS

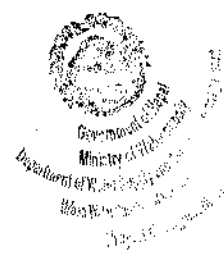
The IEE study shows that the proposed project is not an environmentally critical undertaking. The IEE indicates that:

- The proposed Subhaghat Urban Water Supply and Sanitation Project and its components are not within or adjacent to environmentally sensitive areas.
- There will be some adverse impacts. However, the extent of adverse impacts is expected to be local, confined within the projects' main areas of influence, quarry or burrowing sites, waste disposal sites, and the routes to and from these sites. Except during windy days and heavy rainfall, fugitive dust, fine aggregates, sediments and/or wastes would not be 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 more site-specific and short term.
- Slope stabilization in Khanidanda area, and protection works along banks of Bheri river are the major concerns to be addressed.
- The few adverse impacts of high magnitude during construction will be temporary and short-termed (i.e. most likely to occur only during peak construction periods). These will not be sufficient to threaten or weaken the surrounding resources. Simple mitigation measures, basically integral to socially and environmentally responsible construction practices, will be used at construction sites. 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. Since it is near Birendranagar Municipality, the implementation of the project will help attract more development and investments in that belt of Karnali Province.

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


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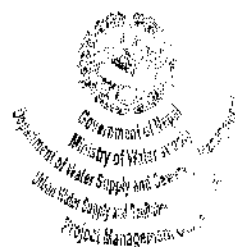

Subhaghat Urban Water Supply and Sanitation Project


Government of Nepal
Ministry of Health
Department of Water Supply and Sanitation

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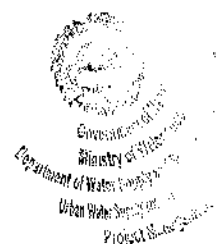

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ANNEXES

- Annex 1: Approved ToR
- Annex 2: Environmental Standards, Sample Forms, Formats and Reporting Templates
- Annex 3: Project Location and Service Area
- Annex 4: Public Notice & *Muchulka*, Public Consultation minutes & Recommendation Letter
- Annex 5: Water Quality Test Report
- Annex 6: Survey Questionnaire & Checklists
- Annex 7: Photographs
- Annex 8: Comments Incorporation Matrix


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ANNEX 1: APPROVED TERMS OF REFERENCE (TOR)







नेपाल सरकार

खानेपानी मन्त्रालय

फाइल नं. : १२१९२०२
प्रमाणित : १३०७-१-१२१९२०२
सिंहदरबार,
काठमाडौं, नेपाल :

पत्र संख्या : ०६५/०६६
खानेपानी नं. : १९२

श्री खानेपानी तथा ढल निकास विभाग
पानीपोखरी, काठमाडौं।

Signature
३१.११.१९

मिति: २०७५/१०/१०२

५६८
०६५/१८१४

Signature
०६५/५४

विषय: प्रारंभिक वातावरणीय परिक्षण (IEE) को कार्यसूचि(TOR) स्वीकृत गरिएको सम्बन्धमा।

उपरोक्त विषयमा तेश्रो साना सहरी खानेपानी आयोजना प्रस्तावक रहेको सुभाघाट, सुर्खेत खानेपानी तथा सरसफाइ आयोजनाको को प्रारंभिक वातावरणीय परिक्षण (IEE) को कार्यसूचि (ToR) नेपाल सरकार(सचिवस्तर) को मिति २०७५/१०/२९ को निर्णयानुसार स्वीकृत गरिएको ब्यहोरा निर्देशानुसार अनुरोध छ।

(स्वीकृत कार्यसूचि (TOR) को १ प्रति संलग्न गरिएको)

Signature
मधुसुधन खनाल
(इन्जिनियर)

बोधार्थ

तेश्रो साना सहरी खानेपानी आयोजान
आयोजना व्यवस्थापन कार्यालय, पानीपोखरी।

Signature
०१/१०





Terms of Reference (ToR)

For

Initial Environmental Examination (IEE) study

Of

Subhaghat Small Town Water Supply
and Sanitation Project
(Subhaghat, Surkhet)

Submitted to

Ministry of Water Supply and Sanitation

Government of Nepal

Singhadurbar, Kathmandu

Submitted by

Project Management Office,
Third Small Towns
Water Supply and Sanitation Sector Project
Department of Water Supply and Sewerage
Panipokhari, Kathmandu

Prepared By

Building Design Authority Pvt. Ltd. and
Plush Engineers and Architects (P) Ltd.
(BDA-PEA JV)
Kamaleadi, Kathmandu

February, 2018



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

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Annex IV: Checklists and questionnaires	





ACRONYMS

ADB	Asian Development Bank
BS	Bikram Sambat
CI	Cast Iron
Cum	Cubic meter
DDC	District Development Committee
DI	Ductile Iron
DMA	District Metering Area
DSMC	Design, Supervision & Management Consultant
DWSS	Department of Water Supply and Sewerage
EPA	Environment Protection Act
EPR	Environment Protection Rules
GI	Galvanized Iron
GoN	Government of Nepal
HDPE	High Density Polyethylene Pipe
ICG	Implementation Core Group
IEE	Initial Environmental Examination
LB	Local Bodies
LPCD	Liter Per Capita Per Day
m ³	meter cube (cubic meter)
MoWSS	Ministry of Water Supply and Sanitation
NAAQS	National Ambient Air Quality Standards
NDWQS	Nepal Drinking Water Quality Standards
NGO	Non-Governmental Organization
OHT	Overhead Tank
PAC	Public Awareness Campaign
PMO	Project Management Office
PPM	Parts Per Million
PPTA	Project Preparation Technical Assistance
RoW	Right of Way
RT	Reservoir Tank
TDF	Town Development Fund
TM	Transmission Main
TOR	Term of Reference
TPO	Town Project Office
TSTWSSSP	Third Small Towns Water Supply and Sanitation Sector Project
VDC	Village Development Committee
WHO	World Health Organization
WRDSMC	Western Region Design Supervision and Management Consultancy
WRPMO	Western Region Project Management Office
WSSDO	Water Supply and Sanitation Division Office
WSSUC	Water Supply and Sanitation Users' Committee
WSUC	Water Supply and Sanitation Users Committee
WUA	Water Users Association
WUSC	Water Users and Sanitation Committee



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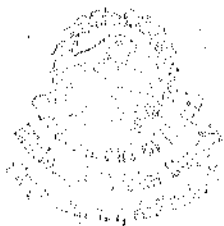
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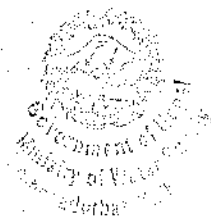
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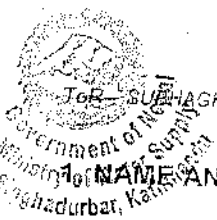


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WUA	Water Users Association
WUSC	Water Users and Sanitation Committee



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1. NAME AND ADDRESS OF THE INSTITUTION PREPARING THE REPORT

1. The Environment Protection Rules 1997 (and its amendments) mentions that a Terms of Reference (TOR) is to be prepared for an Initial Environmental Examination (IEE).

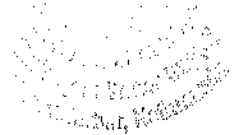
2. This Terms of Reference (TOR) has been prepared in order to carry out an IEE for Subhaghat Small Town Water Supply and Sanitation Project in Surkhet district. The proponent of the proposed project is the Project Management Office (PMO), Third Small Towns Water Supply and Sanitation Sector Project (TSTWSSSP) of the Department of Water Supply & Sewerage. The name and address of the proponent is given below:

Name of the Proponent:

Project Management Office
Subhaghat Small Town Water Supply and Sanitation Project
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:

Panipokhari, Kathmandu, Nepal
Phone: 4423848, 4412348
Fax: 4413280
e-mail: info@stwspp.gov.np
Website: www.sstwspp.gov.np





2. DESCRIPTION OF THE PROPOSAL

2.1 General Introduction

3. The Third Small Towns Water Supply and Sanitation Sector Project is designed with the principle of community management, making it demand responsive, and adopting a participatory approach. Participatory approach aims for greater community participation in planning, implementation along with their O&M activities. Demand responsiveness is demonstrated by willingness to pay for improved service delivery and ultimately aims at 30% cost recovery. Community management is essential for making the community empowered so that the community could take full responsibility on financial, technical and managerial aspects on operation & maintenance activities.

4. In terms of financing, 70% of the cost will be contributed by GON. In regard to cash contribution to be made by WUSC, the initial cash contribution of WUSC should be minimum 5% of the civil works contract in the form of upfront cash contribution. The remaining 25 % to be borrowed from the TDF as a loan at an interest rate not exceeding 5% per annum with a maturity of 25 years including a grace period of five years. The project ensures full participation of Water Users and Sanitation Committee in the formulation, implementation and operation & maintenance of water supply, sanitation and drainage facilities.

5. The main objectives of the project are to:

- i. Improve water supply and sanitation facilities and provide a health and hygiene education program in each town,
- ii. Support community participation in the development of water supply and sanitation facilities, and
- iii. Facilitate sustainable development of the facilities thereby to help/ improve the health and quality of life of the people living in the project area.

6. Subhaghat is a town in Gurbhakot Municipality in Surkhet district in Bheri zone, Province 6. It is surrounded by Salyan district in the East, Simta and Chingadh Rural Municipalities in the North, Bheriganga and Lekbesi Municipalities in the West and Salyan district in the South. Subhaghat town is located in the inner Terai on the banks of the Bheri river.

7. The service area of Subhaghat Small Town Water Supply and Sanitation Project covers wards 6, 7, 8 and 9 of the municipality. The project area is predominantly agriculture based with rural setting surrounding areas. However, the core project area being market centre with compact settlement, the economy is business and commerce oriented in the core project area.

8. The climate of the project area is Sub-tropical. The average maximum temperatures during the summer fluctuates between 35° C and 38° C and minimum temperature in winter ranges from 3° C to 10° C. The relative humidity is in the range of 85 %. The average annual rainfall is estimated at approximately 2,000 mm per year. About eighty percent of the total annual rainfall occurs during the monsoon season (June to September). The altitude of the town varies from 478 to 797 m above mean sea level. The location of the project area is 28°22' North Latitude and 81°51' East Longitude.



9. The proposed sources are ground water sources (tubewells). There are two sources, and both the sources are located nearby the Bheri River, one at Mehelkuna in ward 7 and the other at Botechaur in ward 9. Altogether there are 6 sub-systems.

10. The total households and population of the project area is 3,052 and 16,146 respectively. Out of them 15,854 is the permanent population and 292 is the floating population. The average household size is 5.2.

2.2 Project Description

2.2.1 The Sub-systems

11. Subhaghat Small Town Water Supply and Sanitation Project has been conceptualized as a piped water supply system considering ground water source. Based on the topography, settlements and existing structures decentralized distribution system has been adopted and is described below;

System A (Mehelkuna):

12. This system is proposed to serve service areas in wards 6 and 7 of Gurbhakot Municipality through 4 sub-systems; Badkholi Nakale sub-system, Badkholi Tatopani sub-system, Badkholi Jarkate sub-system, and Mehelkuna sub-system. This system is designed to cater 24,274 permanent and 520 rented (total 24,794) population. Four RCC reservoirs (100 Cum, 50 Cum, 120 Cum, 300 Cum) are proposed.

System B (Botechaur):

13. This system is proposed to serve the service areas in ward 9 of Gurbhakot Municipality through 2 sub-systems; Botechaur Bazar sub-system and Botechaur Bhalukhola sub-system. This system is designed to cater 8,329 permanent and 295 rented (total 8,624) population. An existing 100 Cum RCC reservoir and a proposed 80 Cum reservoir will be used to store and distribute the water.

2.2.2 Project Components

DRINKING WATER SOURCE

14. Ground water sources will be used. Deep tubewells are proposed. The sub-systems and sources are as follows:

Table 1: Sources and their locations

SN	System	Source Type	Well Number/s			Source Location	Remarks
			Working	Standby	Total		
1	System A	Tube Well	4	1	5	Mehelkuna, Ward 7, Gurbhakot Municipality	Along the bank of the Bheri River
2	System B	Tube Well	2	1	3	Botechaur, Ward 9, Gurbhakot Municipality	Along the bank of the Bheri River

15 Water quality assessment of the existing sump wells located nearby the Bheri River at Botechaur and Mehaikuna was carried out in July 2017. All the water quality parameters were found to comply with NDWQS for drinking water. Since the water quality has been analyzed only once, it cannot be accurately reliable. Besides, the quality of water in the proposed tube well may not show exactly the same results as the existing sump well. Further tests will be carried out later period of the study. The water treatment system consisting of aeration, sedimentation, filtration and disinfection is recommended to comply with the requirements of NDWQS for drinking water.

Table 2: Water Quality Assessment

SN	Parameters	Units	Test methods	Observed Values		NDWQS, Nepal
				Botechaur	Mehaikuna	
1	pH at 27°C		Electromeric, 4500 – H ⁺ B, APHA	7.9	7.8	6.5 – 8.5
2	Electrical Conductivity	µc/cm	Conductivity Meter, 2510 B, APHA	393	611	1500
3	Turbidity	NTU	Nephelometric, 2130 B, APHA	<1	1	5
4	Total Hardness as CaCO ₃	mg/l	EDTA Titrimetric, 2340 C, APHA	208	322	500
5	Total Alkalinity as CaCO ₃	mg/l	Titrimetric, 2320 B, APHA	215	310	-
6	Chloride	mg/l	Argentometric Titration, 4500 – Cl ⁻ B, APHA	0.99	13.41	250
7	Ammonia	mg/l	Direct Nesslerization, 4500 – NH ₃ -N B, APHA	0.1	0.05	1.5
8	Nitrate	mg/l	UV Spectrophotometric Screening, 4500 – NO ₃ B, APHA	4.06	33.21	50
9	Nitrate	mg/l	NEDA, Colorimetric, 4500 – NO ₂ B, APHA	0.37	0.04	-
10	Calcium	mg/l	EDTA Titrimetric, 3500 – Ca B & 3500 – Mg B APHA	44.09	72.94	200
11	Magnesium	mg/l		22.82	34.03	-
12	Arsenic	mg/l	SDDC, Hydride Generation 2500-As, C, APHA	N.D. (<0.005)	N.D. (<0.005)	0.05
13	Iron	mg/l	Direct Air – Acetyl Acene	0.17	0.15	0.3
14	Manganese	mg/l	APHA 3110-B APHA	N.D. (<0.02)	N.D. (<0.02)	0.2

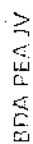


Figure 1: Location Map of the Project Area

16. The major components of the water supply scheme are briefly described below:

Water Treatment Units

17. The water treatment process has been selected based on the raw water quality. The proposed treatment process aims to remove impurities present in the raw water. It also kills pathogenic organisms present in raw water and ensures the presence of residual chlorine to kill the pathogenic organisms during the conveyance of the treated water in pipelines. The treatment process consists of lime dosing, aeration towers, pressure filters and disinfection with associated accessories like air blowers/compressors, valves and pipes.

18. Lime dosing in water is required to precipitate out dissolved iron present in raw water. Aeration towers made of mild steel is proposed to precipitate out dissolved iron. Pressure filters made of mild steel are proposed to remove precipitated iron. A large number of coliforms is also expected to be removed in the pressure filter due to biological action. The remaining coliforms are killed by the disinfection process for which bleaching powder is to be dosed from the chlorine dosing tank.

Transmission Main

19. The transmission main conveys the water from the tubewell to the overhead service reservoirs. Since the water is conveyed by pumping it is also known as the pumping main. The water is pumped from the tubewell with sufficient head so that the water passes through the water treatment plant and delivers it into the reservoirs of the respective sub-systems. The total transmission main pipe length of the proposed systems is 17.270 km.

Reservoir / Overhead Tank

20. The total storage requirement for the system at the end of the design period i.e. year 2039 is calculated as 1,200 Cum. The reservoirs will be constructed of RCC and is designed as ground based tanks as the terrain suggests. Table 3 summarizes the requirement of the reservoir tanks for the various systems;

Table 3: Required Reservoir Sizes

SN	Systems	Reservoir Size (Cum)	Type	Remarks
1	Badkholi Nakale	100	RCC	Proposed
2	Badkholi Tatopani	50	RCC	Proposed
3	Badkholi Jarkute	120	RCC	Proposed
4	Mehelkuna	600	RCC	Proposed, 2 nos. of 300 Cum
5	Botechaur Bazar	100	RCC	Existing
		150	RCC	Proposed
6	Botechaur Bhalukhola	80	RCC	Proposed
Total		1200		

Distribution Networks

21. The water is supplied from the service reservoir to the consumers by the distribution pipe network. Distribution pipes are laid on both sides of the metalled and major roads. Single line pipes are proposed on earthen and other roads. HDPE pipes will be predominantly used. Existing pipes will not be used as these are leaking and not suitable. The length of the distribution network pipes proposed for various systems is shown in the Table 4;



Table 4: Required Pipes and lengths

SN	Systems	Length of Pipes (m)
1	Badkholi Nakale	13320
2	Badkholi Tatopani	6544
3	Badkholi Jarkute	15642
4	Mehelkuna	50522
5	Botechaur Bazar	14121
6	Botechaur Bhalukhola	11765
Total		111914

House Connections

22. The system has been designed, predominantly for house to house connections. The system has been analyzed for a design capacity of providing a total of 6,276 house connections at the end of the design period. However, initially during the construction phase, only 3249 house connections are provided to satisfy the need for the base year population.

Appurtenances

23. These will primarily comprise of valve chambers with flow control valves for controlling flow in the pipeline. Altogether 194 valve chambers and 10 pipe valve boxes are expected in the system. Other appurtenances as air valves, scour valves, fire hydrants will be provided at suitable locations. Some road crossings have been initially provided. This will also facilitate for less road diggings during the operational phase.

Generator House, Office Building/Laboratory Room

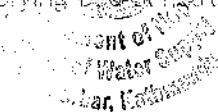
24. Three permanent generator/operator houses to accommodate the generators shall be constructed. A guard room is also proposed. Since there is no office building in the existing system, a new one is proposed to accommodate the required facilities Laboratory room, counters, managers room cannot be accommodated in the present office building. The new building will consists of a manager's room, cash counters, meeting hall etc. A laboratory room and store will also be included in the office building.

O&M Equipment and Tools

25. An assessment was done for O&M equipment and tools. The TSTWSSSP has also some guide lines on it. The following equipment have been also considered in the project so that project works during construction period and for operational activities are effectively carried out; (a) Leakage detecting equipment - 1 set, (b) submersible sludge pump - 1 no., (c) Electro-fusion machine for joining the HDPE pipes including portable generator - 1 set, (d) Water quality testing laboratory equipment - 1 set, and (e) other tools and plants like: electric pipe cutters, pipe wrenches etc.

SANITATION ASPECTS

26. Individual household toilet improvement and construction of new toilets in the households which do not have toilets are planned. However, these activities will only be technically supervised and supported. The community will construct the toilets themselves. A public toilet is also proposed. A sludge drying bed constructed from masonry with sand and gravel packing is proposed.





Capital Cost of Water Supply and Sanitation Facilities

27. The cost for the proposed water supply component has been estimated as Rs. 665,727,807.72. The cost for the proposed sanitation facilities has been estimated as Rs. 23,395,450.45. The total project cost is Rs 689,123,258.17 including 15% contingency and 13% VAT. The cost has been based on the district rates of Surkhet (FY 074/75)

2.2.3 Salient Features of the Proposed Project

28. Salient features of the town project is summarized in Table 5;

Table 5: Salient Feature of the proposed Project

SN	Items	Description
1	Name of the Project	Subhaghat Small Town Water Supply and Sanitation Project, under (Subhaghat, Surkhet) Third Small Towns Water Supply and Sanitation Sector Project, DWSS
2	Type	Pumping scheme
3	Study Level	Detailed Engineering Design Report
4	Location Area	
	Province	Number 6
	Zone	Bheri
	District	Surkhet
	VDC/Municipality	Gurbhakot Municipality
	Wards	Parts of Ward No 6, 7, 8 and 9
5	Available Facilities	
	Road	Chhinchu-Jajarkot Highway
	Nearest Airport	Surkhet
	Existing Water Supply System	Partially covered by piped water supply system. Spring sources are used
	Electricity	Available
	Communication	Available
	Health Services	Available
	Banking Facilities	Available
	Chhinchu- Botechaur distance	21 km
6	Source Characteristics	
	Source Name	Deep Tube Well
	Source Type	Groundwater
	Source Location	Mehelkuna Ward # 7 and Botechaur in Ward # 9, Gurbhakot Municipality
	Proposed Tapping yield (lps)	Mehelkuna DTW : 4 x 8,885 = 35.54 lps (Pumping) Botechaur DTW : 2 x 6,345 = 12.69 lps (Pumping)
7	Project Components	
	Storage Tank	RCC Ground Tank 50 Cum : 1 # (Proposed) RCC Ground Tank 80 Cum : 1 # (Proposed) RCC Ground Tank 100 Cum : 1 # (Proposed) RCC Ground Tank 100 Cum : 1 # (Existing) RCC Ground Tank 120 Cum : 1 # (Proposed) RCC Ground Tank 150 Cum : 1 # (Proposed) RCC Ground Tank 300 Cum : 2 # (Proposed) Total : 1200 Cum
	Valve Chamber (Prop)	Type 2 (900 x 800 x 1000) : 15 # Pipe Valves (125mm dia) : 10 #
	Community Stand Post	100
	Household Connections	1200

Prepared by: [Signature]
Checked by: [Signature]
Approved by: [Signature]
Date: [Date]

SN	Items	Description
	Total Length of pipe (Km)	Transmission : 17.270 Km Distribution : 111.914 Km
	Treatment Unit	Lime dosing unit, Aerator, Pressure filter and Disinfection
	Fire Hydrants	65 numbers
8	Social Status	
	Survey Year Population (2017)	15,854 (permanent) 292 (floating) [Total 16,146]
	Base Year Population (2019)	16,876 (permanent) 321 (floating) [Total 17,197]
	Design Year Population (2039)	32,603 (permanent) 815 (floating) [Total 33,418]
	Adopted Annual Growth Rate %	3.36 (Average)
	Household Numbers (2017, 2039)	3,052 in 2017 and 6,269 in 2039
	Average Family Sizes	5.2
9	Total Water Demand	
	Base year 2019 (m ³ /day)	Total 1,883.73
	Design year 2039 (m ³ /day)	Total 4,163.15
10	Total Cost of the Project (NRs.)	689.123 million with 15% contingencies & 13% VAT
	Water Supply Sector	NRs. 665.728 million
	Sanitation Sector	NRs. 23.395 million
11	Cost Sharing Arrangement for water supply component (NRs)	665.728 million
	1) GoN Grant @ 70%	NRs. 466.010 million
	2) WUSC Contribution	
	a) Upfront cash contribution @ 5%	NRs. 33.286 million
	b) Loan through TDF @ 25%	NRs. 166.432 million
12	Cost Sharing Arrangement for Sanitation Component (NRs)	23.395 million
	1) GoN Grant @ 85%	NRs. 19.886 million
	2) Local Body (WUSC, VDC & others) 15%	NRs. 3.509 million
13	Per capita Investment (for water supply sector)	Base Year : NRs. 40,072.30 (considering permanent and floating population both) Design Year : NRs. 20,621.32 (considering permanent and floating population both)
14	Project Status	
	Design Phase. Started	October 2017

2.2.4 Environmental Conditions

(a) Physical Environment of the Project area

Climate, Topography and Geology:

29. The climate of the Subhaghat town located in Gurbhakot Municipality project area is sub-tropical. The average maximum temperatures during the summer fluctuates between 35° C and 38° C and minimum temperature in winter ranges from 3° C to 10° C. The relative humidity is in the range of 35 %. The average annual rainfall is estimated at approximately 2000 mm per year. About eighty percent of the total annual rainfall occurs during the monsoon season (June to September). The project is located in inner Terai on the banks of the Bheri River. The altitude of the town varies from 478 to 797 m above the mean sea level.

30. Geologically, Subhaghat is situated in the lower and middle parts of the mid-hills which consist of fine grained grey sand inter-bedded with purple and chocolate shale, clay and conglomerates. The area also consist of medium coarse grained arkosic sand and fine, medium and hard massive grey sandstones. The fossils are also reported in the mudstone. (Source: Department of Geology, TU, 2006).

Water sources:

31. The project area is situated on the river basin of Bheri river. Agar Khola, Bote Khola and Jhon Jhonge Khola are among the few streams flowing in the project area. These water bodies are located in or nearby the forest areas. The watershed has a low gradient and is covered with mixed vegetation. The project uses water only from the Bheri river bank.

(b) Ecological Profile

Flora, Fauna and Protected Areas:

32. The project area is primarily agricultural and the settlement area is surrounded by the river banks and forest areas. There is only scattered tree cover and grassland within the project area. The surrounding forest area is mixed forest with predominant sal (*Shorea robusta*) and salla (*Pinus roxburghii*). Pine forests become more dense as the surrounding areas extend towards the upper elevations. Sisau (*Dalbergia sisoo*), Karma (*Syzygium aromaticum*), Shag (*Carya ovate*), Jhamun (*Mangifera indica*) and Teak (*Tectona grandis*) are also found in the forest covers.

33. Many species of mammals and birds are observed in the project area. Both large and small mammals including Leopard (*Panthera pardus*), Indian Fox (*Vulpus bengalensis*), Deers (*Cervidae*), Wild Boar (*Sus scrofa*), Langoor Monkeys (*Trachypithecus francoisi*), Common Mongoose (*Herpestes javanicus*), Squirrel (*Sciuridae*) etc are found in and around the project area. Weaver Sparrow (*Passer, Ploceidae family*), Peafowl (*Pavo cristatus*), Carrion crow (*Corvus corone*), Vulture (*Diurnal neophron*) and Red Junglefowl (*Gallus gallus*) are among the bird species found in the area.

34. There are no protected areas within, or close to the project area.

(c) Socio-Economic Profile

Population, Communities and Occupation:

35. There are total 3052 households in the service area (wards 6, 7, 8 and 9) of the municipality. With an average household size of 5.2, the project area is quite densely populated. The permanent population is 15,654 and among the permanent population, 7361 are males and 7,883 are females. People are living in clusters in the growing settlements. Dalits comprising 52.7% of total families prevail in the service area. Enrollment of children in the primary school is 11.5 percent (11.5%) which is higher than the national average of 10.5%.

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Majority of the households are still dependent on agriculture. Nearly 58% of the households have agriculture as the primary occupation. Service is another main occupation of 13% households, followed by business which is 12%. Almost 8% of the people are also involved in daily wage-based labour works.

Drinking Water, Sanitation and Health:

36. The finding of socio-economic census survey of May 2017 signifies that more than half of the households (55.7%) in the service area are getting drinking water from public tap and only 2.59% have private tap connections. Nearly 27.5% households have dugwells or tubewells for water. The existing piped water supply scheme is not sufficient to serve the growing population. The access of households to toilet facility is about 94.8% (2892 out of 3052). Among the households with access to household latrines, 85.6% have ventilated type of latrines, 11.5% have pit latrines and 2.5% have water seal types. Diarrhoea, typhoid, worms, dysentery, cholera and other vector borne diseases are among the prevalent health issues in the project area. The District Hospital at Surkhet is the primary and closest medical center for the people in the project area.

Economic Characteristics:

37. Subhaghat is a growing town with a semi-urban and rural setting, and is urbanizing fast. There is high in-migration in the project area. The core project area consists of settlements and market areas, and the economy is supported by business and commercial activities. Socio-economic census survey shows that the household average monthly income is NRs. 26,547 (Survey, 2017). Although there is no remarkable industry in this area, some small cottage and agro-based industries have been established, which have been providing services to the local people and also contributing to the local economy to some extent.

Infrastructural Facilities:

38. The project area is connected to the rest of the district and country through the Chhinchu-Jajarkot Highway. Surkhet airport is the nearest airport. There are total of 10 government offices like Jilla Ban Karyalaya, Malpot Office etc. Besides these a significant number of government and private institutions / organizations exist in the town. Among them 13 are financial institutions, 18 educational institutions i.e. college/schools, 8 health intuitions (hospital / health centres) and hotels & lodges are growing in numbers.

2.2.5 Threshold Limits for Conducting IEE

39. For a drinking water supply project, according to Schedule-1 (Clause G. Drinking Water) of Environment Protection Rules, 1997 (and its amendments), an IEE study is required under the following conditions;

Table 6: Thresholds for IEE as per EPR, and the Project Conditions

Particulars	Status for proposed Subhaghat Town Project
1) Collection of rain- water in not more than 200 hectares. and use of water sources (springs and wetlands) located within the same area.	Not applicable
2) Surface water sources with not more than 1 cubic ft. safe yield and supply of not more than 50 percent of the water during the dry season.	Not applicable
3) Processing of water at the rate of 10 to 25 liters per second	Within range

4) Recharging up to 50 percent of the total aquifer for the development of underground water source.	Not applicable
5) Construction of not more than one kilometer long tunnels for carrying water	Not applicable
6) Displacement of not more than 100 persons for operating a water supply scheme.	Not applicable
7) Settlement of not more than 500 persons on the upper reaches of water sources	Not applicable
8) Supply of drinking water to population ranging between 5,000 and 50,000	Within limits
9) Supply of drinking water to a population ranging between 10,000 and 100,000 upon connecting new sources.	Within Limits (32,603 permanent and 815 rented; in total 33,418 population)
10) Installation of more than 20 kilometers long electricity transmission lines for pumping or processing water and consumption of more than one MW of electricity.	Not applicable
11) River training and diversion activities over an area of more than one kilometer.	Not applicable
12) Operation of a drinking water supply system with inclusion of sewage disposal system with sewage treatment system	Not applicable
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	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)	This is not a multipurpose project and is solely for water supply.

40. For Drinking Water Supply Project: IEE is required for the water supply scheme having a population between 10,000 - 100,000. The population of the project falls within this criteria. Further this is an upgrading of existing system. Service areas have been added and new sources are to be tapped. Further, no people will be displaced with the construction / operation of the project. Thus the IEE study has to be carried out.

2.2.6 Impact Area Delineation:

Direct Impact Zone (DIZ)

41. The area directly affected by the project activities are demarcated as Direct Impact Zone. DIZ can also be said to be the core project area. Subhaghai Small Town Water Supply and Sanitation Project has been conceptualized as a piped water supply system considering ground water sources. The areas where the project components lie and construction works take place are considered under DIZ.

Indirect Impact Zone (IIZ)

42. The area around DIZ that could be indirectly affected due to project construction and implementation activities such as mobility of people, equipment, vehicles, noise, dust are demarcated as the Indirect Impact Zone. This IIZ area within 200 meters from the DIZ are considered as the Indirect Impact Zone.



2.3 Relevancy of the Proposal

43. Any development project has some environmental implications, both beneficial and adverse. Therefore, it is pertinent to identify the complications/changes apparent in the environmental conditions along with the favorable or adverse impacts resulting from the activities associated with the project over the physical, biological, socio-economic and cultural environments of the project area. Similarly the assessment of the magnitude of the impacts is also equally important. The assessment techniques and methods to be adopted may however vary depending upon the nature of the project.

44. In recent years, environmentally sustainable development has become one of the major challenges faced by different development institutions. Accordingly, GoN has introduced a variety of instruments into the country's development activities. IEE is one of the tools for environmentally sustainable development.

45. Taking in view of the statutory requirement of GoN to adhere with the environmental assessment of any development projects under EPA 2053 & EPR 2054, an IEE study is necessary and thus TOR is prepared. The Schedule-1 of EPR states to conduct IEE Study.

46. 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).

2.4 Objectives of the Terms of Reference (ToR)

47. The primary objective of the ToR is to guide the IEE study to the relevant areas of environmental resources and most likely implications of the project activities on the resources. It further defines the scope of the study, study area, human and financial resources, and timeframe required for the accomplishment of the study.

2.5 Objectives of the IEE Study

48. IEE is a tool for incorporating environmental concerns at the project level and is carried out as a part of the detailed study. The objectives are:

- to provide information about the general environmental settings of the project area as baseline data,
- to provide information on potential impacts of the project and the characteristics of the impacts, magnitude, distribution, affected groups and duration,
- to provide information on potential mitigation measures to minimize the impact including mitigation costs
- to assess the best alternative project with most benefits and least costs in terms of financial, social and environmental aspects
- to provide basic information for formulating management and monitoring plans

49. The present IEE has been conducted for the water supply and sanitation subproject proposed for Subhaghat Small Town Water Supply and Sanitation Project of Surkhet District. It discusses the environmental impacts and mitigation measures relating to the location, design, construction and operation and management of the scheme.

3.0 PROCEDURE TO BE ADOPTED WHILE PREPARING THE REPORT

50. The Initial Environmental Examination report will be based on this Terms of Reference to be approved by the Ministry of Water Supply and Sanitation, GoN. The general methodology to be used in the preparation of the IEE report will be as follows:

3.1 Desk Study and Literature Review

51. A desk review will be carried out with the following steps:

- i. Collection and review of secondary information from various sources
- ii. Initial interaction and consultation with the local community and district level stakeholders
- iii. Collection and review of secondary sources of information from various sources
- iv. Secondary information will be collected through published and unpublished reports and interpretation of maps and photographs will be done
- v. Delineation of the geographical boundary of the Zone of Influence area on the topo-map
- vi. Preparation of a project specific checklist
- vii. A checklist is prepared to collect physical, biological, socio-economic and cultural environment-related information in the field. In addition, a ZOI household survey questionnaire will be used to collect socio-economic information of the households.
- viii. Information on following aspects will be covered;

Physical:

Topography, Land Use, Air Noise and water Quality, Geology, Hydrology Soil Type, etc.

Biological:

Flora/Fauna, Endangered Species, NTFPs, etc.

Socio-Economic:

Population, Ethnicity, Existing Infrastructure, Health Facility, Public utilities, Economic status, etc.

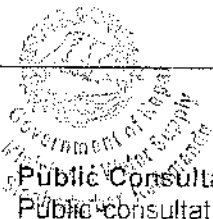
3.2 Field Works

52. In order to identify the impacts, field visits and studies will be carried out. A preliminary exercise to solicit information from planners, policy makers, project components, concerned authorities and the user community will be conducted.

53. Similarly, any cases related to hydrology, meteorology, geology and other aspects related to the environment will also be reviewed.

54. The consultant shall address the impact details by collecting information on physical, biological, socio-economic and cultural aspects of the environment. A description of relevant parts of the 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 shall be determined

55. Nature of impacts, time duration of impacts and geographical extent of impacts will be defined for design, construction and operation & maintenance phases of the project.



3.3 Public Consultation Program and Public Notice

56. Public consultations in the project area will be organized to inform the communities and to collect the feedbacks and suggestions regarding the issues. This program mainly focuses on the awareness about the project plans and programs, building of mutual consensus about the implementation of the project, identification of the key issues to be considered during the IEE study and project design. Public consultation shall remain a continuous process during the entire period of the IEE study and during implementation of the project.

57. The proponent will affix a notice in the office of Gurbhakot Municipality and concerned ward offices, Office of the DDC, schools, hospitals, health posts requesting the concerned authorities and individuals to offer their written opinions and suggestions within fifteen days with regard to the possible impact of the implementation of the proposal on the environment. The notice will be published in a national daily newspaper. Deeds of the fixing of notice from the concerned offices will be collected and included in the IEE report.

3.4 Data Analysis and Report Preparation

58. The data collected shall be analyzed to identify both the negative and positive impacts of the project on the existing environment. During this stage, the socio-economic profile prepared shall also be considered for further verification before finalization and prediction of the possible adverse and beneficial impacts. The consultant will submit the IEE Draft report within 45 days after approval of TOR. The draft IEE report will be presented to WUSC, local body representatives etc. The consultant will incorporate the comments and suggestion made by PMO and WUSC. The consultant will submit the final IEE report within 7 days after receiving comments from PMO.

59. The proponent shall submit fifteen (15) copies of the proposal to the concerned Ministry (MoWSS) in accordance with Rule 10 of the EPR, 1997 for the approval of the proposal.

3.5 Identification, Prediction and Evaluation of Impacts

60. Considering the proposed project activities in terms of construction and operation stages of the project, identification and prediction of impacts will be carried out. The impacts of the activities will be on biophysical, social, economic, and cultural resources in a defined Zone of Influence (Zoi). The impacts will be classified in terms of extent (site specific, local, and regional), magnitude (low, medium, and high) and duration (short term, medium term and long term). The likely impact will be assessed covering both adverse and beneficial ones.

61. All the physical, biological, socio-economic and cultural information and data collected from both secondary and primary sources will be analyzed. The tools and techniques include checklists (simple, descriptive, scaling or questionnaire), interaction matrix (simple, Leopold, modified graded or impact matrix) and network methods. If required, expert judgment, GIS tools, Delphi method and experience from the past projects shall also be employed for the prediction of potential impacts.

62. The IEE report will be prepared in accordance with the content given in Schedule 5 of the EPR '97, and the final report will be prepared after incorporating all the relevant comments and suggestions on the draft report. Requirements as per ADB's SPS 2009 will be complied during the study and while preparation of the report.





4.0 POLICIES, LAWS, RULES AND GUIDELINES TO BE TAKEN INTO ACCOUNT WHILE PREPARING THE REPORT

63 The IEE will be conducted in compliance with the following Policies, laws, Acts, Regulations, Standards and Guidelines as mentioned below;

Constitution

The Constitution of Nepal, 2072

Acts

- Water Resources Act, 2049 BS (1992 AD)
- Forest Act, 2049 BS (1992 AD)
- Environment Protection Act, 2053 BS (1996 AD)
- Local Self Governance Act, 2055 BS (1999 AD)
- Aquatic Animals Protection Act 1961 and First Amendment, 2055 BS (1999 AD)
- Land Acquisition Act, 2034 BS (1978 AD)
- National Park and Wild Life Conservation Act, 2030 BS (1974 AD)
- Soil and watershed Area Conservation Act, 2039 BS (1983 AD)
- Labour Act, 2048 BS (1992 AD)
- Child Labour Prohibition and Regulation Act, 2056 BS (2001 AD)

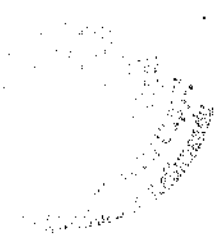
Rules and Regulations:

- Forest Regulations, 2050 BS (1993 AD)
- Environment Protection Rules, 2054 BS (and its amendments)
- Local Self Governance Regulations, 2056 BS (2000 AD)
- Water Supply and Sanitation Regulation, 2062 BS (2005 AD)

Plan and Policies:

- Rural Water Supply and Sanitation National Policy, Strategy and Action Plan, 2060 BS (2004 AD)
- Water Supply and Sanitation National Policy and Strategy, 2060 BS (2004 AD)
- Urban Water Supply and Sanitation Policy, 2066 BS (2009 AD)
- ADB's " Safeguard Policy Statement (SPS) " 2066 BS (2009 AD)

Standards, Guidelines and Strategies

- National EIA Guidelines, 2050 BS (1993 AD)
 - National Drinking Water Quality Standards 2062 BS (2005 AD)
 - National Ambient Air Quality Standards, 2003 AD
 - National Noise Standard Guidelines, 2012 AD
 - Water Resources Strategy, 2055 B.S. (2002 AD)
- 

5.0 PREPARING THE REPORT

5.1 Time

64 Time schedule envisaged for the IEE study is as follows;

Duration: Within two months of the approval of TOR.

Proposed Schedule of work for the IEE Report Preparation

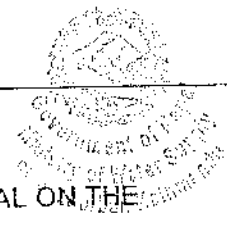
Table 7: Schedule proposed for IEE

S.No	Activities / Week	1 wk	2 wk	3 wk	4 wk	5 wk	6 wk	7 wk	8 wk
1	TOR Approval								
2	Public Notification								
3	Field investigation, experts view / focus group session and collection of public opinion								
4	Preparation and submission of Draft Report								
5	Collection of comments and suggestions								
6	Preparation and submission of Final Report								

5.2 Estimated Budget

65. The estimated budget for this IEE study is Rs. 500,000. Following inter-disciplinary human resources will be engaged with the co-ordination of the team leader;

- i. Environmental Specialist
- ii. Water Supply Engineer
- iii. Sociologist
- iv. Geo-hydrologist
- v. Ecologist/Botanist



6.0 SPECIFIC IMPACTS OF THE IMPLEMENTATION OF THE PROPOSAL ON THE ENVIRONMENT AND MITIGATION MEASURES

66. A distinction shall be made between the potentially significant positive and adverse impacts and immediate and long term impacts. Impacts that are unavoidable or irreversible shall be identified. Where ever possible, the significant impacts shall be quantified in terms of the environment costs and benefits.

67. The impacts shall be identified mainly for the activities during the pre-construction, construction and post construction (O&M) phases on the existing physical, biological and socio-economic resources.

68. As a part of the study, enhancement of the positive impacts shall also be carried out. The potential impacts that shall be assessed are grouped and prioritized into three major impacts as follows:

6.1 Beneficial Impacts

a. Construction Phase

i. Employment Generation and Increase in Income

69. One of the major direct beneficial impacts of the water supply and sanitation project during construction stage is the creation of employment opportunity to the local community.

ii. Skill Enhancement

70. Although many people in the project area are found unskilled at present, the construction of the water supply system and the distribution network is likely to enhance their skills in plumbing, fittings and other construction works.

b. Operation and Maintenance Phase

i. Improvement in health and saving of time

71. After the water supply and sanitation project is complete, the people living within the project area will benefit from the supply of sufficient quantity and good quality water and improved sanitary conditions.

ii. Development of Market Centers

72. The availability of good supply of drinking water will accelerate development of market centers.

iii. Appreciation of Land Value

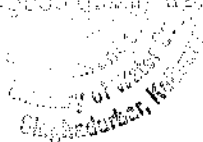
73. One of the major benefits of the project is that the land price will increase due to the availability of reliable safe drinking water and sanitation system.

iv. Women Empowerment

74. Women and girls in particular will largely benefit from this project, as they are the ones who spend a great deal of time in fetching water. With the operation of the water supply scheme, this time will be saved.

v. Quality of Life Values

75. The project will help to enhance the quality of life of the people by providing opportunities for the providing good quality water, improved sanitary and



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6.2 Adverse Impacts

6.2.1 Pre-construction Phase

76. The pre-construction works involves field survey and investigation, development of design & detailed drawings, carrying out cost estimates etc. This also includes discussion with WUSC and revision of the design if necessary. Some of the issues of the pre-construction phase are;

- i. Social conflicts for any land requirements
- ii. Water use conflicts
- iii. Disturbance to vegetation and wildlife

6.2.2 Construction Phase

(a) Socio-economic Environment

i. Disturbance to community activities

77. Construction activities particularly construction works in the roads may cause disturbances to the community activities, festivals and social events.

ii. Social Dispute and Dissatisfaction

78. There is possibility of influx of outside workforce. Their activities and consumption of local resources may cause conflicts with the local people. Use of public land for project infrastructures may also bring some complaints from the locals.

iii. Community health and safety

79. Accidental cases of local children and people moving near the work-sites, possibility of communicable diseases, and challenge on local sanitation will be concerns related to project construction phase.

iv. Occupational health and safety (OHS)

80. Safety and health of workers particularly of those involved in concreting, trench cutting, formwork and other activities in construction sites is of prime concern.

(b) Physical Environment

i. Erosion and land surface disturbance

81. Construction activities may lead to erosion and caving thereby causing soil erosion, silt runoff, and unsettling of street surfaces. The activity as such will be a nuisance and discomfort to the road users and inhabitants.

ii. Damage to the existing facilities

82. During construction, while excavating the earth, existing water supply distribution pipe lines and telecommunication cables may get damaged particularly in the bazaar area despite of efforts to avoid such cases.

iii. Impact on water bodies

83. There will be some impacts on water bodies located within project area during the construction phase. Construction activities are likely to influence the surface water quality.



iv. Air and Noise pollution

84. The construction activity will comprise of construction, laying of transmission and distribution pipelines, construction of storage reservoirs, transport and installation of pumps. This will cause air pollution and noise nuisance.

v. Vibration effects

85. The vibrations during construction works may result in cracks and damages to local infrastructures and private properties.

(c) Biological Environment

86. The project area falls under vegetated land, and built-up areas with agricultural land. Loss of vegetation cover, although limited, will be a concern to be addressed in this project.

i. Impact on Flora

87. The loss of vegetation cover and species diversity due to earthwork primarily in the direct impact area of the intake will be minimum, yet these need to be accounted for.

ii. Impact on Fauna

88. Movement, inhabitation and population dynamics of resident and migratory birds and reptiles at the project site may be affected due to disturbances caused by construction activities.

iii. Impact on aquatic life

89. Construction activities will physically disturb the water quality for a certain period and may cause impact on aquatic life.

6.2.3 Post-Construction and Operation Phase

90. i. Impacts on land resource and landscape aesthetics if decommissioning of construction facilities is not conducted in proper manner

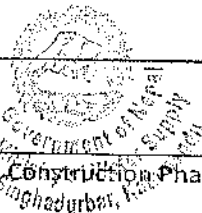
91. ii. Risk of health hazard if water supply system is not well maintained during leakages, and if disinfection is not well carried out

6.3 Prioritized Issues

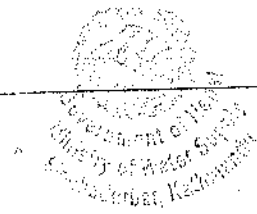
92. Issues that are likely to occur during different phases of the construction have been prioritized as follows;

Table 8: Prioritized Issues

Project Phases and Environmental Issues	Physical	Biological	Socio-economic and Cultural
Pre-Construction Phase	Degradation of source areas through repeated access	Access and site clearance can affect the vegetation, especially at source and reservoir sites	Concerns of water rights
	Construction activities leading to loss of habitat	Disturbance to wildlife	Issues of land requirements for project activities



Construction Phase	Disturbance to land-surface during construction of project components	Vegetation may be lost during construction of project components and during pipe laying works	Local festive and cultural activities, and social events may be disturbed due to construction activities
	Loss of top-soil	Disposal of spoil and waste onto water bodies may impact the aquatic lives	Social disharmony due to influx of outside workforce could be an issue
	Roads that are in use, electrical poles etc may be disturbed due to laying of transmission and distribution pipelines	Illegal hunting by workforce, encroachment of wild habitats could take place	Competitive sense of employment opportunities among the locals and outside workforce could bring conflicts
	Drying of water sources could be an issue		Elderly and young ones, and the people travelling to work and market may face health and safety challenges, especially if quarries and ditches are not well managed
	Ambient air pollution due to use of vehicles and equipment, its associate noise and vibration effects		Health and safety of the workers, e.g. workers involved in construction of water tanks, pipe-laying may have injuries, etc
Post Construction and Operation Phase	If campsites and temporary facilities are not well decommissioned after the completion of construction works, this may impact on local land aesthetics	Discharge of slurry from treatment plants onto water bodies may negatively affect the aquatic lives	If the water supply system is not well operated and maintained, there may be chances of supply of polluted water to its users
	Issues of ground water level		

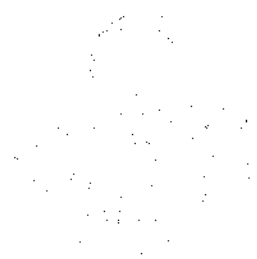


6.4 Mitigation Measure

93. Suitable, cost effective and environment friendly mitigation measures shall be recommended during the preparation of the IEE report for all the perceived impacts in order to minimize the environmental impacts of project implementation. In general the following phases shall be covered while preparing mitigation measures:

- i. Project design and preparation phase
- ii. Project construction phase
- iii. Project operation and maintenance phase

94. Concerned agencies; TSTWSSSP, DWSS, WSSDO and local agencies, and the local administration office shall be consulted during the implementation of mitigation measures. National EIA Guidelines 1993 will be used for significance analysis of impacts.





7.0 ALTERNATIVES TO THE IMPLEMENTATION OF THE PROPOSAL

95. The study will consider different project alternatives for the selection of the best option to achieve the sustainability of the proposed development works. The significant alternatives to be considered during the study are as follows;

7.1 Design

96. Alternative designs of the project will be examined and analyzed to select the most appropriate design of the proposed project so that the project caters its best services to the project area. In doing so, environmental considerations and safety will be given due considerations and will be analyzed accordingly.

7.2 Project site

97. Alternative sites will be considered and studied during the process so as to avoid significant environmental impacts. The options will primarily focus on reducing the felling of trees, avoiding disturbance on wildlife habitats, avoiding the damage to public/private infrastructures and avoiding disturbances to local services, etc.

7.3 Technology, Procedure of Operation, Time Schedule, and Raw Materials to be used

98. The study will analyze different technology, procedures of operation, time - schedule and raw materials to be used to select the best alternative among them. The technological alternatives will include fully-mechanized, semi-mechanized, labor-intensive, labor-based etc options, etc of implementation.

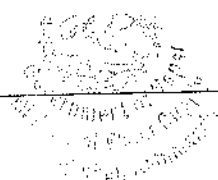
99. Similarly methods of operation whether contractor-based, community-based, labor-based or a mix of them will also be assessed.

100. Procedures of operation will be assessed in terms of round the year operation and peak-time operation services; types and specifications of equipment to be used, etc will also be assessed in terms of needs as well as demands in the area. The schedule of implementation of the proposal works including agricultural off-season, monsoon season, day and night time working etc. will be assessed.

101. Alternative resources required for the proposed works, including cement, steel, gabion boulders, gravel, earth, sand, bioengineering saplings, etc will be assessed.

7.4 Other Factors

102. The study will also consider different options of project implementation. The IEE study will examine different alternatives for the environmental management system. The options will be assessed based on the institutional structures of the project implementation, monitoring options, extent of participation of the stakeholders, and the role of local bodies, including NGOs/CBOs etc.

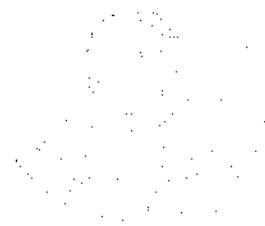


8.0 MATTERS CONCERNING THE PREVENTION OF THE IMPACTS OF THE IMPLEMENTATION OF THE PROPOSAL ON THE ENVIRONMENT

103. The IEE team will study the mitigation measures for all the identified significant impacts and incorporate them in the report. The proponent will identify the most suitable of measures to prevent or to reduce significant adverse impacts. Measures to enhance beneficial project impacts will also be presented. The mitigation measures will deal separately for physical, biological, socio-economic and cultural environments during both the construction and operation phases. The proponent will be responsible for the implementation of environmental mitigation and enhancement programs mentioned in IEE report.

104. The mitigation measures shall be specific and developed by applying a pragmatic approach that is technically and economically feasible, socially acceptable, and preferably of proven effectiveness. The cost required for each and every mitigation measure and enhancement measures will be estimated and incorporated in the IEE report. Cost of mitigation and enhancement measures will be categorized in terms of the construction and operation phases.

105. The enhancement and mitigation measures will be categorized in terms of the physical, biological, socio-economic and cultural environments for the construction and operation phases. A matrix of impact and mitigation measures shall also be included in the IEE report.







9.0 MATTERS TO BE MONITORED WHILE IMPLEMENTING THE PROPOSAL

9.1 Environmental Management Plan

106. 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. 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. EMP therefore provides the necessary feedback required for correcting potentially serious project deficiencies, and for planning of other projects.

107. 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 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. EMP will include proposed work programs, budget estimates, schedules, staffing and training requirements, and other support services to implement the mitigating measures.

9.2 Environmental Monitoring Plan

108. The project will develop an Environmental Monitoring Plan for the project. The program will evaluate:

- (i) extent and severity of the adverse environmental impacts compared to predicted ones,
- (ii) how effective the mitigating measures were and compliance with the regulations and
- (iii) overall effectiveness of EMP.

109. 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 to the approved design and that the environmental mitigation measures are fully implemented in accordance with EMP.

110. DSC will prepare progress reports on EMP implementation and submits to relevant agencies on a regular basis. WSSDO Surkhet will supervise the environmental monitoring activities undertaken by DSC.

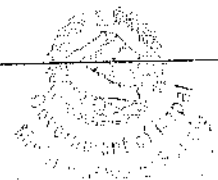
111. Monitoring of the mitigation measures during the construction and operation phase will mainly consider the following impacts:

(a) Construction Phase:

112. Soil erosion, sedimentation and slope stabilization; spoil-tip protection and management; stock taking of species of urban vegetation during vegetation clearance along pipeline alignments and re-plantation; change in hydrology and morphology of streams and rivers; water, air and noise (vibration) pollution; solid waste; land intake and compensation; reinstatement of damaged structures and services; crime and community stress; health, safety and sanitation of the work force and camps; archaeological and cultural sites and chance finds; and traffic management.

(b) Operation Phase:

113. Discharge of water sludge during plant maintenance, leakage, backwash, treatment operations; silt disposal; quality of drinking water supplies; pipe flushing.



Monitoring mechanism:

114. The monitoring mechanism during construction will be of a regular type whereas baseline monitoring, compliance monitoring and process monitoring shall have to be done during the operation and maintenance phase. The monitoring team shall visit the project site and monitor the effectiveness of the implementation of the mitigation measures.

9.3 Information Disclosure, Public Consultation and Participation

115. Public consultation is the process of exchanging information with those persons and organizations with legitimate interests 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.

116. 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, 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.

117. 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.

118. 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 meetings, implementation of mitigation measures should be prioritized and should be carried out with the involvement of the local people.

119. 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.

9.4 Grievance Redress Mechanism

120. The Subhaghat Project Coordination Committee (SPCC), Subhaghat of Surkhet will be responsible to address the issues and problems raised by the local communities regarding the loss of assets, issues related to water and sanitation, etc. during the implementation of the project. The SPCC, Subhaghat, shall ask the Environment Specialist and Social Specialist of DSMC to assist in the handling of grievances and the community level stakeholders should be encouraged to help in the handling of grievances at the project sites.

121. The affected person / community will submit grievances / complaints to the SPCC, Subhaghat. SPCC, Subhaghat will try to solve the grievance at the project level. If the grievance cannot be solved at the project level, SPCC, Subhaghat will forward it to the Director General (DG), Office in Kathmandu through the STWSSP.



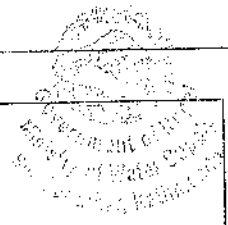
10.0 OTHER NECESSARY MATTERS

122. The report shall include all cited information, reference lists, maps, graphs, photographs, tables and charts, graphs, and questionnaires used during the IEE study as per the ERR 1997. The IEE Report will be prepared based on Schedule-5 (pertaining to Rule 7) of the EPR 1997.

123. IEE report shall be prepared as per this TOR and shall be submitted to MWSS and ADB through TSTWSSSP. The basic format of the report will be in accordance with the EPR, 1997 and National EIA Guidelines, 1993. Land use map of location sites, letters obtained from the stakeholders in response to public notification, and the newspaper cut piece of public notification and no objection letter from local authorities will be included in the IEE report. Similarly, wherever applicable maps, photographs, tables and matrices shall be presented. ADB requirements as per SPS 2009 will also be fulfilled.

124. The format for the IEE report should include, but not be limited to the following:

1. **Name and Address of the Institution Preparing the Report**
2. **Summary of the Proposal**
 - 2.1 Background
 - 2.2 Need of the Sub-project
 - 2.3 Objectives of the Environmental Study
 - 2.4 Scope of IEE
 - 2.5 Relevancy of IEE
3. **The Proposal**
 - 3.1 The Study Area
 - 3.2 The Sub-project
 - 3.3 Existing Situations
 - 3.4 Size and magnitude of operation
 - 3.5 Proposed schedule of implementation
 - 3.6 Components of the project
 - 3.7 Land Requirements and compensation
 - 3.8 Construction and Operation Activities of the project
4. **Review of Acts/Rules, Plans/Policies, Guidelines and Standards**
 - 4.1 Policy and legal frameworks
 - 4.2 Conventions
 - 4.3 Other documents
 - 4.4 Relevant standards
5. **IEE Study Methodology**
 - 5.1 Desk Study and Impact Area Delineation
 - 5.2 Field Work
 - 5.3 Data Processing
 - 5.4 Consultation and Information Disclosure
6. **Description of the Environment**
 - 6.1 Physical Resources
 - Topography, Geology and Soils
 - Land Use
 - Climate
 - Water Resources
 - Air quality
 - Noise Levels



6.2 Ecological Resources

- Flora
- Fauna
- Aquatic lives

6.3 Social and cultural resources

- Households and Population
- Caste and Ethnicity
- Educational facilities
- Occupation
- Economic Characteristics
- Existing water supply conditions
- Existing sanitation conditions
- Existing health conditions
- Cultural heritage
- Other Infrastructures

7. Anticipated Environmental Impacts and Mitigation Measures

7.1 Beneficial Impacts and Augmentation Measures

- i. Construction Phase
- ii. Operation and maintenance phase

7.2 Adverse Impacts and Mitigation Measures

- i. Pre-construction Phase
- ii. Construction Phase
 - (a) Physical Environment
 - (b) Biological Environment
 - (c) Socio-Economic and Cultural Environment
- iii. Operation and Maintenance Phase

7.3 Indirect, Induced and Cumulative impacts

7.4 Evaluation of Impacts

7.5 Implementation of Mitigation Measures

8. Analysis of Alternatives With and Without Project Situations

9. Environmental Management Plan (EMP)

- 6.2 Environmental Management Plan
- 6.3 Monitoring & Reporting
- 6.4 Implementation Arrangements
- 6.5 Information Disclosure, Consultation and Public Participation
- 6.6 Grievance Redress Mechanism

10. Conclusions and Recommendations

125 While preparing the report any issue / impacts found relevant will be included in the report, besides the issues / impacts mentioned in this TOR. The proponent shall submit fifteen copies of the final IEE Report of this project to the concerned ministry (MoWSS) in accordance with Rule 10 of the EPR 1997 (and its amendments).

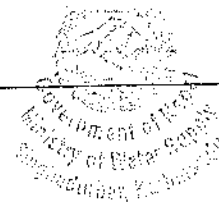
ANNEXES:

Annex I: References

Annex II: Schematic Layout of Project

Annex III: ADB's Rapid Environmental Assessment (REA) Checklist for IEE Study of Subhaghat Small Town Water Supply and Sanitation Project

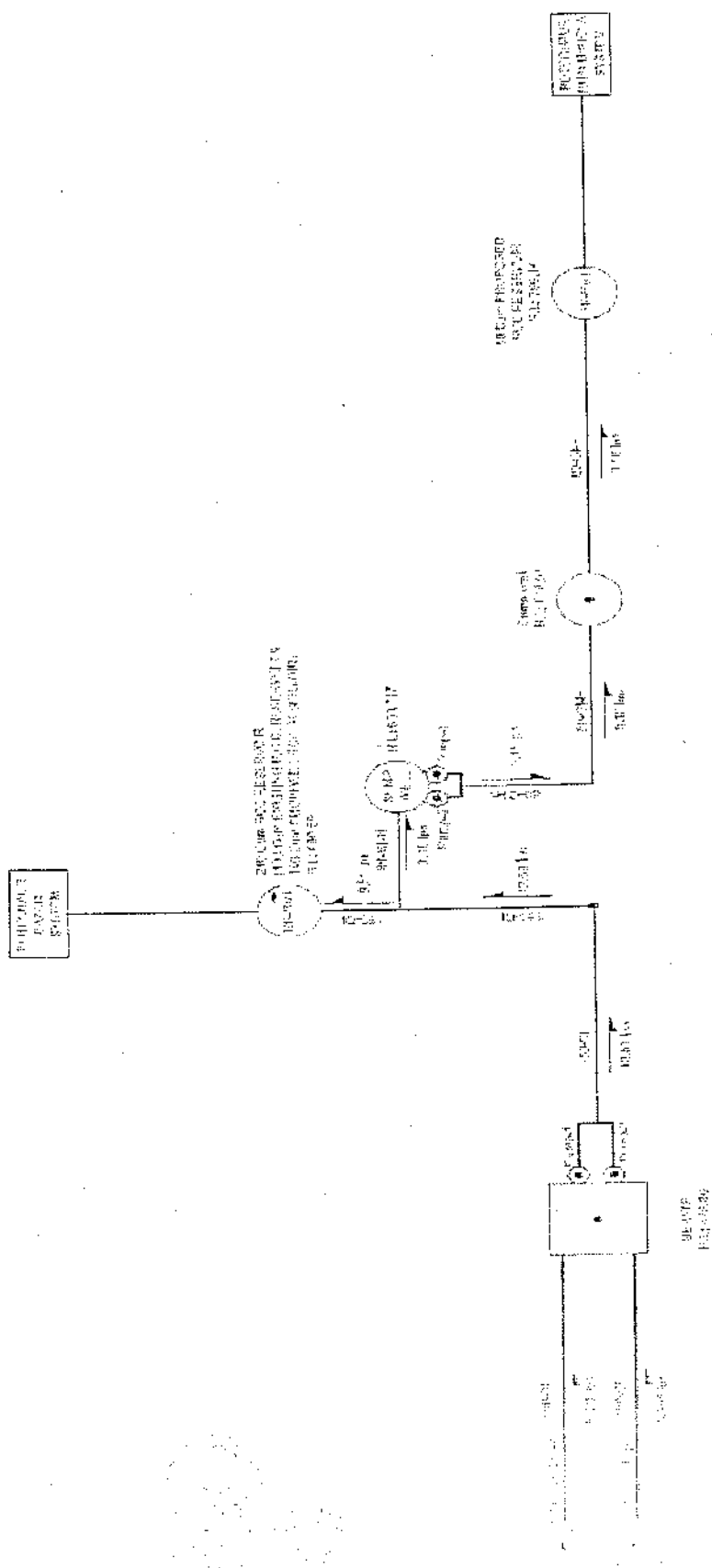
Annex IV: Checklists and Questionnaires



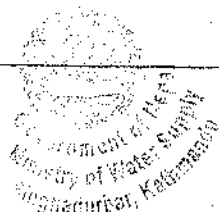
Annex I: Reference of literatures

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Ministry of Water and Power
Islamabad, Pakistan



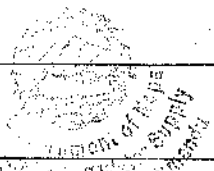
Annex III:



ADB's RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST FOR IEE STUDY OF SUBHAGHAT SMALL TOWN WATER SUPPLY AND SANITATION PROJECT

Screening Questions	Yes	No	Remarks
A. Project Siting Is the project area.			
☐ Densely populate		No	
☐ Heavy with development activities?		No	
☐ Adjacent to or within any environmentally sensitive areas?		No	
☐ Cultural heritage site		No	
☐ Protected Area		No	
☐ Wetland		No	
☐ Mangrove		No	
☐ Estuarine		No	
☐ Buffer zone of protected area.		No	
☐ Special area for protecting biodiversity		No	
☐ Bay		No	
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?		No	
☐ impairment of historical/cultural monuments/areas and loss/damage to these sites?		No	
☐ hazard of land subsidence caused by excessive ground water pumping?		No	
☐ social conflicts arising from displacement of communities?		No	
☐ conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		No	
☐ unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?		No	Lab tests will be the basis
☐ delivery of unsafe water to distribution system?		No	
☐ inadequate protection of intake works or wells, leading to pollution of water supply?		No	

☐ over pumping of ground water, leading to salinization and ground subsidence?		No	
☐ excessive algal growth in storage reservoir?		No	
☐ increase in production of sewage beyond capabilities of community facilities?		No	
☐ inadequate disposal of sludge from water treatment plants?		No	
☐ inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and		No	
☐ impairments associated with transmission lines and access roads?	Yes		Options for minimum disturbance/damage will be considered
☐ health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.		No	Standard procedures, precautions and provisions will be adopted
☐ 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?		No	
☐ dislocation or involuntary resettlement of people?		No	
☐ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		No	
☐ noise and dust from construction activities?	Yes		Low magnitude
☐ increased road traffic due to interference of construction activities?		No	
☐ continuing soil erosion/silt runoff from construction operations?		No	
☐ 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		No	
☐ delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?		No	
☐ accidental leakage of chlorine gas?		No	
☐ excessive abstraction of water affecting downstream water users?		No	
☐ competing uses of water?		No	
☐ increased sewage flow due to increased water supply?	Yes		
☐ increased volume of effluent water due to flushing and washing and leakage from wastewater treatment plant?	Yes		



☐ large population will be during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		No	
☐ social conflicts if workers from other regions or countries are hired?	Yes		
☐ 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?		No	
☐ 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		No	
C. Potential Environmental Impacts			
Will the Project cause...			
☐ impairment of historical/cultural monuments/areas and loss/damage to these sites?		No	
☐ interference with other utilities and blocking of access to buildings; nuisance to neighboring areas due to noise, smell, and influx of insects, rodents, etc.?	Yes		Minimal effects, such cases will be avoided as far as possible
☐ dislocation or involuntary resettlement of people?		No	
☐ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		No	
☐ impairment of downstream water quality due to inadequate sewage treatment or release of untreated sewage?		No	
☐ overflows and flooding of neighboring properties with raw sewage?		No	
☐ environmental pollution due to inadequate sludge disposal or industrial waste discharges illegally disposed in sewers?		No	
☐ noise and vibration due to blasting and other civil works?	Yes		Minimal level
☐ risks and vulnerabilities related to occupational health and safety due to physical, chemical, and biological hazards during project construction and operation?	Yes		
☐ discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers?		No	
☐ inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances, and protect facilities?		No	
☐ road blocking and temporary flooding due to land excavation during the rainy season?		No	
☐ bone and dirt from construction activities?	Yes		



☐ traffic disturbances due to construction material transport and wastes?		No	
☐ temporary silt runoff due to construction?		No	
☐ hazards to public health due to overflow flooding and groundwater pollution due to failure of sewerage system?		No	
☐ deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water?		No	
☐ contamination of surface and ground waters due to sludge disposal on land?		No	
☐ health and safety hazards to workers from toxic gases and hazardous materials which may be contained in confined areas, sewage flow and exposure to pathogens in untreated sewage and unstabilized sludge?		No	
☐ large population increase during project construction and operation that causes increased burden on social infrastructure (such as sanitation system)?		No	
☐ social conflicts between construction workers from other areas and community workers?	Yes		Slight possibility
☐ 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 construction and operation?		No	
☐ 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?	Yes		Some concerns of accidental possibilities

ANNEX IV:

Checklists and Questionnaires

Checklist for Physical Environment

A. Topography/Physiography

1. Study of Topographic maps/ other available maps and identify the ground topographic characteristics of land covered by the proposed project
2. Verify the topographic characteristics of the land in the field
3. Soil Type

B. Climate and Meteorology

1. Study of published data of regarding temperature, rainfall, humidity, wind speed and direction, solar radiation
2. If possible classify the climatic zone and its verification
3. Visit the meteorological office of the district and get latest information

C. Air Quality

1. Collect any data on air quality of the area from previous literature
2. Investigate on the air polluting activities of the area (traffic, biomass burning, industries, other anthropogenic activities)

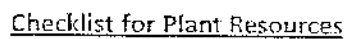
D. Erosion and land Stability

1. Identification of erosion prone area along the pipeline alignment
2. Investigate the erosion features and potentials of the local streams and gullies

E. Land Use

1. Investigate on the land use of the Project Blocks from the topo-maps, and other available land use maps
2. Investigate the land use affected by the project structures and subsidiary facilities
3. Investigate on the land use potentials of the area

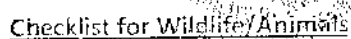
Checklist for Plant Resources



Date:

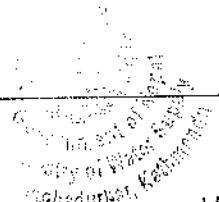
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Note: _____

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Note: _____

Note: _____



Socioeconomic Questionnaires used for the project

१. परिचय

१.१ अन्तर्वाता दिने व्यक्तिको नाम टराना:

(क) जिल्ला:

(ख) गा.वि.स.:

(ग) टोल स्थान:

(घ) बाई नं.:

१.२ पारिवारिक विवरण

(क) घरमुलिको नाम: श्रीमान् र श्रीमती

(ख) जाती: (ग) उमेर: (घ) लिंग: ☐ पुरुष ☐ महिला ☐

(ङ) वैवाहिक स्थिति: (च) धर्म: (छ) व्यवसाय (घरमुलीको):

(ज) बसेको वर्ष: (झ) शिक्षा :

(ञ) कुल परिवार संख्या

उमेर समुह	पुरुष	पेशा	महिला	पेशा	जम्मा
०-५ वर्ष					
६-१० वर्ष					
११-१५ वर्ष					
१६-४५ वर्ष					
४५-६० वर्ष					
६० भन्दा माथि					
जम्मा					

१.३ विद्यालय जाने उमेरका बाल बालिका (६-१५ वर्ष)

जम्मा	विद्यालय गएका		विद्यालय नगएका	
	पुरुष	महिला	पुरुष	महिला

२. साक्षरता : (तपाईंको परिवारमा)

लेखपढ गर्न सक्ने	एस.एल.सी. उत्तिर्ण	स्तातक	स्नातकोत्तर	जम्मा
पुरुष				
महिला				
जम्मा				

३. कृषि (भु-उपयोग)

३.१ तपाईं वा परिवार सदस्यको नाममा गा.वि.स. र वडा भित्र जग्गा छ, र

छ ☐

छैन ☐

३.२ यदि छ भने कति छ ? रोपनीमा भन्नुहोस् :

क्र.सं.	स्वामित्व	खेत	बारी	खरवारी	वन	कैफियत
१	आफ्नै					
२	संगोत्रको					
३	कमाई आएको					
४	कमाउन दिएको					
५	जग्गा					

३.३ गा.वि.स. वा वडा बाहिर कुन ठाउँमा जग्गा छ, र

क्र.सं.	ठाउँको नाम	जग्गा				कैफियत
		खेत	बारी	खरवारी	वन	

३.४ तपाईंको जग्गा आयोजना भित्र पर्छ, र ९९भिवक्कम नभलतप्यल तजभ अकउयलभलत या उचयवभयत धजभचभ जज बार्कि०

घर

खेत

☐ लम्वाई (फिटमा)

☐ पाखो बारी

☐ चौडाई (फिटमा)

☐ जंगल

☐ छाना

☐ अन्य

☐ तल्ला

☐ कोप

☐ अन्दाजी मूल्य (चलनचल्तीमा) नेरु

(क) आयोजना क्षेत्र भित्र तपाईंको कतिवटा घर र गोठ छन् ।

घर

गोठ

क्र.सं.	किसिम	क्षेत्रफल
घर १		
घर २		
घर ३		



(१) कच्ची-खरले छाँकी (२) पक्की ढुङ्गा, ईटाको पर्खाल र ढलान भित्रको वा टिनको छाँको ।

	संख्या	क्षेत्रफल
गोठ		
अन्य (खुलाउने)		

३.५ (क) तपाईंको आयोजना क्षेत्र भित्र पर्ने जमिनमा कुन कुन फसल लगाउनु हुन्छ, र

कसं.	खाद्यान्न वाली	वाली लगाएको क्षेत्रफल	उत्पादन परिणाम
१. खाद्यान्न वाली			
	धान		
	गहुँ		
	मकै		
	कोदो		
	झल गेडागुडी		
	अन्य		
२. नगदे वाली			
	आलु		
	तोरी		
	तरकारी		
	अन्य		

(ख) उक्त जग्गामा लगाएको फलफूल र अन्य बोट विरुवाको विवरण दिनुहोस् ।

कसं.	बोटविरुवा	विरुवा संख्या		जम्मा
		फल लागेको	फल नलाएको	
१	फलफूल			
२	कागती			
३	सुन्तला			
४	आप			
५	मधु			
६	अम्बा			
७	लिच्ची			
८	कटहर			
९	बेरा			
१०	आरु			
११	नाम्पती			
१२	आरुबखडा			
१३	अन्य			
१४	बाले घाँस			
१५	शालुग्री			
१६	धान			
१७	रुद्रा			
१८	रुद्रा			



क्र.सं.	बोटविस्वा	विरवा संख्या	
		फल लाएको	फल नलाएको
२०	टाकी		
२१	गिद्धी		
२२	अन्य		
२३	इन्धनको लागि प्रयोग गर्ने बोट विस्वा		
२४	काठमा प्रयोग हुने बोटविस्वा		
२५	बाँस तिगाला		

३.६ के तपाईंको जमामा भएको गत वर्षको उत्पादनले तपाईंको परिवारलाई खान पर्याप्त भयो र

भयो ☐

भएन ☐

३.७ यदि अपर्याप्त भयो भने कति महिनाको लागि पुगेन र महिना

(क) तिन महिना

(ख) छ महिना

(ग) नौ महिना

(घ) बाह्र महिना

३.८ आफ्नो उत्पादित खाद्यान्न अपर्याप्त भएको बेला आफ्नो परिवारलाई कसरी खुवाउनु हुन्छ ?

क. ऋण गरेर

ख. नोकरीबाट भएको आम्दानीबाट

ग. व्यापारीको आम्दानीबाट

घ. भारी बोकेर भएको आम्दानीबाट

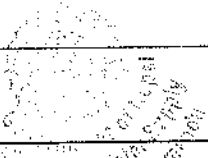
ङ. दैनिक मजदुरबाट भएको

च. अन्य

३.९ पशुपालन सम्बन्धी :

तपाईंको घरमा कति / कस्तो पशु पक्षीहरु पाल्नु भएको छ, र

क्र.सं.	पशुपक्षी	संख्या
१	गाई	
२	गोरु	
३	भैँसी	
४	वाछा	
५	वाछि	
६	पाडा	
७	पाहि	
८	रागा	
९	जोडा	
१०	बाखा	
११	बाक्ल	
१२	डुम्री	
१३	पतल पतल	
१४	चंगुर चंगुर	



क्र.सं.	पशुपंक्षी	संख्या
१५	हास	
१६	कुखुरा	
१८	अन्य (खुलाउने)	

४. घर परिवारको वार्षिक औषत आम्दानी :

श्रोत,	वार्षिक आम्दानी (रु.)	श्रोत	वार्षिक आम्दानी (रु.)
कृषिबाट		अन्य श्रोतहरु	
छातान्न		नोकरी, सेवा	
नगदेवाली		ज्याला मजदुरी र धरीया	
फलफूल		निवृत्तभरण	
जम्मा (१)		व्यापार	
पशुपालनबाट		घरेलु उद्योग	
दुग्ध उत्पादन		पेशागत सेवा	
अण्डा कुखुरा हास बिक्री		माछा बिक्री	
बाछ्छा/बाछ्छी/रातो/विक्रि		अन्य	
भैँस/रागा बिक्रि		जम्मा (२)	
बाँका/खसी/भेडा/वाख्रा बिक्रि			
सुगर/वंगुर विक्रि			
कुखुरा/हास बिक्रि			
जम्मा (२)			
जम्मा आय (१+२)			

५. घर परिवारको वार्षिक औषत खर्च :

विवरण	जम्मा रकम (रु.)	विवरण	जम्मा रकम (रु.)
चासल		चिया	
द्याल		दाउरा	
मकै		विजुली	
तरकारी		माहुँतल	
दुध/दही		औषधि	
माछा/मान्छु		शिक्षा	
तेल/धु		कपडा	
सर-मसला		चाडपर्व	
पुन		अन्य	
किस्ता			
		जम्मा खर्च	

६. पानीको आपूर्ति

(क) तपाईंले यस खोलाको पानी उपयोग गर्नु हुन्छ कि हुदैन र

गर्दछ ☐ गर्दिन ☐

(ख) यदि खोलाको पानी प्रयोग गर्नु हुन्छ भने कुन प्रयोजनको लागि प्रयोग गर्नुहुन्छ र

सिँचाई ☐ नुहाउने, कपडा धुने ☐
पिउने ☐ अन्य ☐

७. स्वास्थ्य सम्बन्धि:

(क) तपाईंको परिवारमा कुनै सदस्य विगत वर्षमा विरामी भएका थिए र

थिए ☐ थिएनन् ☐

(ख) यदि थिए भने निम्न विवरण दिनुहोस् र

क्र.सं.	नाता	पुरुष	महिला	उमेर	रोग
१					
२					
३					
४					

(रोगको प्रकार:- विसापखाला, आउ, टाइफाइड, हैजा, मलेरिया, टीबी, जन्डीस, छाला सम्बन्धी, निमोनिया, दम, रक्तचाप, एड्स र यौन रोग, अन्य)

(ग) विरामी पर्दा सर्वप्रथम कहाँ जानुहुन्छ र

(घ) त्यहाँ निको नभए कहाँ जानुहुन्छ र कसको सल्लाह लिनुहुन्छ ।

क्र.सं.	जाने ठाउँ	रहेको स्थान	दूरी (कि.मी.)
१	अस्पताल		
२	हेल्थपोस्ट		
३	हेल्थ सेन्टर		
४	आयुर्वेदिक औषधालय		
५	निजी चिकित्सक/औषधी पसल		
६	धार्मी भवन		
७	अन्य		

८. महिलाको अवस्था:

(क) थपको विवरण

क.सं	कामको विवरण	हिस्सा प्रतिशतमा	
		पुरुष	महिला
१	खनजाग		
२	भूल राख्ने		
३	जामिन तयारी		
४	राप्ते		
५	गोडमेव		
७	सिंचाई		
८	काट्ने		
९	वाक्ने र धक्काउने		
१०	अन्न प्रसोधन (कुटाई पिसाई)		
११	घाँस दाउरा		
१२	गोठालो		
१३	मेलामात		
१४	खाना पकाउने		
१५	घानी पधेरी		
१६	बच्चावच्ची र बुढाबुडी हेरविचार		

(ख) सम्पत्तिमा अधिकार

क.सं	कामको विवरण	हिस्सा प्रतिशतमा	
		पुरुष	महिला
१	घर		
२	जग्गा		
३	पशु		
४	गरगहना		
५	उद्योग धन्दा		
७	अन्य		

(ग) निर्णय प्रक्रियामा अधिकार

क.सं	कामको विवरण	हिस्सा प्रतिशतमा	
		पुरुष	महिला
१	बानी गेज्ने		
२	पशु खरिदबिक्री		
३	सम्पत्तिका खरिदबिक्री		
४	अन्न खरिदबिक्री		
५	सम्पत्तिका खरिदबिक्री		
६	सम्पत्तिका खरिदबिक्री		
७	सम्पत्तिका खरिदबिक्री		
८	सम्पत्तिका खरिदबिक्री		

Ministry of Water and Electricity
Kathmandu

क्र.सं	कामको विवरण	हिस्सा प्रतिशतमा	
		पुरुष	महिला
९	विहावारी		
१०	परिवार नियोजन		
११	छाराछोरी पढाई लेखाई		
१२	अन्य		

९. मुआब्जा सम्बन्धी: (आवश्यक परेको अवस्थाना मात्रै)

(क) तपाईंको घर र जग्गाको मुआब्जा के मा चाहनु हुन्छ र

नगद ☐

जग्गाको सहा जग्गा ☐

अन्य ☐

(ख) यदि तपाईंले मुआब्जा नगदमा पाउनु भयो भने उक्त मुआब्जा रकम के मा प्रयोग गर्नु हुन्छ र

जग्गा किन्ने ☐

घर बनाउने ☐

ऋण तिर्ने ☐

व्यापार गर्ने ☐

अन्य ☐

१०. प्रस्ताव कार्यान्वयन गर्दा के कस्तो प्रभाव पर्ने सक्दछ सो सम्बन्धी राय सुझाव छ र
सकारात्मक: नकारात्मक:



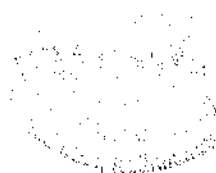
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*IEE of Subhaghat Urban Water Supply and Sanitation Project
BDA/PEA JV, November 2019*



**ANNEX 2:
SAMPLE FORMS, FORMATS, AND REPORT TEMPLATE**





**ANNEX 2-A:
RELEVANT ENVIRONMENTAL QUALITY STANDARDS**

Ambient Air Quality Standards

Parameter	Averaging Period	Nepal's Ambient Air Quality Standard ($\mu\text{g}/\text{m}^3$) *	WHO Air Quality Guidelines ($\mu\text{g}/\text{m}^3$) **	
			Global Update 2005	Second Edition ^
TSP	Annual	-	-	-
	24-hour	230	-	-
PM ₁₀	Annual	-	20	-
	24-hour	120	50	-
PM _{2.5}	1-year	-	10	-
	24-hour	-	25	-
SO ₂	Annual	50	-	-
	24-hour	70	20	-
	10-minute	-	500	-
NO ₂	1-year	40	40	-
	24-hour	80	-	-
	1-hour	-	200	-
CO	8-hour	10,000	-	10,000
	15-minute	100,000	-	100,000
Pb	1-year	0.5	-	0.5
Benzene	1-year	20	-	-

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

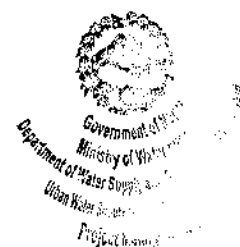
** Environmental, Health and Safety General Guidelines, 2007. International Finance Corporation, World Bank Group.

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

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



[Signature]
Engineer



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	63	55		
Quiet area	50	40	-	-
Water pump	65		-	
Diesel generator	90		-	

* Guidelines for Community Noise, WHO, 1999.

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




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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	µs/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	0.5 - 1.5 ^A	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 ^{AA}
	E-coli	MPN/100ml	0	must not be detectable in any 100 ml sample
Micro Germs	Total Coliform	MPN/100ml	0 in 95% of samples taken	

* Health-based guideline values

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

^A These standards indicate the maximum and minimum limits.

^{AA} 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.

[Signature]
Engineer



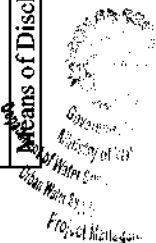
ANNEX 2-B:
SAMPLE GRIEVANCE REDRESS FORM
(To be available in Nepalese and English)

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:	

Engineer



**ANNEX 2-C:
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

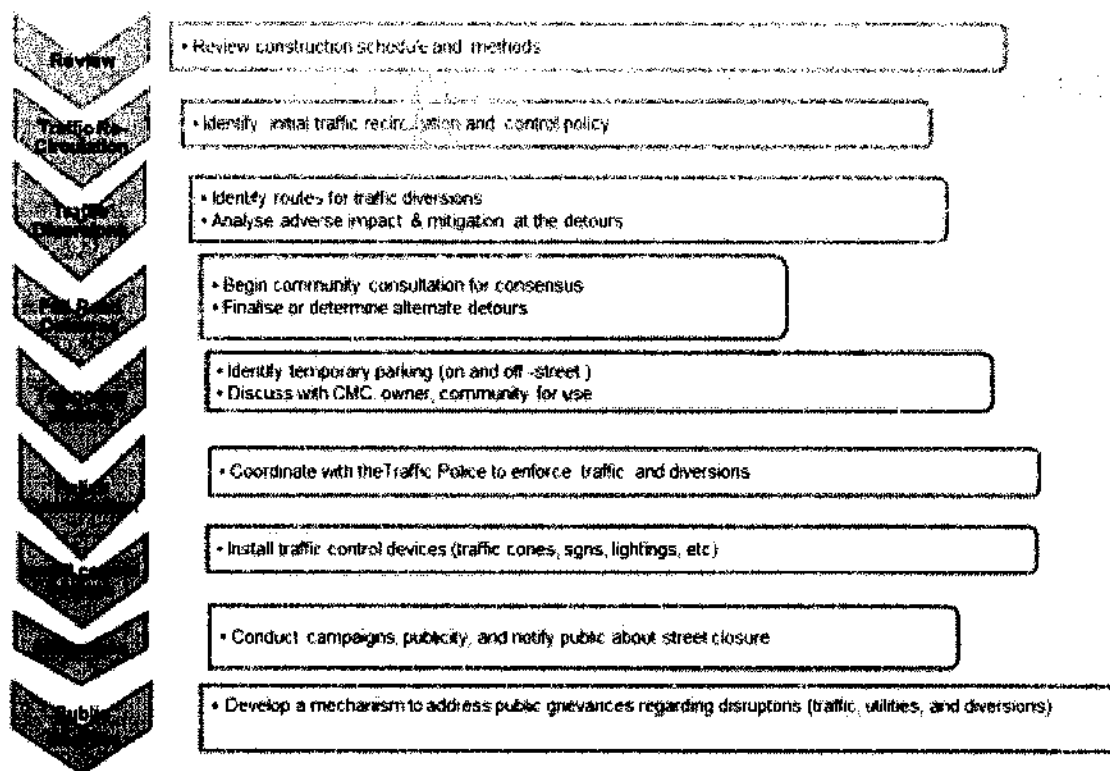
Apart from the capacity analysis, a final decision to close a particular street and divert the traffic should involve the following steps:

- 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.

Engineer
City of Nepal
Ministry of Water Supply
Subhaghat, Kathmandu

Government of Nepal
Ministry of Water Supply
Department of Water Supply and Sewerage
Subhaghat, Kathmandu
Project Management Unit



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;

[Handwritten signatures and stamps are visible at the bottom of the page, including a large circular stamp and the word 'Engineer' written vertically.]

- 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.




Engineer



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

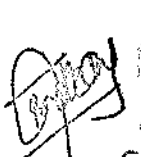
Procedures for installing traffic control devices at any work zone vary, depending on road configuration, location of the work, construction activity, duration, traffic speed and volume, and pedestrian traffic. Work will take place along major roads, and the minor internal roads. As such, the traffic 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.


Engineer
Subhaghat Urban Water Supply and Sanitation Project


Government of Punjab
Department of Urban Water Supply and Sanitation
Project Engineer

ANNEX 2-D: 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
- Manage 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.

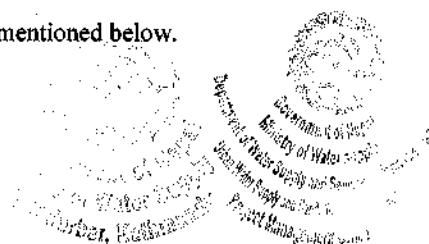
Characterization of spoil: Based on the type of spoil; characterization is done (sand stone, MWSS mix materials, reusable materials)

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


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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

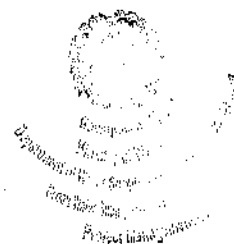
- Summary of follow up time-bound actions to be taken within a set timeframe.

Appendixes

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



[Signature]
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**ANNEX 2-E:
SAMPLE SEMI-ANNUAL ENVIRONMENTAL MONITORING REPORT TEMPLATE**

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

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

N o.	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

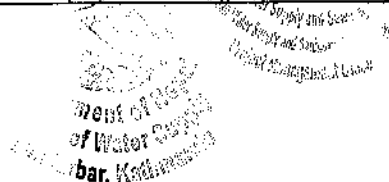
COMPLIANCE STATUS WITH THE ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

- 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	Parameters Monitored (As a Minimum those	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted

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*IEE of Subhaghat Urban Water Supply and Sanitation Project
BDA/PEA JV, November 2019*

	IEE)	identified in the IEE should be monitored)				the Monitoring
Design Phase						
Pre-Construction Phase						
Construction Phase						
Operational Phase						

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 Ministry of Water Supply
 Urban Water Supply Project Management

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)


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Water Quality Results

Water Quality Results			Parameters (Government Standards)					
Site No.	Date of Sampling	Site Location	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

[Signature]
Engineer

[Circular Stamp]
BDA/PEA JV
Subhaghat Urban Water Supply and Sanitation Project
BDA/PEA JV, November 2019

[Circular Stamp]
BDA/PEA JV
Subhaghat Urban Water Supply and Sanitation Project
BDA/PEA JV, November 2019

**ANNEX 2-F:
SAMPLE ENVIRONMENTAL SITE INSPECTION REPORT**

Project Name
Contract Number

NAME: _____
TITLE: _____
LOCATION: _____

DATE: _____
DMA: _____
GROUP: _____

WEATHER CONDITION: _____

INITIAL SITE CONDITION: _____

CONCLUDING SITE CONDITION:

Satisfactory _____ Unsatisfactory _____ Incident _____ Resolved _____ Unresolved _____

INCIDENT:

Nature of incident: _____

Intervention Steps: _____

Incident Issues

Resolution

Project Activity Stage	Survey	
	Design	
	Implementation	
	Pre-Commissioning	
	Guarantee Period	

Inspection

Emissions	Waste Minimization
Air Quality	Reuse and Recycling
Noise pollution	Dust and Litter Control
Hazardous Substances	Trees and Vegetation
Site Restored to Original Condition Yes	No

Signature _____

Sign off

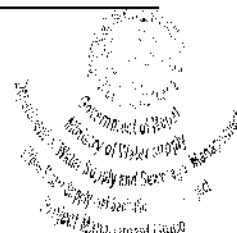
Name _____

Position

Name _____

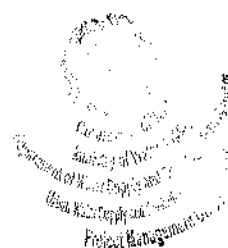
Position

top
Engineer

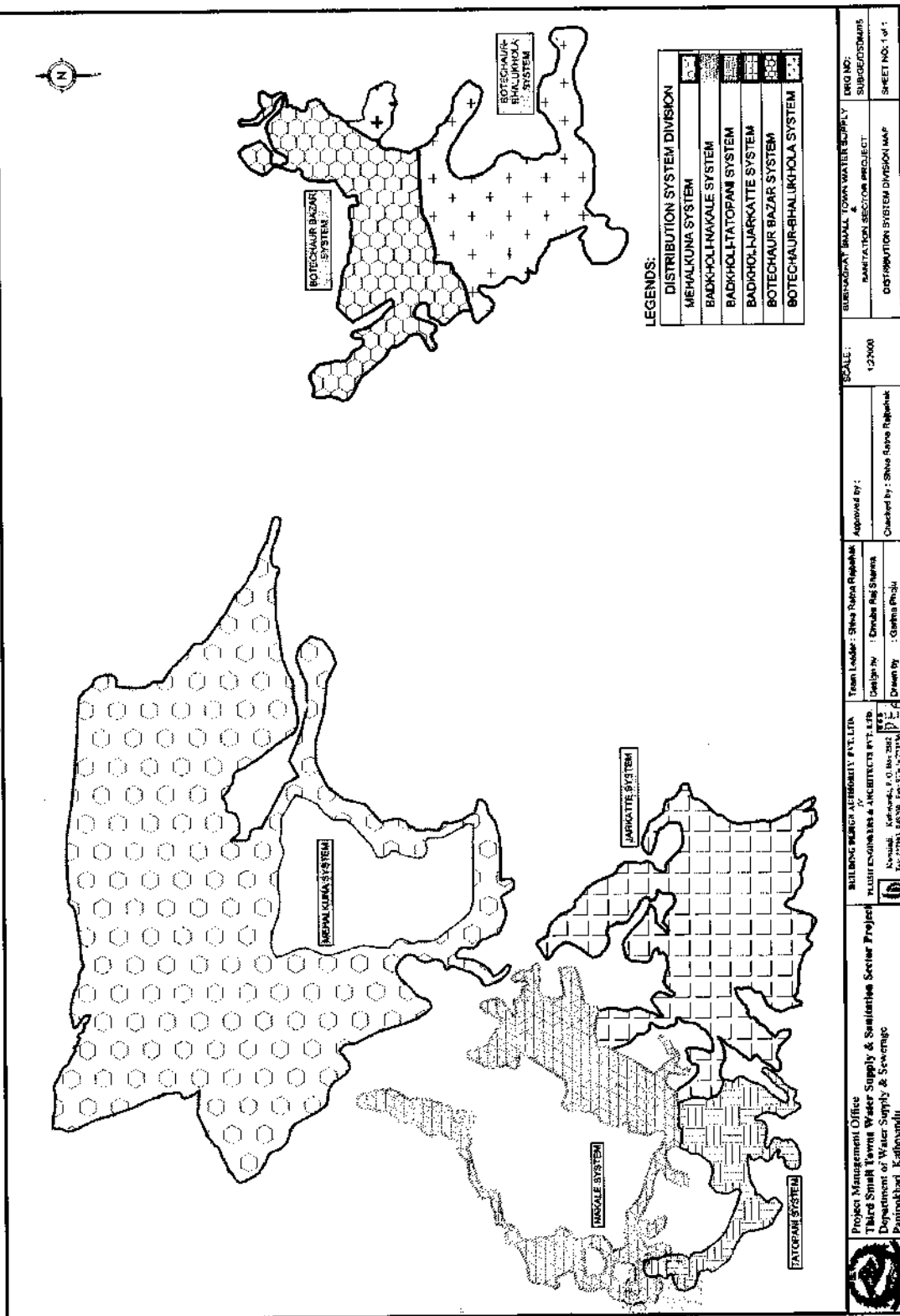


**ANNEX 3:
PROJECT LOCATION MAP AND LAYOUT MAP**


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Project Layout Map

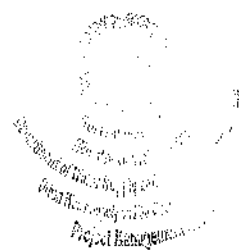


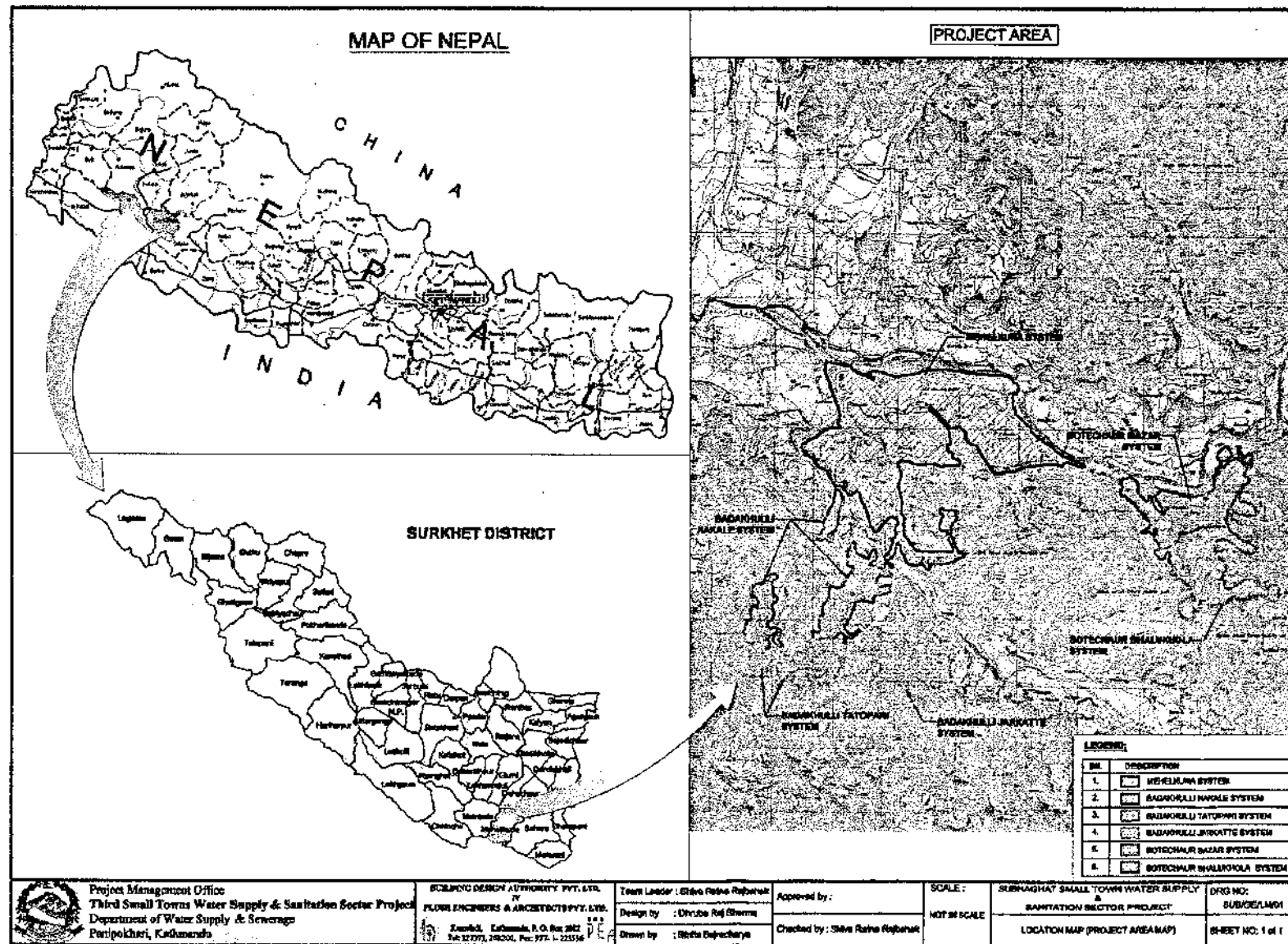
Engineer

Department of Water Supply and Sewerage
Ministry of Water Supply
Kathmandu, Nepal


Engineer



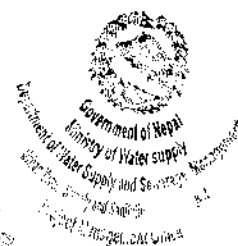

Ministry of Transport, Road and Maritime Transport
General Directorate of Road Transport
Project Management



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ANNEX 4:
PUBLIC NOTICE, MUCHULKA, PUBLIC CONSULTATION, CONSENT LETTER,
AND
RECOMMENDATION LETTER


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राहरी खानेपानी तथा सरसफाई क्षेत्रगत आयोजना
सुभाघाट खानेपानी तथा सरसफाई आयोजना
गुर्भाकोट नगरपालिका, सुर्खेत
प्रारम्भिक वातावरणीय परिक्षणको लागि राख सुझाव पेश गर्ने सुझावी
सार्वजनिक सूचना
प्रकाशित मिति: २०७४/०८/०३

नेपाल सरकार र एशियाली विकास बैंकको आर्थिक सहयोगमा कर्णाली प्रदेशको सुर्खेत जिल्ला स्थित गुर्भाकोट नगरपालिकाको वडा नं. ६, ७, ८ र ९ मा सञ्चालन हुनगइरहेको सुभाघाट साताराहरी खानेपानी तथा सरसफाई आयोजनाको प्रारम्भिक वातावरणीय परिक्षण (Initial Environmental Examination) प्रतिवेदन तयार गर्नु पर्ने भएकाले सो आयोजनाबाट शैतिक, जैविक सामाजिक आर्थिक एवं सांस्कृतिक पक्ष तथा प्रणालीहरूमा के कस्ता असरहरू पर्दछन् वा पर्न सक्दछन् सो बारे लिखित राय सुझाव सहित १५ (पन्ध्र) दिनभित्र आईपुग्ने गरी निम्न ठेगानामा पठाई दिनु हुन वातावरण संरक्षण नियमावली २०५४ को नियम ७ (२) अनुसार यो सूचना प्रकाशित गरिएको छ। साथै लिखित राय सुझावको प्रतिलिपी सम्बन्धित मन्त्रालय तथा विभागमा समेत दिन सकिनेछ।

राख सुझाव पठाउने ठेगाना

तेश्रो साना राहरी खानेपानी तथा
सरसफाई क्षेत्रगत आयोजना
आयोजना व्यवस्थापन कार्यालय
पानीपोखरी, काठमाण्डौ
फोन: ०१-४४१२३४८
फ्याक्स: ०१-४४१२२८०

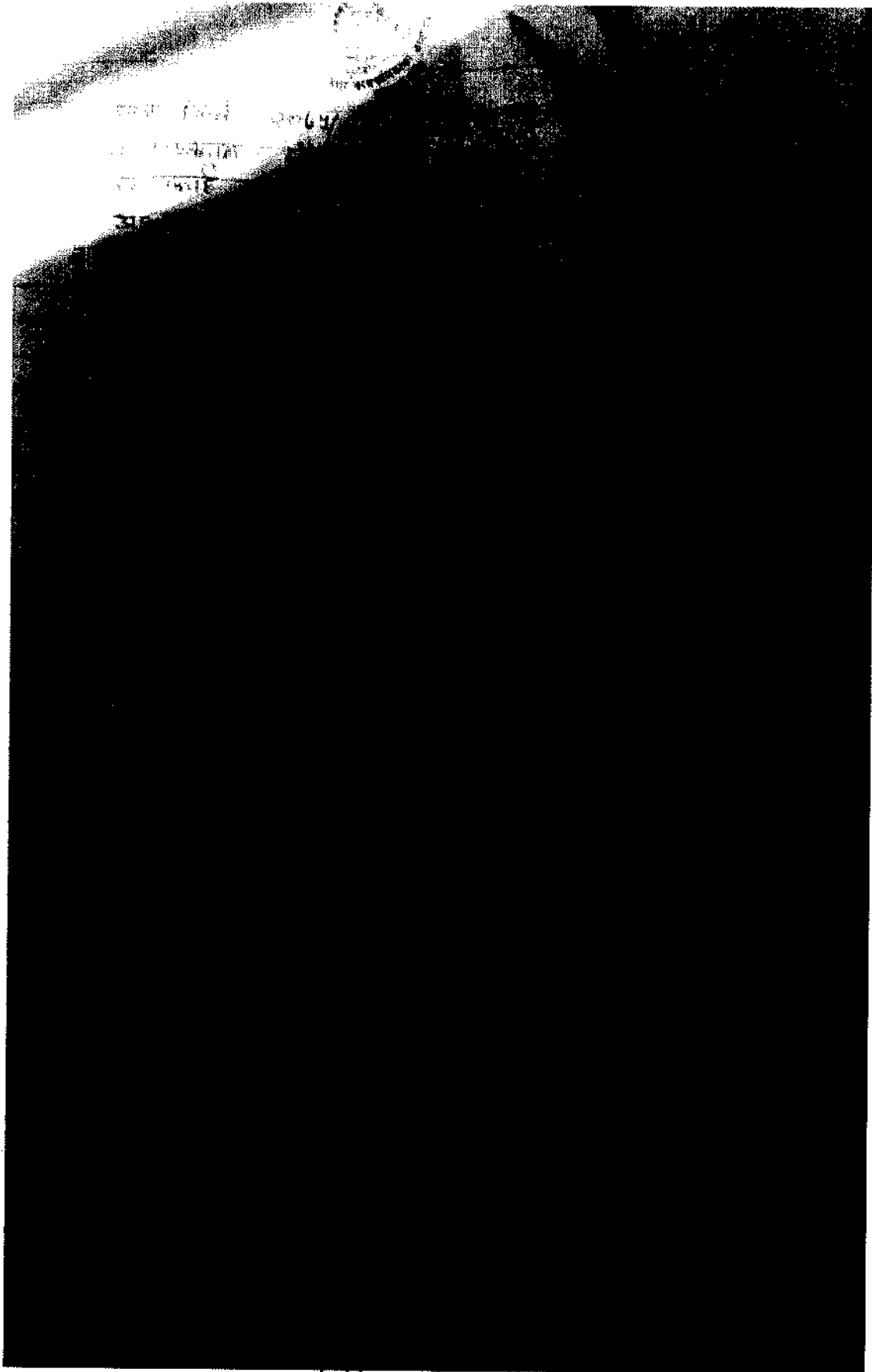
खानेपानी तथा सरसफाई उपभोक्ता
कार्यालय, सुभाघाट
गुर्भाकोट नगरपालिका, सुर्खेत
फोन: ९८४८९३९३९

वि.हि.ए.-पि.ई.ए. जे. भी.
कमलादी, काठमाण्डौ
फोन नं.: २८८२
फोन नं.: ०१-४२४८२००
फ्याक्स: ०१-४२२३४३६
ई-मेल: bdaenvi@outlook.com

For
Info
Site

Engineer

Project Manager




Engineer

Ministry of Water Supply
Subhaghat Urban Water Supply
BDA/PEA JV, November 2019

Water Supply and Sanitation
Subhaghat Urban Water Supply
Project Management Office



निर्देश / उपनिर्देश / सूचना

* यह निर्देश गा.स. उपनिर्देश 2019 के अन्तर्गत
गा.स. के माध्यम से निर्देशित व कृषि व वन्यजीव
संरक्षण के लिए गा.स. के माध्यम से निर्देशित व
कृषि व वन्यजीव संरक्षण के लिए गा.स. के माध्यम से
निर्देशित व कृषि व वन्यजीव संरक्षण के लिए गा.स.
के माध्यम से निर्देशित व कृषि व वन्यजीव संरक्षण के लिए
गा.स. के माध्यम से निर्देशित व कृषि व वन्यजीव संरक्षण के लिए

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ENC
Ministry of Water Supply
Government of India
New Delhi
BDA/PEA JV
Project Management Unit



मिति: २०७५/०७/०६

संख्या: ११०८

सुदूरपश्चिम प्रदेश, नवलपरासी जिल्ला, गुर्भाकोट नगरपालिकामा
संचालन हुने शुभघाट खानेपानी तथा सरसफाई आयोजना (वडा नं. ९, ७, ८ र ९) को प्रारम्भिक वातावरणीय परीक्षण
(Initial Environmental Examination) प्रतिवेदन तयार गर्ने क्रममा सो आयोजनाबाट भौतिक, जैविक सामाजिक आर्थिक
एवं सांस्कृतिक पक्ष तथा प्रणालीहरूमा के कस्ता असरहरू पर्दछन् वा पर्ने भन्दछन् सो बारे लिखित राय सुझावका लागि
मिति २०७५/०९/०३ मा प्रकाशित १५ (पन्ध्र) दिने सूचना यस नगरपालिकामा र सार्वजनिक स्थानहरूमा टाँस गरिएको
र सो अवधि भित्र यो कार्यालयमा कुनै विरोध पर्ने नआएको कारण उक्त आयोजना संचालनबाट वातावरणीय क्षेत्रमा
कुनै प्रतिकूल प्रभाव नपर्ने देखिएको व्यहोरा समेत सिफारिस गरिन्छ।

मिति: २०७५/१२/०५

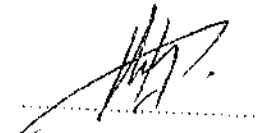
श्री खानेपानी मन्त्रालय,

सिंहदरबार, काठमाडौं।

विषय : सिफारिस सम्बन्धमा।

उपरोक्त सम्बन्धमा त्यस मन्त्रालय अन्तर्गत कर्णाली प्रदेश को सुर्खेत जिल्ला स्थित गुर्भाकोट नगरपालिकामा
संचालन हुने शुभघाट खानेपानी तथा सरसफाई आयोजना (वडा नं. ९, ७, ८ र ९) को प्रारम्भिक वातावरणीय परीक्षण
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कुनै प्रतिकूल प्रभाव नपर्ने देखिएको व्यहोरा समेत सिफारिस गरिन्छ।




हस्ताक्षर
जनसंरक्षण विभाग

Document of Donation of Land by Mr. Bhim Raj Gharti Magar

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Engineer

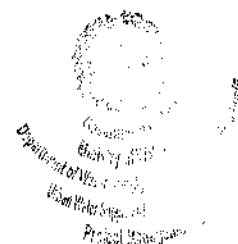


GOVERNMENT OF CANADA
Ministry of Health and Social Services
1979-80

ANNEX 5
WATER QUALITY TEST REPORT



[Signature]
Engineer





Nepal Environmental & Scientific Services (P) Ltd.

Plot No. 7301, Thapathali, Kathmandu, Nepal
Phone: +977-1-4244089, 4241001, Fax No.: +977-1-4226038, Email: nass@ness.com.np
http://www.nesspvt.com

QS Test Report / Certificate

NS Accreditation No. PRA. 01/053-54

Entry No. : NCL-785(W) (5) - 07 - 2017 Date Received : 04 - 07 - 2017
Sample : Betechnur Sump Well Water Date Completed : 13 - 07 - 2017
Client : Building Design Authority (P) Ltd. Sampled By : Client
(BDA - PEA JV) Location : Surkhet

S. No.	Parameters	Test Methods	Observed Values	NDWQS, Nepal
1	pH at 24°C	Electronic, 4500 - H ⁺ B. APHA	7.9	6.5 - 8.5
2	Electrical Conductivity, $\mu\text{S/cm}$	Conductivity Meter, 2510 B. APHA	393	1500
3	Turbidity, (NTU)	Nephelometric, 2130 B. APHA	< 1	5
4	Total Hardness as CaCO_3 (mg/L)	EDTA Titrimetric, 2340 C. APHA	208	500
5	Total Alkalinity as CaCO_3 (mg/L)	Titrimetric, 2320 B. APHA	218	-
6	Chloride, (mg/L)	Argentometric Titration, 4500 - Cl ⁻ B. APHA	0.99	250
7	Ammonia, (mg/L)	Direct Nesslerization, 4500 - NH ₄ C. APHA	0.10	1.5
8	Nitrate, (mg/L)	UV Spectrophotometric Screening, 4500 - NO ₃ B. APHA	4.06	50
9	Nitrite, (mg/L)	NEDA Colorimetric, 4500 - NO ₂ B. APHA	0.37	-
10	Calcium, (mg/L)	EDTA Titrimetric, 3500 - Ca B & 3500 - Mg B. APHA	44.09	200
11	Magnesium, (mg/L)	EDTA Titrimetric, 3500 - Ca B & 3500 - Mg B. APHA	22.82	-
12	Arsenic, (mg/L)	SDOC, Hydride Generation, 2500 - As, C. APHA	N.D. (<0.005)	0.05
13	Iron, (mg/L)	Direct Air - Acetylene AAS, 3111 B. APHA	0.17	0.3
14	Manganese, (mg/L)	APHA	N.D. (<0.05)	0.2

N.D.: Not Detected

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

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

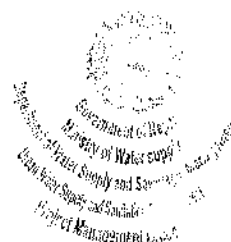
[Signature]
(Analyzed By)

[Signature]
(Checked By)

[Signature]
(Authorized Signature)

- Note:
1. This report/certificate is in reference to Laboratory Quality Control Manual, QS (812), section OPT.
 2. The result listed refer only to the tested samples & applicable parameters. Endorsement of products is neither inferred nor implied.
 3. Liability of our institute is limited to the invoiced test parameters & amount only.
 4. Samples will be destroyed after one month from the date of issue of test certificate unless otherwise specified.
 5. This report is not to be reproduced wholly / partially & cannot be used as an evidence in the Court of Law & should not be used in any advertising media without our permission in writing.
 6. The clients are requested to take back their hazardous samples along with the report/certificate.

Engineer





[Signature]
Engineer





Nepal Environmental & Scientific Services (P) Ltd.
G.P.O. Box 730, Thapathali, Kathmandu, Nepal
Phone: +977-1-4244080, 4241001 Fax No: +977-1-4296078 Email: ness@ness.com.np
http://www.nessnepal.com

QS Test Report Certificate

NS Accreditation No. Pfa. 01/053-54

Entry No: NCL-785(W)(5)-07-2017 Date Received: 04-07-2017
Sample: Pabitra Bazar Mahel Kana Sump Well Date Completed: 13-07-2017
Water: Sampled By: Client
Client: Building Design Authority (P) Ltd. Location: Surkhet
(BDA - PEA JV)

S. No.	Parameters	Test Methods	Observed Values	NDWQS, Nepal
1	pH at 24°C	Electrometric, 4500-H ⁺ B, APHA	7.8	6.5-8.5
2	Electrical Conductivity (µS/cm)	Conductivity Meter, 2510 B, APHA	811	1500
3	Turbidity (NTU)	Nephelometric, 2130 B, APHA	1	5
4	Total Hardness as CaCO ₃ (mg/L)	EDTA Titrimetric, 2340 C, APHA	322	500
5	Total Alkalinity as CaCO ₃ (mg/L)	Titrimetric, 2320 B, APHA	310	-
6	Chloride (mg/L)	Argentometric Titration, 4500-Cl ⁻ B, APHA	13.41	250
7	Ammonia (mg/L)	Direct Nesslerization, 4500-NH ₃ C, APHA	0.05	1.5
8	Nitrate (mg/L)	UV Spectrophotometric Screening, 4500-NO ₃ B, APHA	33.21	50
9	Nitrite (mg/L)	NEDA Colorimetric, 4500-NO ₂ B, APHA	0.04	-
10	Calcium (mg/L)	EDTA Titrimetric, 3500-Ca B & 3500-Mg B, APHA	72.84	200
11	Magnesium (mg/L)	EDTA Titrimetric, 3500-Ca B & 3500-Mg B, APHA	34.93	-
12	Arsenic (mg/L)	SDOC, Hydride Generation, 2600-As C, APHA	N.D. (<0.005)	0.05
13	Iron (mg/L)	Direct Air-Acetylene AAS, 3111 B, APHA	0.15	0.3
14	Manganese (mg/L)	Direct Air-Acetylene AAS, 3111 B, APHA	N.D. (<0.02)	0.2

N.D. - Not Detected

Note: NDWQS: National Drinking Water Quality Standard: 2003; AAS: Atomic Absorption Spectrophotometer; UV: Ultraviolet; EDTA: Ethylenediaminetetraacetic acid; NTU: Nephelometric turbidity unit; NEDA: N-1-Naphthylethylenediamine dihydrochloride; APHA: American Public Health Association.

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

(Analyzed By)

(Checked By)

(Authorized Signature)

- Note:
1. This report/certificate is in reference to Laboratory Quality Control Manual, QS (012), section OPT.
 2. The result listed refer only to the listed samples & applicable parameters. Endorsement of products is neither inferred nor implied.
 3. Liability of our institute is limited to the invoiced test parameters & amount only.
 4. Samples will be destroyed after one month from the date of issue of test certificate unless otherwise specified.
 5. This report is not to be reproduced wholly / partially & cannot be used as an evidence in the Court of Law & should not be used in any advertising media without our permission in writing.
 6. The clients are requested to take back their hazardous samples along with the report/certificate.

Engineer

Ministry of Water Supply and Sanitation, Kathmandu

Government of Nepal
Ministry of Water Supply and Sanitation, Kathmandu
Project Management Office



Nepal Environmental & Scientific Services (P) Ltd.

G.P.O. Box: 7301, Thapathali, Kathmandu, Nepal

Phone: +977-1-4244589, 4241001, Fax No: +977-1-4228028, Email: ness@ness.com.np

http://www.nessnepal.com

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NESS/Lab, M-03/R1.1

QS Test Report / Certificate

NS Accreditation No. Pra. 01/053-54

Entry No. : NQ - 322 (W) (A) - 02 - 2018

Date Received : 12-02-2018

Sample : Water (Bote Chaur)

Date Completed : 27-02-2018

Client : PEA-BN JV

Sampled By : Client

S. N.	Parameters	Test Methods	Observed Values	NDWQS, Nepal
1	pH at 18°C	Electronic, 4530 - H ⁺ B, APHA	7.8	6.5 - 8.5
2	Electrical Conductivity (µS/cm)	Conductivity Meter, 2510 B, APHA	384	1500
3	Turbidity (NTU)	Nephelometric, 2130 B, APHA	11	5
4	Color (Chromatic Unit)	Spectrophotometric, 2130 C, APHA	0.07	5
5	Total Hardness as CaCO ₃ (mg/L)	EDTA Titrimetric, 2340 C, APHA	258	500
6	Total Alkalinity as CaCO ₃ (mg/L)	Titrimetric, 2320 B, APHA	275	-
7	Chloride (mg/L)	Argentometric Titration, 4500 - Cl ⁻ B, APHA	4.44	250
8	Ammonia (mg/L)	Direct Nesslerization, 4500 - NH ₃ C, APHA	0.24	1.5
9	Nitrate (mg/L)	UV Spectrophotometric Screening, 4500 - NO ₃ B, APHA	2.58	50
10	Nitrite (mg/L)	NEDA, Colorimetric, 4500 - NO ₂ B, APHA	1.37	-
11	Fluoride (mg/L)	SPANDS, 4500 - F ⁻ D, APHA	<0.06	0.5-1.8
12	Sulphate (mg/L)	Gravimetric Method with Ignition of Barium, 4500 - SO ₄ ²⁻ C, APHA	1.85	250
13	Calcium (mg/L)	EDTA Titrimetric, 3500 - Ca ²⁺ & 3500 - Mg B, APHA	84.53	200
14	Magnesium (mg/L)	- Mg B, APHA	28.17	-
15	Iron (mg/L)	Direct Ar - Acetylac AS, 3111 B, APHA	0.12	0.30
16	Manganese (mg/L)	APHA	N.D. (<0.02)	0.20
17	Arsenic (mg/L)	SCDC, 3800 - As, C, APHA	N.D. (<0.01)	0.05

N.D.: Not Detected

Note:

NDWQS: National Drinking Water Quality Standard - 2053; AAS: Atomic Absorption Spectrophotometer; UV: Ultraviolet; EDTA: Ethylenediaminetetraacetic acid; NTU: Nephelometric turbidity unit; NEDA: N-1-Naphthylethylenediamine dihydrochloride; APHA: American Public Health Association

Remarks: The observed value for turbidity did not comply the prescribed NDWQS for drinking water.

(Analyzed By)

(Checked By)

(Authorized Signature)

1. This report/certificate is in reference to Laboratory Quality Control Manual, QS (R17)
2. The result of parameters refers only to the tested samples. Endorsement of products is neither inferred nor implied.
3. Liability of our Institute is limited to the leveled test parameters & amount only.
4. Samples will be destroyed after three months from the date of issue of test certificate unless otherwise specified.
5. This report is not to be reproduced wholly / partially & cannot be used as an evidence in the Court of Law & should not be used in any advertising media without our permission in writing.
6. The clients are requested to take back their hazardous samples along with the report/certificate.

Engineer

Project Manager



Nepal Environmental & Scientific Services (P) Ltd.

G.P.O. Box: 7301, Thapathali, Kathmandu, Nepal

Phone: +977-1-4244989, 4241001, Fax No: +977-1-4226028, Email: ness@nessnepal.com.np

http://www.nessnepal.com.np

Page 2 of 2

NESS/Lab, M-03/RI.1

QS Test Report / Certificate

NS Accreditation No. Pra. 01/053-54

Entry No. : NCL-322 (W) (3)-02-2018

Date Received : 12-02-2018

Sample : Water (Motel Kuno)

Date Completed : 27-02-2018

Client : PEA-BN JV

Sampled By : Client

S. N.	Parameters	Test Methods	Observed Values	NDWQS, Nepal
1	pH at 18°C	Electrometric, 4500-H B, APHA	7.0	6.5-8.5
2	Electrical Conductivity ($\mu S/cm$)	Conductivity Meter, 4510 B, APHA	464	1500
3	Turbidity (NTU)	Nephelometric, 2120 B, APHA	<1	5
4	Color (Chromaticity Unit)	Spectrophotometric, 2120 C, APHA	<0.05	5
5	Total Hardness as $CaCO_3$ (mg/L)	EDTA Titrimetric, 2340 C, APHA	385	500
6	Total Alkalinity as $CaCO_3$ (mg/L)	Titrimetric, 2320 B, APHA	303	-
7	Chloride (mg/L)	Argentometric Titration, 4500-Cl B, APHA	10.85	250
8	Ammonia (mg/L)	Direct Nitration, 4500-NH ₃ C, APHA	0.10	1.0
9	Nitrate (mg/L)	UV Spectrophotometric Screening, 4500-NO ₃ B, APHA	23.98	50
10	Nitrite (mg/L)	NEDA Colorimetric, 4500-NO ₂ B, APHA	<0.02	-
11	Fluoride (mg/L)	SPANDS, 4500-F D, APHA	<0.05	0.5-1.5
12	Sulphate (mg/L)	Gravimetric Method with Ignition of Residue, 4500-SO ₄ C, APHA	<1	250
13	Calcium (mg/L)	EDTA Titrimetric, 3500-Ca B & 3500-Mg B, APHA	28.94	300
14	Magnesium (mg/L)	-	30.82	-
15	Iron (mg/L)	Direct Al-Ascorbic AAS, 3111 B, APHA	0.15	0.30
16	Manganese (mg/L)	-	N.D. (<0.02)	0.30
17	Arsenic (mg/L)	SGOR, 3500-Ar, C, APHA	N.D. (<0.01)	0.05

N.D.: Not Detected

Note:

NDWQS: National Drinking Water Quality Standard - 2003; AAS: Atomic Absorption Spectrophotometer; UV: Ultraviolet; EDTA: Ethylenediaminetetraacetic acid; NTU: Nephelometric turbidity unit; NEDA: N-1-Naphthylethylenediamine dihydrochloride; APHA: American Public Health Association

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

(Analyzed By)

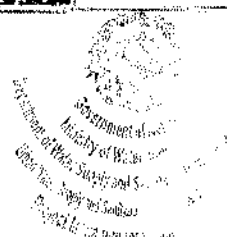
(Checked By)

(Authorized Signatory)

Note:

1. This report/certificate is in reference to Laboratory Quality Control Manual, Q2 (01/2).
2. The result of parameters refers only to the tested samples. Endorsement of products is neither inferred nor implied.
3. Liability of our institute is limited to the invoiced test parameters & amount only.
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Engineer



**ANNEX 6: SURVEY QUESTIONNAIRE
AND
CHECKLISTS**

to
Engineer



Household Survey

१. परिचय

१.१ अन्तर्वाता दिने व्यक्तिको नाम ठेगाना:

(क) जिल्ला:

(ख) गा.वि.स.:

(ग) टोल रस्थान:

(घ) वार्ड नं.:

१.२ पारिवारिक विवरण

(क) घरमुलिको नाम: श्रीमान् र श्रीमती

(ख) जाती:

(ग) उमेर:

(घ) लिंग: ☐ पुरुष ☐ महिला

(ड) वैवाहिक स्थिति:

(ध) धर्म:

(छ) व्यवसाय (घरमुलीको):

(ज) बसेको वर्ष:

(झ) शिक्षा :

(ञ) कुल परिवार संख्या

उमेर समूह	पुरुष	पेशा	महिला	पेशा	जम्मा
०-५ वर्ष					
६-१० वर्ष					
११-१५ वर्ष					
१६-४५ वर्ष					
४५-६० वर्ष					
६० भन्दा माथि					
जम्मा					

१.३ विद्यालय जाने उमेरका बाल बालिका (६-१५ वर्ष)

जम्मा	विद्यालय गएका		विद्यालय नगएका	
	पुरुष	महिला	पुरुष	महिला

२. साक्षरता : (तपाईंको परिवारमा)

	लेखपढ गर्न सक्ने	एस.एल.सी. उत्तिर्ण	स्नातक	स्नातकोत्तर	जम्मा
महिला					
पुरुष					
जम्मा					

३. कृषि (भु-उपयोग)

३.१ तपाईं वा परिवार सदस्यको नाममा गा.वि.स. र वडा भित्र जग्गा छ रु

छ ☐

छैन ☐

३.२ यदि छ भने कति छ ? रोपनीमा भन्नुहोस :

क्र.सं.	स्वामित्व	घेत	बारी	बरवाटे	बन	कैफियत
१	आफ्नै					
२	सगोलको					
३	कमाई आएको					

Engineer

क्र.सं.	स्वामित्व	खेत	बारी	खरवारी	वन	कैफियत
४	कमाउन दिएको					
५	जम्मा					

३.३ गा.वि.स. वा वडा बाहिर कुन ठाउँमा जग्गा छ रु

क्र.सं.	ठाउँको नाम	जग्गा				कैफियत
		खेत	बारी	खरवारी	वन	

३.४ तपाईंको जग्गा आयोजना भित्र पर्छ रु १. एभिकम नभलतप्यल तजभ अफउयलभलत या उचयवभअत धजभचभ जज बाकि०

- | | |
|---|--|
| <u>घर</u> | <u>खेत</u> |
| ☐ लम्बाई (फिटमा) | ☐ पाखो बारी |
| ☐ चौडाई (फिटमा) | ☐ जंगल |
| ☐ छान्ना | ☐ अन्य |
| ☐ तल्ला | |
| ☐ कोष | ☐ अन्दाजी मूल्य (चलनचल्तीमा) नेरु |

(क) आयोजना क्षेत्र भित्र तपाईंको कतिवटा घर र गोठ छन् ।

घर गोठ

क्र.सं.	किसिम	क्षेत्रफल
घर १		
घर २		
घर ३		

(१) कच्ची-खरले छाएको (२) पक्की (ढुङ्गा, ईटाको पर्खाल र ढलान फिगटी वा टिनको छानो)

	संख्या	क्षेत्रफल
गोठ		
अन्य (खुलाउने)		

३.५ (क) तपाईंको आयोजना क्षेत्र भित्र पर्ने जमिनमा कुन कुन फसल लगाउनु हुन्छ रु

क्र.सं.	खाद्यान्न बाली	बाली लगाएको क्षेत्रफल	उत्पादन परिणाम
१.	खाद्यान्न बाली		
	धान		
	गहु		
	मकै		
	कोदो		

Engineer

Project Management

	दाल गेडागुडी		
	अन्य		
२. नगदे वाली			
	आलु		
	तोरी		
	तरकारी		
	अन्य		

(ख) उक्त जग्गामा लगाएको फलफूल र अन्य बोट विरुवाको विवरण दिनुहोस र

क्र.सं.	बोटविरुवा	विरुवा संख्या		जम्मा
		फल लाएको	फल नलाएको	
१	फलफूल			
२	कागती			
३	सुन्तला			
४	आँप			
५	मेवा			
६	अम्बा			
७	लिच्ची			
८	कटहर			
९	केरा			
१०	आरु			
११	नास्पाती			
१२	आरुवखडा			
१३	अन्य			
१४	डाले घाँस			
१५	पाखुरी			
१६	काभ्रो			
१७	वडहर			
१८	खनायो			
१९	टाकी			
२०	गिदरी			
२१	अन्य			
२२	इन्धनको लागि प्रयोग गर्ने बोट विरुवा			
२३	काठमा प्रयोग हुने बोटविरुवा			
२४	वाँस निगालो			

३.६ के तपाईंको जग्गामा भएको गत वर्षको उत्पादनले तपाईंको परिवारलाई खान पर्याप्त भयो र

भयो

भएन

३.७ यदि अप्र्याप्त भयो भने कति महिनाको लागि पुगेन र महिना

(क) तिन महिना

(ख) छ महिना

(ग) नौ महिना

(घ) बाह्र महिना

३.८ आफ्नो उत्पादित खाद्यान्न अप्र्याप्त भएको बेला आफ्नो परिवारलाई कसरी खुवाउनु हुन्छ ?

क. ऋण गरेर

ग. व्यापारीको आम्दानीबाट

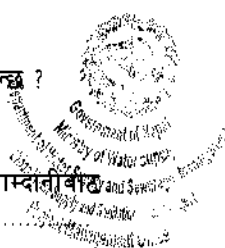
ड. दैनिक मजदुरबाट भएको

ख. नोकरीबाट भएको आम्दानीबाट
भारी बोकेर भएको आम्दानीबाट
अन्य
Engineer

नोकरीबाट भएको आम्दानीबाट

भारी बोकेर भएको आम्दानीबाट

अन्य



३.९ पशुपालन सम्बन्धी :

तपाईंको घरमा कति / कस्ता पशु पक्षीहरु पाल्नु भएको छ र

क्र.सं.	पशुपक्षी	संख्या
१	गाई	
२	गोरु	
३	भैसी	
४	बाछ्छा	
५	बाछ्छि	
६	पाडा	
७	पाडि	
८	राँगो	
९	घोडा	
१०	बाख्खा	
११	बोका	
१२	खसी	
१३	पाठा/पाठी	
१४	सुँगुर/बंगुर	
१५	हाँस	
१६	कुखुरा	
१८	अन्य (खुलाउने)	

४. घर परिवारको वार्षिक औषत आम्दानी :

श्रोत	वार्षिक आम्दानी (रु.)	श्रोत	वार्षिक आम्दानी (रु.)
कृषिबाट		अन्य श्रोतहरु	
खाद्यान्न		नोकरी, सेवा	
नगदेवाली		ज्याला मजदुरी र भरीया	
फलफूल		निवृत्तिभरण	
जम्मा (१)		व्यापार	
पशुपालनबाट		घरेलु उद्योग	
दुग्ध उत्पादन		पेशागत सेवा	
अण्डा कुखुरा हाँस बिक्री		माछा बिक्री	
बाछ्छा/बाछ्छी/गोरु/बिक्री		अन्य	
भैसि/राँगो बिक्री		जम्मा (३)	
बोका/खसी/भेडा/बाख्खा बिक्री			
सुँगुर/बंगुर बिक्री			
कुखुरा/हाँस बिक्री			
जम्मा (२)			
जम्मा आय (१+२):			

५. घर परिवारको वार्षिक औषत खर्च :

विवरण	जम्मा रकम (रु.)	विवरण	जम्मा रकम (रु.)
चामल		चिया	
द्याल		दाउरा	
मकै		बिजुली	
तरकारी		मट्टितेल	
दुध/दही		औषधि	
माछा/मासु		शिक्षा	
तेल/ध्यू		कपडा	
मर-मसला		चाडपर्व	

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विवरण	जम्मा रकम (रु.)	विवरण	जम्मा रकम (रु.)
नून		अन्य	
चिनी			
		जम्मा खर्च	

६. पानीको आपूर्ति

(क) तपाईंले यस खोलाको पानी उपयोग गर्नु हुन्छ कि हुदैन रु
गर्छु ☐ गर्दैन ☐

(ख) यदि खोलाको पानी प्रयोग गर्नु हुन्छ भने कुन प्रयोजनको लागि प्रयोग गर्नुहुन्छ रु
सिँचाई ☐ नुहाउने, कपडा धुने ☐
पिउने ☐ अन्य ☐

७. स्वास्थ्य सम्बन्धि:

(क) तपाईंको परिवारमा कुनै सदस्य विगत वर्षमा विरामी भएका थिए रु
थिए ☐ थिएनन् ☐

(ख) यदि थिए भने निम्न विवरण दिनुहोस् रु

कस	नाता	पुरुष	महिला	उमेर	रोग
१					
२					
३					
४					

(रोगको प्रकार:- दिसापखाला, आउं, टाइफाईड, हैजा, मलेरिया, टीबी, जन्डीस, छाला सम्बन्धी, निमोनिया, दम, रक्तचाप, एड्स र यौन रोग, अन्य)

(ग) विरामी पर्दा सर्वप्रथम कहाँ जानुहुन्छ

(घ) त्यहाँ निको नभए कहाँ जानुहुन्छ रु कमश उल्लेख गर्नुहोस ।

कस	जाने ठाउँ	रहेको स्थान	दूरी (कि.मी.)
१	अस्पताल		
२	हेल्थपोस्ट		
३	हेल्थ सेन्टर		
४	आयुर्वेदिक औषधालय		
५	निजि क्लिनिकर औषधी पसल		
६	धामी भाकी		
७	अन्य		

Engine

Ministry of Water Supply and Sanitation
Water Supply and Sanitation
Kathmandu

Ministry of Health
Ministry of Water Supply and Sanitation
Water Supply and Sanitation
Kathmandu

न. महिलाको अवस्था:

(क) श्रमको वर्गिकरण

क्र.सं.	कामको विवरण	हिस्सा प्रतिशतमा	
		पुरुष	महिला
१	खनजोत		
२	मल राख्ने		
३	जमिन तयारी		
५	रोप्ने		
६	गोडमेल		
७	सिंचाई		
८	काट्ने		
९	बोक्ने र थन्काउने		
१०	अन्न प्रसोधन (कूटाई पिसाई)		
११	घाँस दाउरा		
१२	गोठालो		
१३	मेलापात		
१४	खाना पकाउने		
१५	पानी पधेरो		
१६	बच्चाबच्ची र बुढाबुढी हेरविचार		

(ख) सम्पत्तिमा अधिकार

क्र.सं.	कामको विवरण	हिस्सा प्रतिशतमा	
		पुरुष	महिला
१	घर		
२	जग्गा		
३	पशु		
५	गरगहना		
६	उद्योग धन्दा		
७	अन्य		

(ग) निर्णय प्रक्रियामा अधिकार

क्र.सं.	कामको विवरण	हिस्सा प्रतिशतमा	
		पुरुष	महिला
१	वाली रोप्ने		
२	पशु खरीदविक्री		
३	गरगहना खरीदविक्री		
५	अन्न खरीदविक्री		
६	फलफूल खरीदविक्री		
७	पशुजन्य पदार्थ खरीदविक्री		
८	काठ दाउरा खरीदविक्री		
९	विहावारी		
१०	परिवार नियोजन		
११	छोराछोरी पढाई लेखाई		
१२	अन्य		

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९. मुआब्जा सम्बन्धी:

(क) तपाईको घर र जग्गाको मुआब्जा के मा चाहनु हुन्छ

नगद ☐

जग्गाको सट्टा जग्गा ☐

अन्य ☐

(ख) यदि तपाईले मुआब्जा नगदमा पाउनु भयो भने उक्त मुआब्जा रकम के मा प्रयोग गर्नु हुन्छ

जग्गा कित्ते ☐

घर बनाउने ☐

ऋण तिर्ने ☐

व्यापार गर्ने ☐

अन्य ☐

१०. प्रस्ताव कार्यान्वयन गर्दा के कस्तो प्रभाव पर्न सक्दछ सो सम्बन्धी राय सुभाब छ
सकारात्मक: नकारात्मक:

Engineer



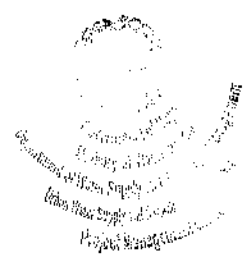
CHECKLISTS

Simple Checklists for Baseline Information Collection

A. Physical Environment

Parameter	Description
Topography	
Geology (Rock and Soil Types)	
Erosion and Sedimentation	
Quarry Sites	
Sites for Labour Camp	
Site for Storage and Stockpiling	
Access and Diversion if necessary	
River Training Works	
Land Use	
Air Quality	
Water Quality	
Noise Level	
Spoil disposal sites	
Drainage Network and Ground Water	
Status of Channel Shifting	

[Signature]
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B. Vegetation and Wildlife

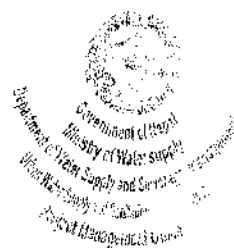
Vegetation in the project area

[illegible]

Mammals in the project area

[illegible]


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100-443887-100

Birds Sighted in the project area

[illegible]

Herpeto-fauna in the Project Area

[illegible]

Fish in the Project Area

[illegible]

C. Socio-Economic and Cultural Environment

Parameter	Description
Demography	
a) Population (Male, Female)	
b) Caste Ethnicity	
c) Language	
d) Religion and Culture	
e) Literacy	
Occupation	
Migration Patten	
Public Health and Sanitation	
Drinking Water Supply	

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Education Facilities	
Communication	
Fuel and Energy	
Road and Transportation	
Land Holding	
Food Sufficiency	
Irrigation	
Health Care System	
Market	
Business and Industries	
Religious and Cultural Sites	
Non governmental activities	
Development Potential	
Detail of Project Affected Structures	

[Signature]
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[Signature]
Minister of Water Supply and Sanitation
Kathmandu

[Circular Stamp]
Government of Nepal
Ministry of Water Supply and Sanitation
Department of Water Supply and Sanitation
Subhaghat Urban Water Supply and Sanitation Project
Project Management Unit

Settlements and Population

SN	Settlement	Municipality & Ward	HH	Population			Caste/Ethnicity
				Male	Female	Total	

[Signature]
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[Circular Stamp]
BDA/PEA JV
Subhaghat Urban Water Supply and Sanitation Project

**ANNEX 7:
PHOTOGRAPHS**


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Photo 1: Public Consultation of IEE report in Gurbhakot Municipality



Photo 2: Existing water scarcity in the project area



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Photo 3: Proposed Reservoir Site of Badakholi Nakale Site



Photo 4: Water Treatment Plant Site of Mehelkuna System

[Signature]
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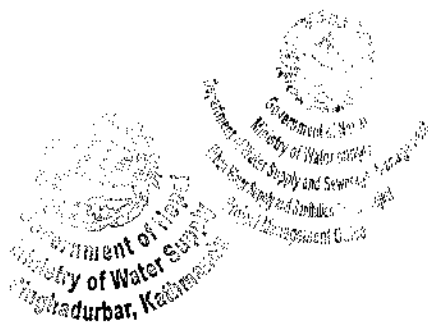




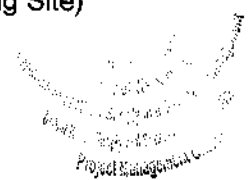
Photo 5: Proposed Site for Office Building (near city hall)



Photo 6: Sumpwell Site of Mehelkuna System (Khatang Site)



[Signature]
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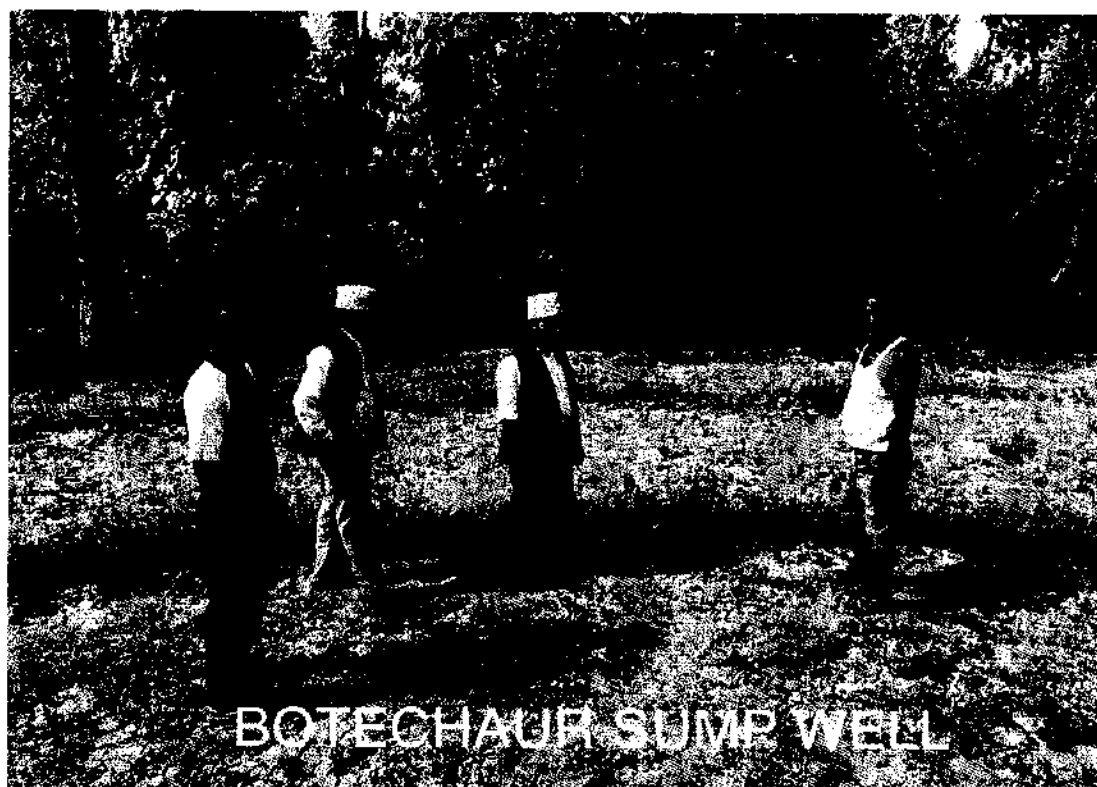


Photo 7: Propose Site for Sump Well of Botechaur



Photo 8: A Project area site where water will be supplied through distribution lines

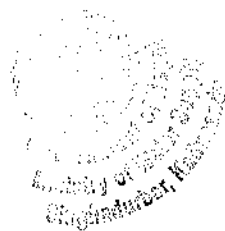
[Signature]
Engineer

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Kathmandu, Nepal

Department of Water Supply
Kathmandu, Nepal
Project Management Office

ANNEX 8: COMMENTS INOCRPORATION MATRIX


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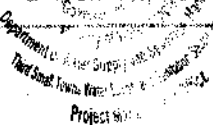

Project Manager



Government of Nepal
Ministry of Water Supply
Department of Water Supply and Sewerage
Third Small Towns Water Supply and Sanitation Project
PROJECT MANAGEMENT OFFICE

Panipatnagar, Kathmandu

Ref. No. 329, 076/077



24 November 2019

Mr. Dhundi Raj Dahal
Team Leader
Western Regional Design Supervision and Management Consultants (WRDSMC)
Kathmandu, Nepal

**Subject: Comments on IEE Report of Subhaghat_Surkhet and Liwang_Rolpa
Town Water Supply and Sanitation Project**

Dear Mr. Dahal,

The Ministry of Water Supply has given comments on the IEE report of Subhaghat_Surkhet and Liwang_Rolpa Town Water Supply and Sanitation Project.

You are requested to address these comments and submit 3 copies of the revised IEE Reports to PMO at the earliest along with comments incorporation matrix.

The Ministry's comments on the report are attached herewith.

Bhutta

Bidya Nath Bhattarai

Project Director
Project Director

Engineer
Engineer





नेपाल सरकार

खानेपानी मन्त्रालय



पत्र संख्या:- ०६६१०६६
चलानी नं:- ११६

फोन नं: ४२११६९२
फ्याक्स : ९७७-१-४२११४३३
सिंहदरबार,
काठमाडौं, नेपाल।

मिति: २०७६।०८।०६

श्री खानेपानी तथा ढल व्यवस्थापन विभाग,
पानीपोखरी, काठमाण्डौ।

विषय : IEE प्रतिवेदन Revise गरी पुनः पेश गर्ने सम्बन्धमा।

प्रस्तुत विषयमा तहांको पत्र साथ पेश भएको सहरी खानेपानी तथा सरसफाइ (क्षेत्रगत) आयोजना, प्रस्तावक रहेको सुर्खेत जिल्लामा संचालन हुने शुभाघाट, सुर्खेत नगर सहरी खानेपानी तथा सरसफाइ आयोजनाको प्रारम्भिक वातावरणीय परीक्षण प्रतिवेदन (IEE) का सम्बन्धमा मिति २०७६।०८।०२ मा यस मन्त्रालयमा बसेको वातावरण प्रतिवेदन सुझाव समितिको बैठकमा प्राप्त यसै पत्रसाथ संलग्न लिखित राय सुझावहरु अनुरूप प्रतिवेदन परिमार्जन गरी ती सबै Comments को Comments Incorporation Matrix सहित पुनः पेश गर्नुहुन निर्देशानुसार अनुरोध छ।



अन्जना महर्जन
(इन्जिनियर)

बोधार्थ :

श्री आयोजना व्यवस्थापन कार्यालय,
सहरी खानेपानी तथा सरसफाइ (क्षेत्रगत) आयोजना, पानीपोखरी।

014



**Comments on IEE of Subhaghat Urban Water Supply and Sanitation Project,
Gurbhakot Municipality, Surkhet, Karnali Province:**

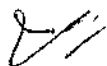
1. Recommendation letter of Municipality is missing.
2. Approved ToR letter is missing.
3. Include a copy of 15 days notice showing the name of a newspaper in which it was published.
4. In deed of inquiry designation of most of the people hasn't been mentioned, whether the people who signed are from the concerned institution or not is not clear.
5. Include a paper reflecting the donation of land by Bhim Raj Gharti Magar.
6. In both executive summary in background section mention the name of the project's district.
7. In both executive summary mention a gist of mitigation measures of main report.
8. In English executive summary (public participation topic), mention clearly that GRC will be formed before construction of the project.
9. Need to follow the format of schedule 5 of EPR, 1997.
10. Better to shift project component section after salient features table.
11. In salient features table mention about the depth of trench, volume of muck generation.
12. Mention clearly about crossings of river, road etc (if there is any)
13. Mention about duration of water supply whether it is for 24 hrs?
14. As about 30% of existing population has access to drinking water supply whether the proposed project is an upgradation of existing supply system or not, clearly mention it.
15. As about 160 HH do not have toilet facility, why this project is planning to construct only one public toilet in sanitation part? Whether the proposed public toilet covers for those HHs or not?
16. The cost sharing arrangement in approved ToR and that mentioned in 3.12 and 3.16 are different, clarify. Better to mention it in salient features table too.
17. Is this project provides a facility of house to house connection?
18. Better to mention clearly about survey year household, base year household and design year household.
19. The number of house connections differ from that of approved ToR.



20. In 3.7, two sentences contradict each other. (human resource per day not decided???)
21. Replace 'walkover' with 'walkthrough'.
22. Mention clearly about date, place of public consultation and field work as well.
23. Add impact identification in topic 3.8.6 and clearly define the methodology of impact identification and prediction.
24. In baseline, correct the topic by replacing 'resources' with 'environment'. Instead of ecological resources, mention biological environment.
25. As inner terai belt has been mentioned, clarify whether proposed project lies in chure region or not?
26. In physical environment section, add about land use pattern, landslide prone area (if any), existing ground water table level and ground water recharge capacity.
27. Include a table of land requirement for the proposed project showing clearly about area, type and ownership.
28. As presence of community forest has been mentioned in page 48 of the report, mention about it in existing biological environment and mention their name.
29. Mention clearly about the public, private, community infrastructures that lies in the alignment of proposed project.
30. Include religion and culture section in socio-economic environment.
31. As about 53% caste of project area seems to be prevailed by Dalit, clearly mention about the existing untouchability practice and also about their accessibility to basic public infrastructures. Also relate this project with the accessibility to these castes.
32. As in-migration plays a vital role in increasing population, mention about it in detail.
33. Remove date from Constitution of Nepal, review National Land Policy, 2075, consumer protection act, 2075, forest act, 2076. Add environment protection act, 2076, correct the date of EPA as 2053. Review working procedure with standard for using national forest by national priority project, 2076 if relevant (if proposed project needs forest area and also if it needs to cut the trees of forest area).
34. Information of pg. no. 17 repeated in pg. no. 25.
35. Clearly mention about how many guard houses out of nine will be constructed in reservoir site, treatment plant site and sump well site?
36. In 3. 14 section, clearly mention component wise land requirement.

Ministry of Water Resources
Kathmandu, Nepal

37. Mention clearly about the amount of construction material, location and number of camp site, facilities to the workers location of stockpiling site, drainage condition in proposed area, distance between pipe laying area and municipal drainage.
38. Mention in detail about water treatment process and frequency of backwashing process.
39. In 4.2.2, iii, specify which structures are going to damage along with the level of damage.
40. As in pg, 48, iv, it has been mentioned that land parcel under ownership of school is planned for spoil disposal, clearly mention whether it lies within the premises of existing school?? Is it possible to dump all of the spoil at single place as the length of laying pipe is 114km that lies in 4 different wards.
41. Likewise in pg, 48, v, it has been mentioned that waste will be landfill at designated site of municipality, clarify whether there is any landfill site of municipality.
42. Mention about existing provision of 1:10 compensatory plantation and looking after for 5 yrs.
43. In table 6.1, clearly mention the designated sites for camp site (as only ward no. 8 has been mentioned before-number should specify), waste disposal.
44. As landslide has been mentioned in impact but land type hasn't been mentioned in detail in the report.
45. Add existing road damage in movement of vehicle section.
46. In 7.5.1, better to include monitoring cost in lumpsum rather than specifying individuals amount.



.....
Jwala Shrestha
Undersecretary
Ministry of Forests and Environment



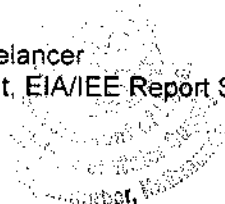
Comments on the IEE Report of Subhaghat Urban Water Supply & Sanitation Project

1. Chapter 2 seems unnecessary.
2. Linkage of core area and surrounding area with direct impact area and indirect impact area respectively is technically wrong and hence the concerned section i. e. section 3.4 (a) & (b) needs to be revised accordingly.
3. Proposed sites for disposal of sludge and demolition waste need to be indicated as well in Figure 3.2.
4. Sub-chapter 3.8 needs to be presented in a separate chapter.
5. in-situ measurements and sampling seem to have been overlooked as methods of field assessment of physical environment.
6. Sub-chapter 3.9 should be presented as a separate chapter.
7. Without field measurements, it'd be technically wrong to state the observed states of ambient air/noise/water quality as acceptable or being within standards.
8. The following could be considered as some additional construction activities.
 - a) Stockpiling of construction materials/fuel
 - b) Drilling??
 - c) Storage/disposal of extra spoil/solid waste
 - d) Operation of DG sets during operation phase during electric power failure
9. It'd be advisable to quantify the change in land use due project construction.
10. Placing electro-mechanical components more than 200 m far from major settlement as part of measures to mitigate adverse impacts of operation of diesel generators seems okay. Nevertheless, as their position will be basically governed by the location of ~~treatment plant~~ *Source* with respect to settlements, feasibility of this mitigation measure needs to be justified by the location of the proposed ~~WTP~~ *Source of groundwater.*
11. Proposed proper disposal of the inorganic fraction of solid waste generated from workers' camps needs to be further elaborated to ensure that the disposal is environmentally safe.
12. The proposed sanitary toilets for the workers need to be in adequate number with respect to the maximum number workers accommodated in the camps during the peak construction period.
13. The mitigation measures proposed with respect to damage to existing facilities would be those that should be undertaken during pre-construction phase rather than construction phase.
14. Monitoring parameters selected for compliance monitoring both during construction and operation phases should be source oriented rather than sink oriented.



(B. R. Manandhar)

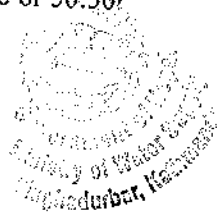
Environmental Engineer & Freelancer
Expert on physical environment, EIA/IEE Report Suggestion Committee, MoWS, GoN





Comments on the IEE Report of Subhaghat, Surkhet

1. Tools used for data collection should be clearly mentioned in the methodology chapter.
2. What specific tools have been used for socio-economic survey, mention specifically in the report.
3. Is there water right issues of the source used in the project? Clearly mention.
4. Baseline data/information should be mentioned clearly in the report.
5. नियमावली अनुसूची अन्तर्गत दफा ऐनको उपदफा ८ के हो ?
6. शौचालयको १.२% बनाउन बाँकी जब की खुल्ला दिशामुक्त भई सकेको छ । Data Source के हो?
7. जमिन भित्रको जग्गा प्रयोग गरिन्छ ?
8. project को नाम फरक फरक ठाउँमा फरक फरक कहि sector छ कि छैन ?
9. suep well र कहि Deep boring छ कि छैन?
10. Project background is incomplete OBA, user contribution mention छैन ।
11. Project cost मा user contribution हरको Ratio छैन ।
12. Team expert Qualification लेख्न पन्यो कि?
13. The surface water source do not have significant source of threat
14. Construction ratio 30:70 or 50:50?



Annex 8: Comments Incorporation Matrix

(Based on comments on IEE Report provided during presentation in MoWS and received on 22nd November 2019)

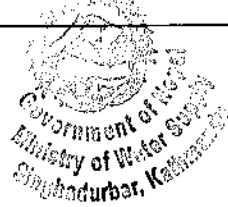
SN	Comments by MoFE (Jwala Shrestha, Head - EA Section)	Response/Updates
1	Recommendation letter of Municipality is missing	It was already present in the hard-copy report, but in the soft copy report sent to the expert, it was not attached (Annex 4)
2	Approved ToR letter is missing	The ToR approval letter from PMO will be replaced by approval letter from MoWS (Annex 1)
3	Include a copy of 15 days notice showing the name of a newspaper in which it was published	The Public Notice showing the name of the newspaper has been provided (Annex 4)
4	In deed of inquiry, designation of most of the people hasn't been mentioned, whether the people who signed are from the concerned institution or not is not clear	Yes, the witness of the pasting of notice also include the local authority representatives
5	Include a paper reflecting the donation of land by Bhim Raj Gharti Magar	This has been included in Annex 4
6	In both executive summary in background section, mention the name of the project's district	This has been incorporated (Page vii - paragraph 1; and Page xi - paragraph 1)
7	In both executive summary mention a gist of mitigation measures of main report	The gist of mitigation measures have been added in both the executive summaries (Page ix: Nepali Executive Summary; & Page xiii: English Executive Summary)
8	In English executive summary (public participation topic), mention clearly that GRC will be formed before construction of the project	This has been mentioned in the last paragraph of Page xiii
9	Need to follow the format of schedule 5 of EPR, 1997	The report was submitted in the format as per Schedule 5 of EPR 1997
10	Better to shift project component section after salient features table	The report has been prepared as per the standard format
11	In salient features table, mention about the depth of trench, volume of muck generation	These information are not relevant to salient features of the project. The information have been added in sub-section 3.15 page 34; and sub-section 3.8.7, page 12 of the report.
12	Mention clearly about crossing of river, road etc (if there is any)	The information on road crossing has been provided in sub-section 4.2.2 (A-i), page 39 The information on river crossing has been provided in sub-section 4.2.2 (A-v), page 40
13	Mention about duration of water supply whether it is for 24 hours?	This has been mentioned in sub-section 3.12 (Page 26), and also in the salient features table (Table 3.1, Page 6)
14	As about 30% of existing population has access to drinking water supply whether the proposed project is an upgradation of existing supply system or not, clearly mention it	The proposed project is not an upgradation project. This clarification has been added in sub-section 3.1, and also in point 2 of salient features (Table 3.1, Page 5)
15	As about 160 HH do not have toilet facility, why this project is planning to construct only one public toilet in sanitation part? Whether the proposed public toilet covers for those HHs or not?	HH toilets are covered by OBA component of the project (sub-section 3.13.3.2, heading number viii, Page 33) Public toilet is proposed for regular/normal public use
16	The cost sharing arrangement in approved	The uniformity as per ToR, and sections 3.12

	ToR and that mentioned in 3.12 and 3.16 are different, clarify. Better to mention it in salient features table too.	(Page 26) and 3.16 (Page 34) have been maintained with corrections
17	Is this project provides a facility of house to house connection?	The project provides HH tap connection as mentioned in salient features (point 6, Page 6), and also in sub-section 3.12 1 st Paragraph (Page 26)
18	Better to mention clearly about survey year household, base year household and design year household	This has been mentioned in point 7 of salient features (Page 6)
19	The number of house connection differ from that of approved ToR	The house connection number in the IEE has been updated based on the final design report
20	In 3.7, two sentences contradict each other. (human resources per day not decided???)	There is no contradiction
21	Replace 'walkover' with 'walkthrough'	The replacement has been made in sub-section 3.8.3 (Page 11)
22	Mention clearly about date, place of public consultation and field works as well.	It was already mentioned in sub-section 7.10 (Page 80); however, the date has been added also in sub-section 3.8.7 (Page 12)
23	Add impact identification in topic 3.8.6 and clearly define the methodology of impact identification and prediction	Impact identification has been added in topic 3.8.6 in Page 11.
24	In baseline, correct the topic by replacing 'resources' with 'environment'. Instead of ecological resources, mention biological environment	The corrections have been made (Sub-headings 3.9.1, 3.9.2 and 3.9.3)
25	As inner terai belt has been mentioned, clarify whether proposed project lies in chure region or not?	This has been mentioned in sub-section 3.9.2; Page 14
26	In physical environment section, add about land use pattern, landslide prone area (if any), existing ground water table level and ground water recharge capacity	Landuse pattern and landslide prone areas are mentioned in sub-section 3.9.1 Ground water table level/ground recharge capacity is not relevant for this project
27	Include a table of land requirement for the proposed project showing clearly about area, type and ownership	The has been tabulated in table number 3.15 (page 33)
28	As presence of community forest has been mentioned in page 48 of the report, mention about it in existing biological environment and mention their names	The information has been added ins sub-section 3.9.2 under the sub-heading 'Flora in the Project Area', Page 14
29	Mention clearly about the public, private, community infrastructures that lies in the alignment of proposed project	This details is not required for laying of water supply pipelines
30	Include religion and culture section in socio-economic environment	The information has been added under sub-section 3.9.3, in Page 16
31	As about 53% case of project area seems to be prevailed by Dalit, clearly mention about the existing untouchability practice and also about their accessibility to basic public infrastructures. Also, relate this project with the accessibility to these castes	This has been clarified under sub-heading 'Caste and Ethnicity' in sub-section 3.9.2; Page 15
32	As in-migration plays a vital role in increasing population, mention about it in detail	This has been clarified under sub-heading 'Household and Population' in sub-section 3.9.2; Page 15
33	Remove date from Constitution of Nepal, review National Land Policy 2075, consumer protection act 2075, Forest Act 2076. Add environment protection act 2075, correct the date of EPA as 2053. Review working procedure with standard for using national	The date has been removed from title of the Constitution of Nepal The date of EPA 2053 has been mentioned in sub-section 3.10.2 The suggested policies and acts have been reviewed

	forest by national priority project 2076 if relevant (if proposed project needs forest area and also if it needs to cut the trees of forest area)	
34	Information of pg. no. 17 repeated in pg. no. 25	The repeating information has been deleted
35	Clearly mention about how many guard houses out of nine will be constructed in reservoir sites, treatment plant site and sumpwell site?	This has been clarified in sub-heading 3.13.3.2 (vi), Page 32
36	In 3.14 section, clearly mention component-wise land requirement	This has been elaborated in Table 3.15, Page 33
37	Mention clearly about the amount of construction material, location and number of campsite, facilities to the workers, location of stockpiling sites, drainage condition in proposed area, distance between pipe laying area and municipal drainage	The details of construction materials are estimated in sub-section 3.5, page 9 Number and location of campsite facilities are mentioned in sub-section 3.15, page 34, & Table 6.1, page 54 under Construction sub-heading There is no municipal drainage system
38	Mention in detail about water treatment process and frequency of backwashing process	This has been discussed in sub-section 3.13.3.2; last paragraph of page 29
39	In 4.2.2. iii, specify which structures are going to damage along with the level of damage.	This has been mentioned in sub-section 4.2.2 (A-iii); Page 39
40	As in pg, 48, iv, it has been mentioned that land parcel under ownership of school is planned for spoil disposal, clearly mention whether it lies within the premises of existing school?? Is it possible to dump all of the spoil at single place as the length of laying pipe is 114 km that lies in 4 different wards.	The land parcel is not within the school premise. Two sites have been proposed for spoil disposal.
41	Likewise in pg 48, it has been mentioned that waste will be landfilled at designated site of municipality, clarify whether there is any landfill site of municipality.	Since the municipality doesn't have a landfill site, it has been proposed that the residue waste will be disposed safely in designated waste disposal site of the municipality; sub-section 6.1.1 (iv), Page 49
42	Mention about existing provision of 1:10 compensatory plantation and looking after for 5 years	This has been mentioned in sub-section 6.1.2 (i), Page 49
43	In table 6.1, clearly mention the designated sites for camp site (as only ward no. 8 has been mentioned before-number should specify), waste disposal	This has been mentioned in 1 st point of sub-heading 'Construction' of Table 6.1; Page 54
44	As landslide has been mentioned in impact but land type hasn't been mentioned in detail in the report.	4.2.2 (A-i), Page 39; & sub-section 3.9.1, page 13
45	Add existing road damage in movement of vehicle section.	This has been added under sub-section 'Construction' of table 6.1; Page 54
46	In 7.5.1, better to include monitoring cost in lumpsum rather than specifying individuals amount	The cost has been revised as lumpsum cost of NRs 300,000

SN	Comments by Expert (Environmental Engineer, BhalRaja Manandhar)	Response/Updates
1	Chapter 2 seems unnecessary	The report is prepared based on Schedule 5 of EPR 2054
2	Linkage of core area and surrounding area with direct impact area and indirect impact area respectively is technically wrong and hence the concerned section i.e. section 3.4 (a) & (b) needs to be revised accordingly	This sub-section 3.4 has been updated; page 9
3	Proposed sites for disposal of sludge and demolition waste need to be indicated as well in Figure 3.2	The sites for disposal of sludge/slurry has not yet been finalized Demolition waste will be disposed either at municipality's disposal site (not yet finalized) or at the spoil disposal site (already shown in Fig 3.2)
4	Sub-chapter 3.8 needs to be presented in a separate chapter	The report is prepared based on Schedule 5 of EPR 2054
5	In-situ measurements and sampling seem to have been overlooked as methods of field assessment of physical environment	This has been added under sub-section 3.8.3; page 10
6	Sub-chapter 3.9 needs to be presented in a separate chapter	The report is prepared based on Schedule 5 of EPR 2054
7	Without field measurements, it'd be technically wrong to state the observed states of ambient air/noise/water quality as acceptable or being within standard	The correction has been made; page 13 & 14 under sub-section 3.9.1
8	The following could be considered as some additional construction activities; a) Stockpiling of construction materials/fuel b) Drilling? c) Storage/disposal of extra spoil/solid waste d) Operation of DG sets during operation phase during electric power failure	Relevant activities have been added in sub-section 3.15, page 34
9	It'd be advisable to quantify the change in land use due to project construction	This had already been quantified in sub-section 3.14 & 4.2.2; and details have been added now in Table 3.15; page 33
10	Placing electro-mechanical components more than 200m far from major settlement as part of measures to mitigate adverse impacts of operation of diesel seems okay. Nevertheless, as their position will be basically governed by the location of source with respect to settlements, feasibility of this mitigation measure needs to be justified by the location of the proposed source of ground water	It has been clearly mentioned that under suitable condition governed by location of source, the electro-mechanical components will be placed as practicably far as possible from the major settlements. (sub-section 6.2 - iii, Page 51)
11	Proposed proper disposal of the inorganic fraction of solid waste generated from workers' camps need to be further elaborated to ensure that the disposal is environmentally safe.	The elaborations have been provided in sub-section 6.1.1 - v; Page 49
12	The proposed sanitary toilets for the workers need to be in adequate number with respect to the maximum number workers accommodated in the camps during the peak construction period	This has been specified in sub-section 6.1.3 - iii; Page 50
13	The mitigation measures proposed with respect to damage to existing facilities would be those that should be undertaken during pre-	This has been discussed under sub-section 6.1.1 - ii; Page 48

	construction phase rather than construction phase	
14	Monitoring parameters selected for compliance monitoring both during construction and operation phases should be source oriented rather than sink oriented.	It has been mentioned that the monitoring of compliance will be source based, and monitoring of impacts will be sink based; Sub-section 7.5; Page 71



SN	Comments from others representatives in the meeting of MoWS	Response/Updates
1	Tools used for data collection should be clearly mentioned in the methodology chapter.	The tools have been mentioned as per relevant; sub-section 3.8; Page 10 and Page 11
2	What specific tools have been used for socio-economic survey, mentioned specifically in the report.	Specific tools have been mentioned as applicable; sub-section 3.8.3; Page 11
3	Is there water right issue of the source used in the project? Clearly mention.	There is no water right issue of the source/s used in this project; This has been mentioned in sub-section 3.13.1 in page 26
4	Baseline data/information should be mention clearly in the report.	Baseline data has been provided; section 3.9
5	नियमावली अनुसूची अन्तर्गत दफा ऐनको उपदफा ८ के हो ?	This has been corrected in third paragraph of Executive Summary in Nepalese language; Page vii
6	शौचालयको ५.२% बनाउन बाँकी जब की खुल्ला दिशामुक्त भई सकेको छ । Data Source के हो? नियमावली अनुसूची अन्तर्गत दफा ऐनको उपदफा ८ के हो ?	The information has been restructured that 5.2% of them lack proper toilet facilities and need upgrading of toilet into water sealed type; Heading 'Access to household latrine' under sub-section 3.9.3; Page 17
7	जमिन भित्रको जग्गा प्रयोग गरिन्छ ?	This has been corrected as "..... क्षेत्रफल भित्रको जग्गा प्रयोग हुनेछ ।" in Executive Summary in Nepalese language; Page viii
8	Project को नाम फरक फरक ठाउँमा फरक फरक कहिँ sector छ कहिँ छैन?	The correct name of the project has been uniformly corrected as; Subhaghat Urban Water Supply and Sanitation Project which is one of the projects under the Urban Water Supply and Sanitation Sector Project (UWSSP)
9	Sump well र कहिँ Deep boring छ कि छैन?	This has been corrected; first paragraph of Page xii
10	Project background is incomplete OBA, user contribution mention छैन ।	Information of OBA, and user contribution have been added in the project background; Page vii, and Page xi
11	Project cost मा user contribution हरूको Ratio छैन ।	This has been tabulated under SN 9 of Table 3.1; Page 6
12	Team expert Qualification लेख्नु पर्‍यो कि ?	This has been stated in Table 1.1
13	The surface water source do not have significant source of threat	It has been corrected as; "The surface water source doesn't have significant source of threat of pollution" Page 14; 1 st Paragraph
14	Construction ratio 30:70 or 50:50?	The cost sharing ratio of 30:70 has been discussed; sub-section 3.12; Page 26

Ministry of Water Supply
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