



नेपाल सरकार
खानेपानी मन्त्रालय
खानेपानी मन्त्रालय
सिंहदरबार, काठमाडौं



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आयोजना व्यावस्थापन कार्यालय
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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 तपसील बमोजिम आयोजनाहरुको परिमार्जित प्रारम्भिक वातावरणीय परीक्षण (IEE) प्रतिवेदन नेपाल सरकार (सचिवस्तर) को मिति २०७६।०९।१६ को निर्णयानुसार स्वीकृत भएको व्यहोरा निर्देशानुसार अनुरोध छ ।

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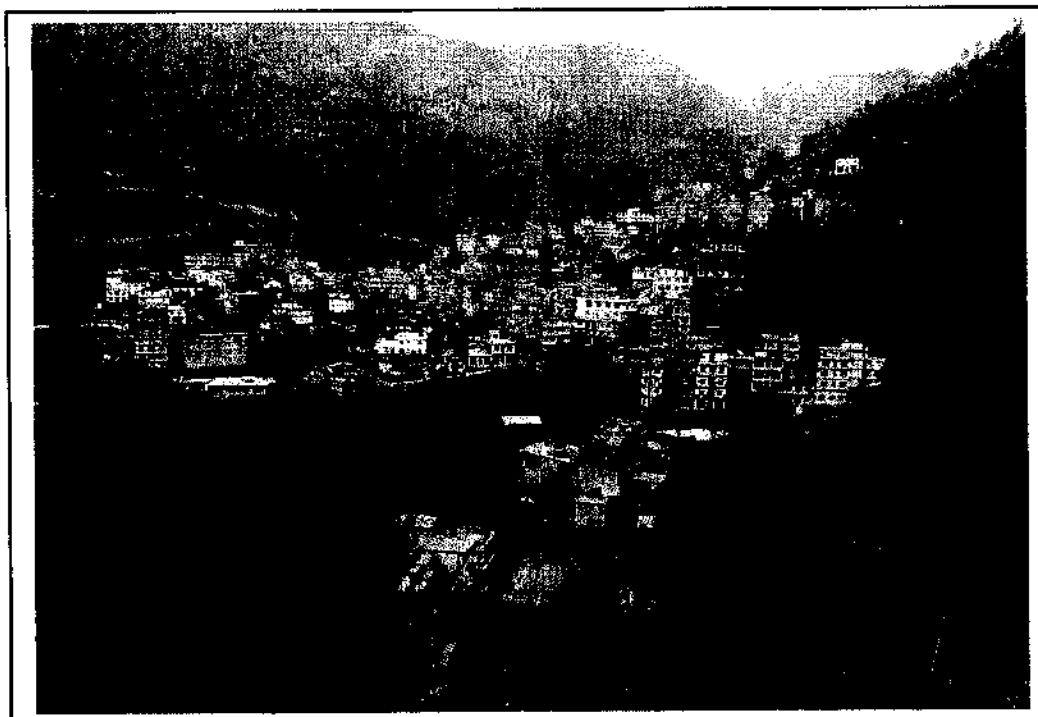
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१५/११/२०७६

"नतिजामुखी प्रशासन:समृद्धि र सुशासन"



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

Initial Environmental Examination (IEE)
of
Liwang Town Water Supply and Sanitation Project
Liwang, Rolpa
Province 5



Submitted To

Ministry of Water Supply
Singhadurbar, Kathmandu



Submitted By

Project Management Office
Urban Water Supply and Sanitation Sector Project
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November 2019

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TABLE OF CONTENTS

कार्यकारी सारांश.....	V
Executive Summary	IX
1. NAME AND ADDRESS OF THE INDIVIDUAL INSTITUTION PREPARING THE REPORT	1
2. SUMMARY OF THE PROPOSAL.....	2
2.1. INTRODUCTION.....	2
2.2. OBJECTIVE OF THE PROPOSAL.....	2
2.3. RELEVANCY OF THE PROPOSAL	2
2.4. RATIONALITY OF IEE	3
2.5. OBJECTIVES OF THE ENVIRONMENTAL STUDY	4
2.6. SCOPE OF THE STUDY	4
3. DESCRIPTION OF THE PROPOSAL.....	5
3.1. TYPE OF PROPOSAL	5
3.2. SALIENT FEATURES OF THE PROPOSAL	5
3.3. LOCATION OF THE PROJECT.....	7
3.4. IMPACT AREA DELINEATION	7
3.5. MATERIALS TO BE USED	9
3.6. ENERGY TO BE USED.....	11
3.7. HUMAN RESOURCES REQUIREMENT.....	11
3.8. METHODS ADOPTED DURING STUDY	11
3.9. ENVIRONMENTAL BASELINE INFORMATION.....	14
3.10. REVIEW OF POLICIES AND LEGISLATION.....	19
3.11. TYPE, CATEGORY, SIZE AND MAGNITUDE OF THE PROJECT	26
3.12. WATER SOURCE AND WATER QUALITY	26
3.13. PROJECT SUB-SYSTEMS AND PROJECT COMPONENTS	28
3.14. PROPOSED SCHEDULE OF IMPLEMENTATION.....	32
3.15. LAND REQUIREMENT	32
3.16. CONSTRUCTION AND OPERATION ACTIVITIES OF THE PROJECT.....	32
4. IMPACTS OF THE IMPLEMENTATION OF THE PROPOSAL ON THE ENVIRONMENT	34
4.1. BENEFICIAL IMPACTS AND AUGMENTATION MEASURES.....	34
4.2. ADVERSE IMPACTS	36
4.3. INDIRECT, INDUCED AND CUMULATIVE IMPACTS	39
4.4. EVALUATION OF THE IMPACTS.....	41
5. ANALYSIS OF ALTERNATIVES WITH AND WITHOUT PROJECT	43
5.1. WITH- AND WITHOUT-SUBPROJECT ALTERNATIVES.....	43
5.2. WITH SUBPROJECT' LOCATION ALTERNATIVE.....	43
5.3. ALTERNATIVES RELATIVE TO PLANNING AND DESIGN	43
6. MITIGATION MEASURES FOR THE ANTICIPATED IMPACTS.....	45
6.1. MITIGATION MEASURES CONSIDERED DURING PRE-CONSTRUCTION PHASE.....	45
6.2. CONSTRUCTION PHASE	46
6.3. OPERATION & MAINTENANCE PHASE.....	49
6.4. IMPLEMENTATION OF MITIGATION MEASURES	49



27/11/2017 Page
Engineer

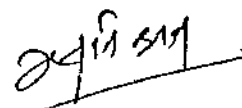
7.	ENVIRONMENT MANAGEMENT PLAN	49
7.1.	ENVIRONMENT MANAGEMENT PLAN AND ITS OBJECTIVE	49
7.2.	ENVIRONMENTAL MONITORING PROGRAM	63
7.3.	INSTITUTIONAL CAPACITY DEVELOPMENT PROGRAM	63
7.4.	STAFFING REQUIREMENT AND BUDGET	65
7.5.	IMPLEMENTATION SCHEDULE	68
7.6.	MONITORING AND REPORTING	69
7.7.	INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION	73
7.8.	GRIEVANCE REDRESS MECHANISM	74
8.	CONCLUSIONS	74
	REFERENCES.....	78

ANNEX

Annex 1:	Approved Terms of Reference
Annex 2:	Checklist, Sample Forms, Formats and Reporting Templates
Annex 3:	Project Location, Service Area and Schematic Layouts
Annex 4:	Public Notice, Muchulka & Recommendation Letter
Annex 5:	Public Consultations
Annex 6:	Survey Questionnaire
Annex 7:	Chlorine Use Guideline
Annex 8:	Water Quality Test Report
Annex 9:	Checklists
Annex 10:	Photographs
Annex 11:	Comments from MoWS, and Comments Incorporation Matrix



Ministry of Water Supply and Sewerage
Urban Water Supply and Sanitation Sector Project
Project Management Office

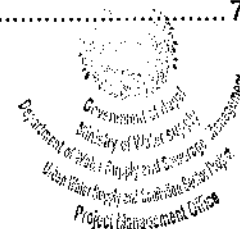

Engineer

List of Tables

Table 1: IEE requirement threshold limits as per EPR 2054, and project conditions.....	3
Table 2: Salient Features of Liwang Town Project.....	5
Table 3: Household and Population in project areas.....	15
Table 4: Distribution of households by occupation.....	16
Table 5: Satisfaction in quality of existing drinking water supply.....	17
Table 6: The Relevant Environmental Policies, Laws and Guidelines of Nepal.....	19
Table 7: Relevant Environmental Quality Standards	24
Table 8: Water Quality Assessment.....	25
Table 9: Transmission Main.....	27
Table 10: Requirement of Reservoir.....	28
Table 11: Settlements Requiring Pumping.....	28
Table 12: Land Requirement for Proposed Project Structures	32
Table 13: Saving in time in terms of economic values	33
Table 14: Evaluation of Potential Environmental Impacts.....	39
Table 15: REA checklist for IEE.....	43
Table 16: Environmental Management Plan (EMP) Matrix.....	51
Table 17: Environmental Monitoring Program.....	61
Table 18: Environmental Monitoring Cost.....	63
Table 19: Training Program for Environmental Management.....	64
Table 20: Indicative Cost of EMP Implementation.....	65
Table 21: Environmental Management Implementation Schedule.....	68
Table 22: List of People and Institutions Consulted	70

List of Figures

Figure 1-A: Project Area.....	8
Figure 1-B: Core Area and Surrounding Area along with Project Components.....	9
Figure 1-C: Core Area and Surrounding Area along with Project Components.....	10
Figure 2: Schematic Diagram of Proposed Treatment Process, Liwang, Rolpa.....	27
Figure 3: Grievance Redress Mechanism	76



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ACRONYMS AND ABBREVIATIONS

ADB	Asian Development Bank
amsl	above mean sea level
BDA	Building Design Authority
C	Celsius/centigrade
CBS	Central Bureau of Statistics
Cum.	Cubic Meters
dba	Decibel audible
DCC	District Coordination Committee
DI	Duct Iron
DSMC	Design, Supervision and Management Consultant
DWSSM	Department of Water Supply and Sewerage Management
EARF	Environmental Assessment Review Framework
EIA	Environmental Impact Assessment
EMAP	Environmental Mitigation Action Plan
EMP	Environmental Management Plan
EPA	Environment Protection Act
EPR	Environment Protection Rules
ESS	Environmental Safeguard Specialist
GI	Galvanized Iron
GoN	Government of Nepal
GRM	Grievance Redress Mechanism
HDPE	High Density Poly Ethylene
Ha	Hectare
HH	Household
ICG	Implementation Core Group
IEE	Initial Environmental Examination
Km	Kilometers
Lps	Liters per second
M	Meter/s
MoFE	Ministry of Forests and Environment
MoWS	Ministry of Water Supply
NDWQS	National Drinking Water Quality Standard
OBA	Output Based Aid
ODF	Open Defecation Free
PMO	Project Management Office
PMQAC	Project Management and Quality Assurance Consultant
RCC	Reinforced Cement Concrete
REA	Rapid Environmental Assessment
SDG	Sustainable Development Goal
SEMP	Site Specific Environmental Management Plan
SPS	Safeguards Policy Statement
TDF	Town Development Fund
ToR	Terms of Reference
TSTWSSSP	Third Small Towns Water Supply and Sanitation Sector Project
UWSSP	Urban Water Supply and Sanitation Sector Project
WUSC	Water User and Sanitation Committee
ZoI	Zone of Influence



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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 रोल्पा जिल्लाको रोल्पा नगरपालिकाको वडा नं. १, २ र ४ का बासिन्दा लाभान्वित रहनेछन् ।

वातावरणीय अध्ययनको उद्देश्य

यस प्रारम्भिक वातावरणीय परिक्षणको मूल उद्देश्य भनेको यस आयोजनाका कार्यहरूबाट वातावरणमा पर्न सक्ने नकारात्मक असरहरूको पहिचान गरी ती असरहरूलाई न्यून गर्नु, निर्मुल गर्नु वा ऐनको स्वीकार्य सिमामा ल्याउन आवश्यक र उपयोगी उपाय तथा सुभावहरू योजनाबद्ध रूपमा तयार पार्नु हो ।

बर्गीकरण

नेपाल राष्ट्रको प्रचलित कानून, नियम तथा एशियाली विकास बैंकको निती अनुसार कुनै पनि विकासको योजना तथा निर्णय निर्माण प्रक्रियामा वातावरणीय असरहरू बारे ध्यान पुर्‍याउनु पर्ने हुन्छ । नेपाल सरकारको कानूनी प्रक्रिया अनुसार यो प्रस्तावित आयोजनाले वातावरण संरक्षण नियमावली, २०५४ को पालना गर्नुपर्ने हुन्छ । प्रस्तावित प्रारम्भिक वातावरणीय परिक्षण, वातावरण संरक्षण नियमावलीको अनुसूची १ अन्तर्गत दफा-ए अनुसार गरिएको छ । त्यसै गरी एशियाली विकास बैंकको सुरक्षण नीति कथन (जुन २००९) अनुसार यो आयोजना श्रेणी “बी” मा पर्दछ र एशियाली विकास बैंकको निर्देशिका अनुसार समेत यो प्रारम्भिक वातावरणीय परिक्षण गरिएको छ ।

अध्ययन विधी

खानेपानी तथा सरसफाई मन्त्रालयद्वारा स्वीकृत कार्यक्षेत्र (टी.ओ.आर.) का आधारमा यो प्रतिवेदन तयार गरिएको छ । यस अध्ययनले वातावरण संरक्षण ऐन (२०५३) तथा वातावरण संरक्षण नियमावली (२०५४), र साथ साथै एशियाली विकास बैंकको सुरक्षण नीति कथन (जुन २००९) का प्रावधान तथा व्याख्याहरूको पालना गरेको छ । यस अध्ययनका सिलसिलामा प्रतिवेदन अध्ययन, फिल्ड अध्ययन, संकलित तथ्यहरूको विश्लेषण तथा सूचना संप्रेषण तथा सार्वजनिक सहभागिताका क्रियाकलापहरू गरिएका छन् । भौतिक वातावरणीय अवयवहरू, जैविक वातावरणका पक्षहरू तथा सामाजिक-आर्थिक अवस्थाहरूको अध्ययन गरी स्थानीय सरोकारवालाहरूसित आयोजना कार्यान्वयन गर्दा हुन सक्ने प्रभावहरूका बारेमा छलफल गरिएको छ ।

आयोजनाका मुख्य संरचनाहरू

यस आयोजनाका दुईवटा कम्पोनेन्टहरू छन्: खानेपानी वितरण र सरसफाई । खानेपानीका लागि सतही जलस्रोतका रूपमा रिम खोला, मूलपानी, सत्तले र मूलखोलाको पानी उपयोग हुनेछ । खानेपानी प्रणाली अन्तर्गत पानीको मूहान निर्माण, पानीको इन्टेक निर्माण गर्ने, प्रसोधन प्रणाली, पानी भण्डारण ट्याङ्की निर्माण, वितरण प्रणालीको निर्माण, पाइप विछ्याउने कार्य, घरधारा जडान एवम् कार्यालय भवन

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निर्माणका कार्यहरु हुनेछन् । दोस्रो पाटोमा सरसफाई कार्यक्रम छ, जस अन्तर्गत अति विपन्न घरधुरीहरु तथा सार्वजनिक शौचालयको निर्माण प्रस्ताव गरिएको छ ।

वातावरणको वर्णन

यस आयोजनाको सिमा क्षेत्र रोल्पा जिल्लाको सदरमुकाम लिवाङ रहेको छ । आयोजना क्षेत्र समुन्द्री सतहबाट १३००-१५०० मिटरको उचाईमा रहेको छ । आयोजना क्षेत्र मध्य पहाडी भेगमा पर्दछ । आयोजना क्षेत्रको भू-उपयोगमा खेतीबारी, बन, बजार सहितका आवासिय बस्तीहरु तथा खुला स्थानहरु प्रमुख रुपमा देखिन्छन् । मेवाङ सामुदायिक बन र गोर्बान बन आयोजना क्षेत्रका प्रमुख बन क्षेत्रहरु हुन् । आयोजना क्षेत्रमा जुके खोला, चाक्ले पाताल खोला, दुङ्गे-बिसौनी खोला र ओखेनी खोलाहरु पनि छन् । आयोजना क्षेत्र भित्र कुनैपनि किसिमका संरक्षित क्षेत्रहरु छैनन् । आयोजना क्षेत्रमा बजार क्षेत्रहरु पनि पर्दछन् जुन बढ्दो क्रममा देखिन्छन् ।

लिवाङ एक शहरोन्मुख बस्ती हो जहाँ आर्थिक कारोबार बढ्दो क्रममा छन् । आयोजना क्षेत्रका घरधुरीको औसत मासिक आय करिब रु २२,४७८ रहेको छ । बाहिरका बस्तीहरुबाट बसाई सरी आएका बासिन्दाहरु तथा भाडामा बस्ने मानिसहरुको बढ्दो जनसंख्याका कारण आयोजना क्षेत्रको जनसंख्या बृद्धि उल्लेखनीय रहेको देखिन्छ । विद्यमान खानेपानी प्रणालीको क्षमता नपुग देखिन्छ र हाल १६.३८ प्रतिशत घरधुरी मात्रै खानेपानी गुणस्तरबाट सन्तुष्ट छन् । केही घरहरुमा अझै पनि व्यवस्थित चर्पी बनाउन बाँकी रहेको छ । बजार क्षेत्रमा केवल एउटा सार्वजनिक शौचालय रहेको पाइयो ।

वातावरणीय प्रभाव, वातावरणीय व्यवस्थापन तथा अनुगमन

यस आयोजनाको कार्यान्वयनले कुनै खासै उल्लेखनीय नकारात्मक वातावरणीय प्रभाव पर्ने देखिदैन र संभावित नकारात्मक प्रभावहरु पनि स्थानीय र सजिलै सँग निराकरण गर्न सकिने प्रकारका रहेका छन् । खानेपानी वितरण प्रणालीका मुख्य वातावरणीय मुद्दा निर्माणसंग सम्बन्धित क्रियाकलाप जस्तै इन्टेक निर्माण, प्रशोधन इकाई निर्माण, पानीको ट्याङ्क निर्माण र पाइप लाइन बिछ्याउँदा भीड तथा सडकको सतह खुकुलो हुदा हुने भूक्षय हुन सक्ने जस्ता प्रभावहरु रहेका छन् । तिनको नकारात्मक प्रभाव न्यूनीकरण गर्न सावधानीका उपायहरु वातावरणीय व्यवस्थापन योजनामा उल्लेख गरिएका छन् ।

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 । प्रशोधन इकाई, भण्डारण ट्याङ्की र पानी सुद्धिकरण प्रणाली निर्माण गर्नको लागि आवश्यक पर्ने जग्गा उपभोक्ता समितिले समयमै हाशील गर्नेछ । छोटो समयको लागि हावा, पानी तथा ध्वनी प्रदूषण हुन सक्ने देखिन्छ । त्यसै गरी कामदारहरुको सुरक्षा पनि एउटा चासोको विषयको रुपमा हेरिएको छ । समग्र रुपमा हेर्दा प्रस्तावित आयोजनाबाट सो क्षेत्रका जैवीक, भौतिक, आर्थिक, सामाजिक तथा सामाजिक वातावरणमा कुनै गहन प्रभावको सम्भावना निकै कम देखिन्छ ।

वातावरणीय व्यवस्थापन योजना अन्तर्गतका अन्य महत्वपूर्ण केही कार्यहरु मध्ये रेउघा उपल्लो गाउँ र थलिवाङ साईटमा भूक्षय नियन्त्रणका कार्य, हरियाली प्रवर्धन; कुनै पनि क्षति भएका निजी वा सार्वजनिक संरचनालाई पहिलेकै उचित अवस्थामा पुनर्स्थापना गर्ने र सो विषयमा पाईपलाईनको काम गर्दा लिवाङ बजार तथा रेउघा बजार क्षेत्रमा विशेष ध्यान दिनुपर्ने; वडा नं. ४ मा नगरपालिकाको नजिकै रहेको



[Signature]
Engineer

खुल्ला सार्वजनिक स्थलमा निर्माण सामग्रीको भण्डारण गर्न प्रस्तावित निर्धारित स्थानमा मात्रै संचय गर्ने, तथा स्थानीय सरोकारवालाहरु सित समन्वय गरी वातावरणीय संरक्षणका विषयमा जनचेतनामूलक कार्यक्रमहरु संचालन गर्ने जस्ता कार्यहरु रहेका छन् ।

प्रारम्भिक वातावरणीय परिक्षण प्रतिवेदनको एउटा मुख्य अंशको रूपमा वातावरणीय व्यवस्थापन योजना बनाईएको छ, जसमा निम्न कुराहरु समेटिएका छन् : क) आयोजना कार्यान्वयन चरणमा पर्न सक्ने वातावरणीय प्रभाव न्यूनीकरणका उपायहरु पत्ता लगाउने, 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 एवम् संसोधन गरेर धेरै जसो वातावरणीय नकारात्मक असरहरुलाई न्यूनीकरण गरिएको छ । वातावरणीय व्यवस्थापन योजना कार्यान्वयनका लागि रु १२,००,००० विनियोजन गरिएको छ । वातावरणीय व्यवस्थापन योजनालाई निर्माण कार्यको ठेक्का सम्झौताको एउटा अंशको रूपमा राखिएको छ । नकारात्मक प्रभाव न्यूनीकरणको कार्यान्वयन राम्रो संग भएको वा नभएको जाँच गर्न अनुगमन गर्नु जरुरी छ । त्यसैले निर्माण र संचालन अवधिमा हुने क्रियाकलापहरुलाई समेटेर एउटा बिस्तृत अनुगमन कार्यक्रम तयार पारिएको छ । आयोजना शुरु गर्नु अगाडि आयोजना व्यवस्थापन कार्यालयले नकारात्मक प्रभाव न्यूनीकरणका उपायहरुको कार्यान्वयन गर्नका लागि कार्य योजना र वातावरणीय योजना अनुसारको अनुगमन योजना बनाइने छ । सो योजना निर्माण र संचालन कार्यको ठेक्का संगै संलग्न गरिनेछ ।

यस आयोजनाबाट स्थानीय जनताहरुले प्रसस्त सकारात्मक फाईदा प्राप्त गर्नेछन्, जसमध्येका मुख्य फाईदाहरु 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) लिवाङ शहरका बासिन्दाहरुको जीवनस्तरमा सुधार आउनु ।

स्थानीय सहभागिता, सूचना सम्प्रेषण र गुनासो सम्बोधन

प्रारम्भिक वातावरणीय परिक्षणको प्रतिवेदन लेखनका क्रममा समुदायसंग व्यापक छलफल गरिएको छ । मिति २०७५ जेठ ४ गतेका दिन अन्नपूर्ण राष्ट्रिय दैनिकमा प्रारम्भिक वातावरणीय परिक्षणका लागि स्थानीय सरोकारवालाहरु बाट राय सुझाव पेश गर्ने सम्बन्धमा १५ दिने सार्वजनिक सूचना जारी गरियो । उक्त सूचना विभिन्न कार्यालय तथा स्थानहरुमा टाँस गरी सोको मुचुल्का गरियो । स्थानीय निकाय तथा सरोकारवालाहरुको उपस्थितिमा यस आयोजनाका बारेमा र प्रतिवेदनमा उल्लेख गरिएका वातावरणीय पक्षहरुका बारेमा जानकारी तथा छलफल पनि गरिएको छ । यस्ता छलफलहरु लाई पुरै आयोजना निर्माण तथा संचालनका चरणसम्म निरन्तरता दिइनेछ । त्यसै गरी नगरपालिकाबाट यस अध्ययन अनुसार आयोजना निर्माणका लागि सिफारिस पत्र पनि लिइएको छ । यस आयोजनाका कार्यहरु सित सम्बन्धित गुनासो भएका कुनै पनि व्यक्तिले यस आयोजनामा सम्पर्क गर्न सक्नेछ । उपभोक्ता समितिले गुनासो प्राप्त भएको समयदेखि २४ घण्टाभित्र सो गुनासोको लिखित अभिलेख राखिनेछ । समुदायका कुनैपनि गुनासाहरुलाई तुरुन्तै सम्बोधन गर्ने हेतुले प्रारम्भिक वातावरणीय प्रतिवेदनमा गुनासो सम्बोधन प्रक्रिया विस्तृत रूपमा वर्णन गरिएको छ ।



Signature
vii / Page
Engineer

निष्कर्ष

यस आयोजना बाट स्थानीय बासिन्दाहरूले चौविंसै घण्टा सुरक्षित खानेपानी पाउनेछन् र सरसफाईको अवस्थामा सुधार हुनेछ जसले गर्दा आयोजना क्षेत्रका बासिन्दाहरूको जीवन स्तरमा सुधार आउनेछ । यस आयोजनाको प्रकृति, आयोजना क्षेत्रको वातावरण एवम् आर्थिक सामाजिक अवस्था र स्थलगत निरिक्षण एवम् सरोकारवाला संगको सरसल्लाहलाई मध्यनजर गर्दा यस आयोजनाबाट आयोजना क्षेत्रमा न्यून नकारात्मक वातावरणीय असर पर्ने देखिन्छ । संभावित प्रभावहरु धेरै जसो स्थानीय प्रकारका छन् र सुझाइएका प्रभाव न्यूनीकरणका उपयुक्त उपाय कार्यान्वयन गरिएमा र नियमित अनुगमन गरिएमा यी प्रभावहरूलाई संजिलै एवम् कम खर्चमा न्यूनीकरण गर्न सकिनेछ । यस आयोजना कार्यान्वयनका लागि प्रारम्भिक वातावरणीय परिक्षण मात्रै गरे पुग्ने देखिन्छ ।



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EXECUTIVE SUMMARY

Background

The Project Management Office (PMO) of Department of Water Supply and Sewerage Management (DWSSM) is the proponent of this project. The project is a part of the Urban Water Supply and Sanitation Sector Project (UWSSP) of the Government of Nepal which aims to construct/extend drinking water supply systems, drainage and sanitation facilities as well as provide sanitary health education to the community in the small urban towns of the country. The project embraces the community managed demand responsive approach and is being implemented under ADB finance. The proposed project will benefit wards 1, 2 & 4 of Rolpa Municipality of Rolpa district.

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.

Law of Nepal, and ADB Policy, both require that the environmental implications of individual developments are taken into account in the planning and decision making process. The statutory requirement of the Government of Nepal, that has to be adhered to for the proposed project, is the Environment Protection Act, 1997 and Environment Protection Rules, 1997 (and amendments). The present IEE study fulfils the requirements pertaining to Rule 3 of EPR 1997.

Categorization

The proposed project needs IEE study as per Clause H of Schedule 1 of EPR, 1997 (including amendments). Similarly, as per ADB Safeguard Policy Statement (SPS) 2009, the project is classified as Category B for environment and IEE is required as per the checklist suggested by ADB.

Methodology Adopted

This Initial Environmental Examination report has been prepared based on the Terms of Reference (ToR) approved by the Ministry of Water Supply, Government of Nepal. 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 (i) Desk Study, (ii) Field Work, (iii) Data Processing, and (iv) Consultation and Information Dissemination. Physical environmental aspects, biological aspects and detailed socio-economic aspects were examined carefully and discussed with the stakeholders, especially in the Core Area. Surrounding Area was also defined and observed.

Components of the project

The project comprises of two major components; Water supply and Sanitation. Rimkhola, Mulpani, Sattale & Mulkhola will be used as water sources. The system also consists of water treatment facilities and ground reservoirs from where water will be distributed through distribution pipelines. The second component is sanitation services. Under this component, promotion of household toilets for ultra poor families, and construction of a public toilet has been proposed.



24/11/2017 ix
Engineer

Description of the Environment

The project area, Liwang, is the district headquarters of Rolpa district. The altitude of the project area varies from 1300 m to 1500 m above the sea level in the mid hill region. The geology of the area shows that the area consists of shallow marine sediments, phyllite, sandstone with quartzite and calcareous sandstone. It has stromatolitic limestone and black slates. Agricultural land, forest area, settlements with market centers, and open public land are the major land forms in the project area. Mewang Community Forest and Gorban Forest are among the major forests in the project area. The project sites have relatively stable landforms. There are no protected areas in or near the project area.

Liwang is a rapidly urbanizing town and the commercial activities are increasing. The household average monthly income of the service area is estimated as Rs. 22,478 (Survey, 2016). In-migration rate and increase of rental population has resulted to high population growth. The existing water supply system has been unable to serve growing population. The present water supply situation is not satisfactory. Only 16.38 percent of the households are satisfied with the quality of drinking water supplied. Regarding the health and sanitation condition, most of the households have toilet facility. The town has been declared Open Defecation Free zone in Jestha 2072 BS. The project area has core market and settlement area. There is one public toilet in the project area.

Environmental impacts, mitigation and monitoring

No remarkable significant adverse environmental impacts have been predicted and the anticipated negative impacts are of local in nature and low in magnitude. The main activities that may cause environmental concerns are construction activities such as intake works, reservoir and treatment plant construction, and laying of transmission mains and distribution lines. Concerns like degradation of land surface and unsettling of street surfaces due to excavation and trenches are there.

The mitigation measures are precautionary types such as proper and timely back filling of the excavated trenches and avoiding cutting of vegetation. The main issues related to the sanitation component are during the operational phase such as nuisance due to increased sewer sludge. The mitigation measures are related to the periodic maintenance, cleaning and safe disposal of sludge. The land required for major structures have been acquired by the user committee and no households or community have been displaced or resettled. Temporary impacts on ambient air, water and noise levels are expected. Occupational health and safety remains a concern in the work fronts. In overall, there are very limited adverse impacts on the biological and socio-economic environment of the project area. Total of NRs 1,200,000 has been allocated for implementation of activities under EMP of this project.

Some of the major environmental mitigations proposed include slope protection works at sites of Reeugha Upallo Gaun and Thaliwang; reinstatement of any damaged public or private property to acceptable state and special considerations in Liwang market and Reeugha market areas; proper stockpiling in the proposed site near municipality office at ward number 4; and conducting environmental awareness activities in coordination with local stakeholders.



24/11/2017
Engineer

A detailed monitoring schedule has been designed specifying the regular and periodic monitoring activities during the project construction and operation phase. Before the operation of the project, PMO will develop detailed work plan for implementing mitigation measures and monitoring plans based on Environmental Management Plan which will be incorporated into the construction and operation contracts.

There are many beneficial impacts of the project. The major ones are; (i) Improved Access of safe water for all the households of the project area, (ii) Employment increase along with skill enhancement of the local people, and (iii) Improvement in quality of life of the people of the project area.

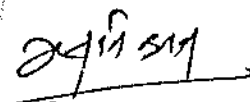
Public Participation, Information Disclosure, and Grievance Redress Mechanism

Local communities were informed and consulted during the field study period. A 15 days' public notice was published in the national daily newspaper (Annapurna Post, 18th May, 2018) seeking written opinions from concerned local bodies, schools, and concerned local organizations and 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 (*muchulka*) was collected. A public consultation was conducted and opinions, concerns and suggestions of the local stakeholders were gathered through a consultation process. Public consultation will be a continuous process during the project development and implementation phases. A recommendation letter was obtained from municipality regarding the conduction of IEE study and implementation of the project. A Grievance Redress Committee (GRC) will be formed at Municipality level. Any person with a grievance related to the project works can contact the project to file a complaint. The WUSC will document the complaint within 24 hours of receipt of complaint in the field. Grievance addressing process and timelines for different levels of interventions required are detailed under the mechanism.

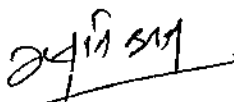
Conclusion

The project will bring overall improvement in quality of life of the people of the project area. However, considering the nature of the project; environmental situations of the area and based on the detailed field survey and consultation with the relevant stakeholders, it can be concluded that the project benefits outweigh the risks and these potential risks can be overcome through the proposed mitigation measures and its monitoring. The impacts are mostly local in nature and can be easily mitigated with low cost mitigation measures. Hence IEE is sufficient for the project, and classification of the subproject as Category "B" is confirmed. No further special study or detailed Environmental Impact Assessment (EIA) is needed to be undertaken.




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1. NAME AND ADDRESS OF THE INDIVIDUAL INSTITUTION PREPARING THE REPORT

The name of the proposal is 'Initial Environmental Examination (IEE) of Liwang Urban Water Supply and Sanitation Project'. It lies in Rolpa District of Province 5 of Nepal.

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;

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



24/11/2011
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2. SUMMARY OF THE PROPOSAL

2.1. Introduction

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 Project

Liwang is a growing small town with dense settlement pattern in core project service area. It is the main market center of Rolpa district. The existing Liwang Water Supply System was constructed under the then DWSSM in 2047 BS (1990 AD). Although this piped water supply services is available, its design limits have been exhausted and there is a demand for its rehabilitation and extension in terms of water quality. Hence, 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.

2.3. Relevancy of the Proposal

The scheme covers the part of the municipality where water is distributed through 390 private and community taps. But the demand is increasing and the supply is insufficient. This gap will grow in near future as Liwang is one of the growing small towns with dense settlement pattern in core project service area and the economy is basically commercial based. It is main market center of the Rolpa district. The project district has number of historical and archaeological sites. Therefore, the project area is potential for tourism in mid-western region.

The existing water consumption scenario indicates that on average only 46 and 41 liter per capita per day of water being consumed in rainy and dry season respectively. Around 60 percent of the households still use other water sources like springs, stream, river and ponds.

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Furthermore, more than 75.85 percent of the beneficiaries feel the quality of supplied water either moderate or unsatisfactory.

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. Considering the present service level, water demand, water quality and condition of existing system, there is need for a water supply to upgrade the existing water supply situation in order to meet growing water demand in the service area.

2.4. Rationality of IEE

The project needs to be studied from the environmental point of view as per EPA 1997 and EPR 1997 (and its amendments). The proposed water supply and sanitation project is an extension and rehabilitation of the existing scheme which is primarily meant to distribute water to market area. The project does not involve construction of any tunnels; relocation and resettling people or households, and construction of river training works.

The proposed project is classified as environment Category B project as per the ADB's Safeguard Policy Statement (SPS) 2009 and an Initial Environmental Examination (IEE) has to be carried out.

Table 1 compares the status of the project with regards to the conditions defined by Environment Protection Rules 1997 (and its amendments 2007) for which a drinking water would require IEE;

Table 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, Sub-clause 8	Supply of water to a population of	5,000 to 50,000	The design population is 10,819 in 2038

The design year population of the project is 10,816. 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.

The studies have been conducted as per the ToR for IEE of Liwang 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.



[Signature]
3 | Page
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2.5. Objectives of the Environmental Study

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 develop plan for 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 subproject proposed for Liwang Small Town Water Supply and Sanitation Project of Rolpa Municipality of Rolpa district. It discusses the environmental impacts and mitigation measures 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 2053 BS (1997AD) 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 approved ToR of Liwang Urban Water Supply and Sanitation Project which has been approved by MoWS on 2075/01/26 BS. 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 developing water supply and sanitation infrastructures in the areas were assessed and the Initial Environmental Examination (IEE) Report and Environmental Monitoring Plans 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 were the range of activities of this IEE study.



3. DESCRIPTION OF THE PROPOSAL

3.1. Type of Proposal

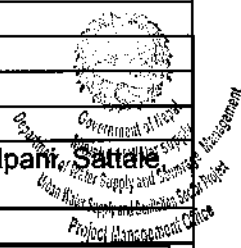
Liwang Urban Water Supply and Sanitation Project is a basic infrastructure development project with motive of gender strengthening in the long run. The project has been conceptualized as surface water based water supply system integrated with sanitation improvement in the project area. The focus of outputs is on water and sanitation status improvement in household level under a community owned water supply system management approach.

3.2. Salient Features of the Proposal

The salient features of Liwang Urban Water Supply and Sanitation Project have been tabulated in the table below;

Table 2: Salient Features of Liwang Town Project

1	Name of the Project	Urban Water Supply & Sanitation Sector Project, Liwang Urban Water Supply and Sanitation Project, Liwang - Rolpa		
2	Type	Pumping and Gravity type using spring water as source		
3	Study Level	Detailed Engineering Design Report		
4	Location Area			
	Province	Province 5		
	District	Rolpa		
	Municipality	Rolpa Municipality Previously Liwang Municipality		
	Wards	Wards 1, 2 & 4 (Previous wards 5, 6, 7, 8)		
5	Available Facilities			
	Road	Rapti Highway (connected to East-west highway in Bhaluwang)		
	Nearest Airport	Wadachour, Rolpa		
	Existing Water Supply System	Partially covered by piped water supply system, springs are used.		
	Electricity	Available		
	Communication	Available		
	Health Services	Available		
	Banking Facilities	Available		
6	Source Characteristics			
	Source Name and Type	All Spring Sources : Mulkhola, Mulpani, Sattale, Rim khola		
	Source Location	Wards # 1, 2 & 4		
	Proposed Tapping yield (lps)	SN	Sources	Proposed Tapping (lps)
		1	Mulkhola	8.31
		2	Mulpani	4.03
		3	Sattale	6.67
		4	Rimkhola	3.08
		Total		22.09



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Sl. No.	Items	Unit/Details
7	Project Components	
	Storage Reservoirs	Multiple distribution system is adopted, 8 distribution reservoirs ranging from 15 Cum to 140 Cum (Total capacity is 545 Cum)
	Valve Chamber (Nos.)	Type 1 (1500x900x1000): 16 # Type 2 (900 x900x1000): 198 #
	Community Stand Posts	Nil
	Designed Household connection	1,931
	Household Connection (Nos.)	1,060 (during construction phase)
	Water Supply	24 hour supply of potable water as per NDWQS
	Total Length of pipe (Km)	Transmission: 10.071 km Distribution Networks: 48.120 km
	Treatment Unit	Pressure Filter and Disinfection
	Fire hydrants	10 numbers
	WUSC Office building	1 (2.5 stories; 170 sq. m.)
	Public Toilet	1 (capacity of 100 users/day)
8	Social Status	
	Survey Year Population (2016)	5,809 (permanent), 181 (floating) [Total 5,990]
	Base Year Population (2019)	6,271 (permanent), 195 (floating) [Total 6,466]
	Design Year Population (2039)	10,487 (permanent), 332(floating) [Total 10,819]
	Household Numbers (2016, 2019, 2039)	1,060 in year 2016, 1,144 in year 2019, and 1931 in year 2039
	Average Family Sizes	5.48
	Adopted Growth Rate	3.0 (high), 2.50 (medium), 2.20(low medium)
9	Total Water Demand	
	Base Year 2019	Total 1,116.73 (m ³ /day) [12.9 lps]
	Design year 2039	Total 1902.28 (m ³ /day) [22.0 lps]
10	Total Cost of the Project (NRs.)	350.4056 million with 15% contingencies & 13% VAT
	Water Supply Sector	NRs 343.5383 million
	Sanitation Sector	NRs 6.8673 million
11	Cost Sharing Arrangement for water supply component (NRs)	NRs 343.5383 million
	1) GoN Grant @ 70%	Rs 240.4768 million
	2) WUSC Contribution	
	a) upfront cash contribution @ 5%	Rs 17.1769 million
	b) Loan through TDF @ 25%	Rs 85.8846 million
12	Cost Sharing Arrangement for Sanitation Component (NRs)	6.8673 million
	1) GoN / ADB Grant @ 85%	Rs 5.8327 million
	2) Local Body (WUSC, VDC & others) 15%	Rs 1.0301 million
13	Per capita Investment (for water supply sector Including floating population) NRs	a) Base Year : 53,129.95 b) Design Year : 31,753.24
14	Project Status	Detailed Engineering Design Stage



24/11/2019
Engineer

3.3. Location of the Project

The project area is located in the south-western midhill portion of the country. The location of the project area is 28°18' North 82°38' East. The project town is surrounded by Gajul and Mishri settlements in the East, Jankot and Kotgad in the West, Dhawang and Homa in the West and Jedwang in the South. All-weather road is connected to the town from Bhaluwang, a small business centre located at East-West Highway.

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 and google map. Depending upon the nature and extent of the expected impact area, the Zone of Influence (Zoi) was categorized into Core Area (CA) and Surrounding Area (SA).

(a) Core Area (CA)

The areas directly affected by the project activities are demarcated as Core Area (CA). Core Area of this project is its service area. This lies within the wards 1, 2 & 4 (Previous wards 3, 4 & 8 are under new ward number 1; similarly previous ward 5 & 6 are under new ward number 2; and previous wards 7 & 9 are under new ward number 4).

(b) Surrounding Area (SA)

The area around the CA 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 area that lies within the distance of 200 m periphery from the boundary of CA is delineated as Surrounding Area.



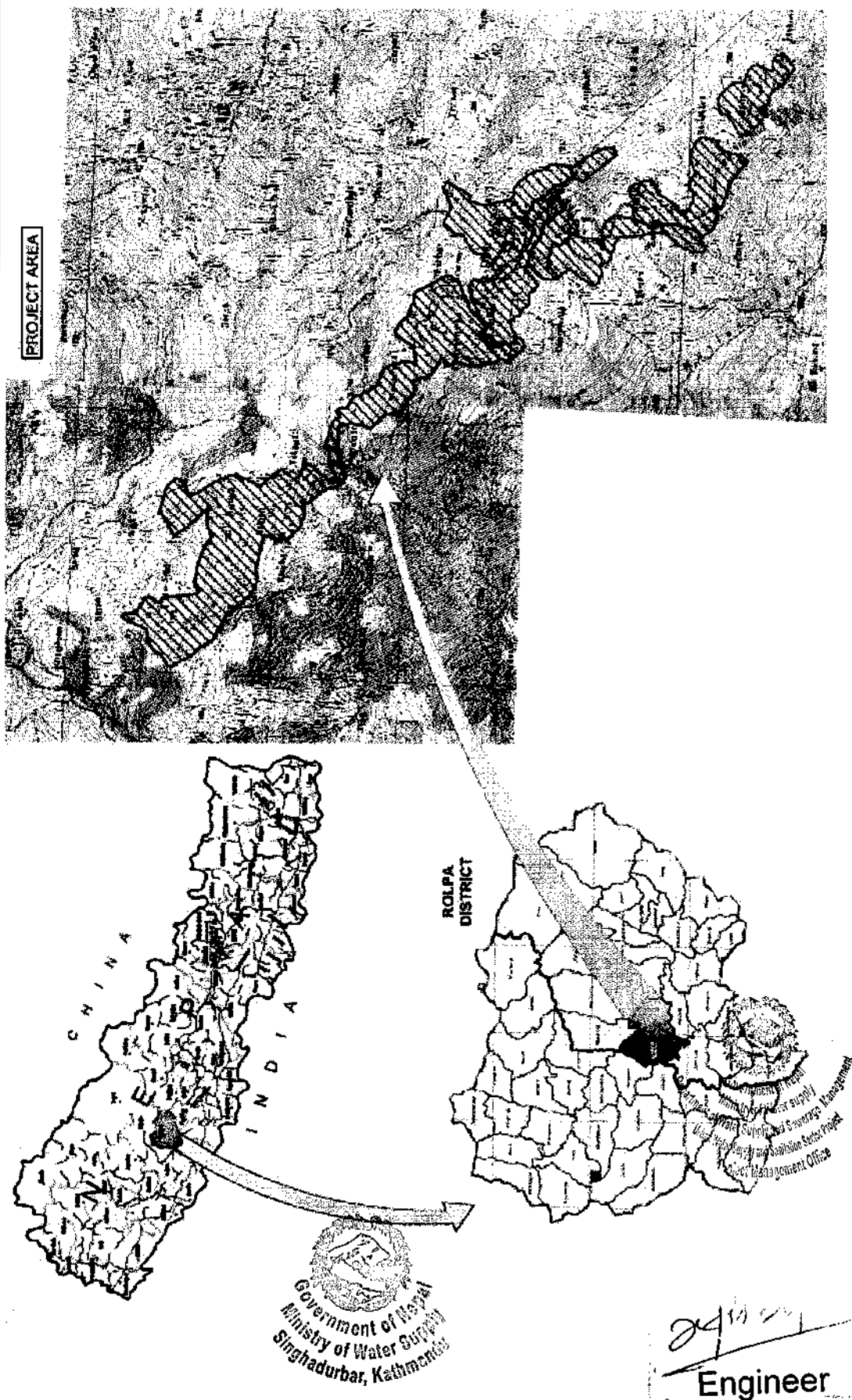


Figure 1-A: Project Area



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Figure 1-C: Core Area and Surrounding Area along with Project Components

3.8.4 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 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 project area, it is referred as site specific (Ss), if it occurs outside area but close to project area, the extent of impact is local (Lc), if it occurs far away from the 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

3.8.5 Consultation and Information Dissemination

Public consultation and information dissemination process was carried out 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 conducting meetings with district officials, concerned departments, institutions and NGOs; key-informant consultations, and meetings with community members within the project area. A 15 days public notice was published (18th May 2018, *Arthik Abhiyan*) in a national daily newspaper 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 and other public areas in the project area and the deed of inquiry was collected. Public consultation was conducted on 4th June, 2019 in the meeting hall of the municipality, and a recommendation letter was received from the municipality regarding conduction of IEE and implementation of the project. The final IEE report, after incorporating the comments from the concerned department and ADB, will be made available in their respective websites and will be made available to anyone interested upon request.



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3.9. Environmental Baseline Information

3.9.1 Physical Environment

3.9.1.1 Topography and Geology

The project area has an elevated landform with scattered settlements. The hilly topography is of significant altitudinal variations. Although the elevation is towards south-west, the landforms are separated by ridges and surface water flows of small size. Terraced land, elevated land and forest covered slopes are major land features. The altitude of the project area is varying from 1,300 m to 1,500 m above the sea level. Geologically the rocks exposed of Liwang are of Precambrian to lower Paleozoic consists of shallow sediments, phyllite, sandstone with quartzite and calcareous sandstone. It has stromatolitic limestone and black slates.

3.9.1.2 Land Use

The major land use is for agricultural purpose. The service area has market areas, and the markets are expanding. The market area has grid pattern roads. No planned land use has been observed. No specific area has been designated for industries. There are a few small scale industries as well. In Liwang, agriculture is the main occupation where the main product being paddy, maize and wheat. Cash crops like potatoes, green vegetables and spices are also widely cultivated. Horticulture and livestock raising including poultry is practiced but not in a commercial scale. Project area has around 5% forest area cover, around 2.5% water bodies, around 20% to 25% residential areas, and around 60% to 65% agricultural land and remaining land is unused/barren land.

3.9.1.3 Climate

The project area has sub-tropical climate. The annual average temperature is 18°C. The average annual rainfall is 1580 mm. Almost 80% of rainfall occurs during monsoon (June to September). The altitude of the project area varies from 1,300 m - 1,500 m (amsl).

3.9.1.4 Air Quality

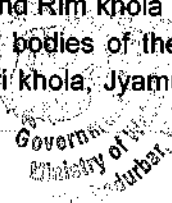
The air quality of the area can be considered to be fair. However, the topography of the area also facilitates for free air circulation. Vehicular movement is regular. Hence, emission from vehicles is the major source of air pollution. No major point sources of air pollution are present in the project area.

3.9.1.5 Noise level

Certain levels of noise ranging from normal environment to noisy environment were recorded in the core-market area where main buspark is located. Instantaneous noise levels were recorded during day time. The value was recorded 59 dBA in average in residential areas and 71 dBA in the buspark area. Besides vehicular noise, no such significant noise is experienced.

3.9.1.6 Surface Water

Mul khola, Mulpani, Sattale and Rim khola are the surface water sources that are proposed for tapping. Other surface water bodies of the project area are Juke khola, Chakle Patal khola, Dhunge Bisauni khola, Lahari khola, Jyamure khola and Okhrene khola. Washing and bathing



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activities, and disposal of waste into water bodies are the sources of pollution of surface water sources in core areas. Water samples will be tested to monitor the water quality of project area.

3.9.2 Biological Environment

Forests, bush land, grass land and the riverine water bodies are the primary habitat sites for the flora and fauna in the project area. Mewang Community Forest and Gorban Forest are the major forests of the project area. The agricultural area and settlements also provide habitats to fauna accustomed with the human settlements only. Most of the floral species in the agricultural lands are exotic species with limited local flora of ethno-botanical and agro-economic values.

3.9.2.1 Flora and Fauna

The dominant forest and fodder species reported in the project area are *Pinus roxburghii* (Salla), *Dalbergia sissoo* (Sisam), *Alnus nepalensis* (Uttis), *Schima wallichii* (Chilaune), *Thysolaena maxima* (Amliso), *Ficus semicordata* (Khaniu), Mulberry (*Morus* sps), Malagiri (*Cinnamomum glaucescens*), Kuiralo (*Bauhinia variegata*) and *Sepium insegue* (Khiro). The project site is rich in different species of *Dendrobium* and *Coelogyne* orchid including other aromatic plants like rose (*Rosaceae* sps), mint (*Mentha piperita*), timoor (*Zanthoxylum piperitum*), dachini (*Cinnamum verum*).

Vulpes sp. (Fox), *Macaca mulatta* (Monkey), *Felis chaus* (Jungle Cat), *Ratufa* sp. (Squirrel), *Lepus* sps (Rabbit), *Columbidae* sps, Jureli (*Pycnonotus barbatus*), Kaliz Pheasant (*Lophura leucomelanos*), titra (*Perdix perdix*), *Corvus splendens* (Crow), *Passer domesticus* (Sparrow), *Columba livia* (Pigeon) are the birds found in the project area. Fish species found in water bodies along the road alignment are Asala (*Schizothorax plagiostomus*), Kalle (*Catla catla*), Hile and Buduna (*Trout* sps).

3.9.2.2 Non-Timber Forest Products

The main NTFP species found in the project area are Timur (*Zanthoxylum armatum*), dachini (*Cinnamum verum*), Allo (*Girardinia diversifolia*), Bamboo (*Bambusa vulgaris*) are the major NTFPs of the project area.

3.9.3 Social and Cultural Environment

3.9.3.1 Household and Population

The project area covers ward number 1, 2 and 4 of Rolpa Municipality of Rolpa district. The service area accommodates a total population of 5809. Major settlements/toles of the service area are Reugha, Mulpani, Simlabang, Sibang, Thalibang, Kabhrekharka, Pipalchautara, Khanepani tole, Bich Bazar Tole in ward number 2; Loktantrik Chowk, Jilla Bikas Tole, Solabang, Bich Bazaar, Balmandir Tole, Shivalaya Tole, Kadya Tole, Kami Tole, Kalimati Tole in ward number 4 and Nebang, Bamruk, Dharapani in ward number 1.

Table 3: Household and Population in project areas

SN	Sub-systems	Household	Population
1	Purano Bamruk	42	230
2	Bamruk-Baddhichour	83	455

SN	Sub-systems	Household	Population
3	Mewang- Diubuje	34	186
4	Tudhikhel Solabang	218	1195
5	Sikshya	50	274
6	Shivalaya-Bichbazar	263	1441
7	Kavre Kharka	201	1102
8	Seewang- Reuga	169	926
Total		1060	5809

Source: Socio-economic Survey, January 2016

There are total 1060 households in the area with an average household size of 5.04. Male population is slightly higher (50.32 %) than the female population (49.68 %).

Since Liwang is the district headquarters of Rolpa district, in-migration of people from surrounding areas of the district is at increasing trend. High in-migration is expected to take place in the settlements near highway along ward number 2 and ward number 4 of the municipality.

3.9.3.2 Caste and Ethnicity

The proposed project service area comprises multi caste / ethnic groups. Each caste and ethnicity is characterized by its own customs, traditions, culture and nature of occupation with which they are associated. Brahmin and Chhetri comprising 45.89 percent of total population are the most prevailing group in the service area. Janajati are the next major group with 30.75 percent, followed by Dalit which constitutes about 14.33 percent (*Field Survey for DEDR, January 2016*).

3.9.3.3 Occupation

Although, the economy of the area is gradually shifting from rural agricultural economy to business and service based, majority of the households are still dependent on agriculture. As the data shows, a high of 47 percent of the households have agriculture as occupation. Service is another main occupation of 21 percent households, followed by business (14%). As in the other parts of Nepal remittance has been playing important role in local economy of the service area, which is the main source of income of less than 1 percent households and secondary source of income of many other households. The ward-wise households by occupation are resented in Table 4 below;

Table 4: Distribution of households by occupation

SN	Occupation	Ward Number			Total
		2	4	1	
1	Agriculture	366	90	127	583
2	Business	38	123	15	176
3	Services	105	116	40	261
4	Foreign Employment	3	2	3	8
5	Wages	49	20	39	108
6	Small industry	11	15	57	83
7	Others	2	17	1	20
Total		574	383	282	1239

Source: Field Survey, January 2016

3.9.3.4 Economic Characteristics

Economic condition of the families in service area seems satisfactory in terms of their monthly income level. The distribution of households by income range is shown in table below, which indicates that 50.3 percent of them have income range NRs. 20,001-50,000 per month. Likewise, 38.7 percent of households fall under the income range NRs. 8,001-20,000 categories. As the data shows 8.9 percent of households have highest income level (more than NRs.50,000/month), whereas less than 1 percent of the households have lowest income level i.e. less than NRs. 5,000 per month. Finding of socio-economic census survey (2016) depicts that the household average monthly income is NRs. 22,478.

3.9.3.5 Existing Water Supply Condition

The existing water supply scheme covers wards 1, 2 and 4 of Rolpa Municipality which supplies water through nearly 390 private and community taps. The present water supply and sanitation situation is not satisfactory. The town project areas have piped water system to serve some households and the remaining of the community depends upon springs and streams. The quality of water delivered through the existing system in the project area is not satisfactory. Adequate treatment facilities are not provided.

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 terms of water quality 16.38 percent of the respondents feel the quality of supplied water is good, where as that of 75.87 percent feel satisfactory or tolerable (Table 5). Nearly 8 percent of the respondents responded that the water quality of supplied water by existing systems is unsatisfactory.

Table 5: Satisfaction In quality of existing drinking water supply

SN	Water Quality	Ward Number			Total	Percent
		2	4	1		
1	Good	67	131	5	203	16.38
2	Satisfactory	445	227	268	940	75.87
3	Unsatisfactory	62	25	9	96	7.75
Total		574	383	282	1239	100

Source: Socio-economic Survey, January 2016

3.9.3.6 Existing Sanitation Condition

Rolpa Municipality was declared as Open Defecation Free (ODF) in Jestha 2072 B.S when it was still Liwang Municipality. In general the overall sanitation condition of the project area was observed satisfactory. 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 schools have toilets; and there is one public toilet in the entire municipality.

Lined drain was observed in this municipality. However, it was limited to core market areas. No water logged area is found as sufficient natural slope exists. Although, proper management of solid waste by the different agencies has not been developed till now, municipality has been providing municipal solid waste collection services. This service is limited to some wards only. Rest of all other wards manage solid waste either by dumping in the backyard or by providing organic waste to pig farms.



24/10/2019
 Engineer
 17 | Page

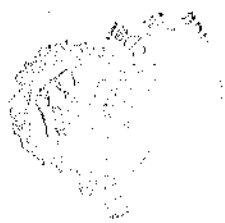
3.9.3.7 Existing Health Situation

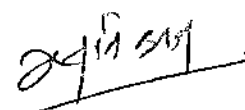
There is a District Hospital located at Liwang Bazaar. The District Hospital has 25 beds and providing basic health care facilities. Most of the people visit District Hospital for general health treatment. However local people visit major cities like Kathmandu for treatment of complicated health problems. Two dental clinics are providing dental care services and 6 numbers of medical shops are also available in this area.

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

3.9.3.8 Religion and Culture

Hindu religion is the main religion followed in the project area. Liwang is famous for historical/cultural and archaeological sites such as Bhama Odar (cave); Gari lake, Jaulipokhari; Bibang Daha; Chaturbhuj Panchayan; Baraha Khetra Badachaur; Devi and Khadga Temple, Durga Bhawani, Durga Temple; Gajulkot; Jaljala, Jankot Jhankristhan; Kalika Devi, Khungrikot, Kot Maula; Pateswari Temple; Shivalaya mandir; and Kothi vhee. Culutral dances like Sarangi and Sorathi are among the popular ones in this area.





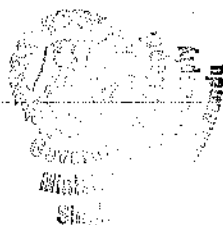
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3.10. Review of Policies and Legislation

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

- The Constitution of Nepal defines the right to live in clean environment as one of the fundamental rights of its citizens (Article 16). 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 (Clause 5 of Article 35). 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 provide the framework within which environmental assessment is carried out in A.
- Environment Protection Act (EPA, 2053), 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 Science, Technology and Environment, 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 Act (2076 BS) 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.
- Environment Protection Rules (EPR), 1997, and its amendments in 1999 and 2007, define the implementing rule and regulations of the IEE/EIA process, elaborating the provisions in the EPA. The preparation, review and approval of IEE and EIA reports are dealt with in Rules 3 to 7 and 10 to 14. Schedules 1 and 2 list down the projects of activities that are required IEE and EIA, respectively, as amended in 2007.
- The environmental policies, laws and rules that are relevant to the Subproject are presented in Table 6;



24/11/21
19 | Page
Engineer

Table 6: 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). Article 17 requires proponents to apply for any necessary land acquisition 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.	Use of water resource has been granted by the District Office.
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 provides 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.	Community Forest Users' Group has provided consent for use of forest for the project components. No trees will be cut.

Engineer

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
	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
Solid Waste Management Act	2011	Article 4 provides that the management of hazardous, medical, chemical or industrial waste rests upon the generators of such wastes. Management 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 adverse effect on the environment.	Monitoring of the quality of supplied water is prescribed in eth EMP following the NDWQS Directives.
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 stakeholders in EMP implementation.
National Environmental Policy	2076 BS	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	

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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.

Monitoring of the quality of supplied water is prescribed in the EMP following the NDWQS Directives.

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 maintenance of sanitation and hygiene.

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

The Policy requires the IEE or EIA of proposed WSS projects in accordance with the EPA/EPR to: (i) incorporate consultations with key stakeholders, including end-point users; & (ii) specify measures to mitigate environmental impacts prior to, during construction & operation, as well as corrective measures.

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

The 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.

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

Engineer

evaluation as an important component of a project to determine the overall impact of a project.

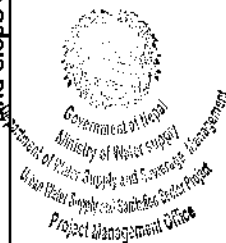
Implementation Directives for the National Drinking Water Quality Standards	2005	It sets out the water sampling, testing, analysis, monitoring and surveillance procedures to certify that the quality of supplied drinking water conforms to the National Drinking Water Quality Standards.	Monitoring of the quality of supplied water is prescribed in the EMP following the NDWQS Directives.
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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.	
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Working procedure with standard for using national forest by national priority project	2074 BS	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.	
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Consumer Protection Act	2075 BS	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.	
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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, location of stockpiles, etc.	
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Engineer

3.10.2 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 1996. The relevance of the afore-mentioned environmental agreements to the Subproject 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 by 2030. Some of these policies relevant to the proposed project are described below.

3.10.3 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).

The Bank has classified this project as of Category B and following normal procedures for project loans and accordingly an IEE has been conducted.

The project comprises of water supply and sanitation improvement works. An initial Rapid Environmental Assessment (REA) was undertaken and the Project classified by ADB as Category B and following normal procedures for project loans, an IEE was conducted.

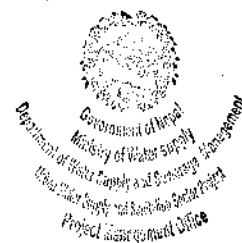
The Asian Development Bank (ADB) affirms that environmental and social sustainability is a cornerstone of economic growth and poverty reduction in Asia and the Pacific region. Therefore, ADB's Strategy 2020 emphasizes assisting developing member countries (DMCs) as they pursue environmentally sustainable and inclusive economic growth. In addition, ADB is committed to ensuring the social and environmental sustainability of the projects it supports. The goal of the Safeguard Policy Statement (SPS) 2009 is to promote the sustainability of project outcomes by protecting the environment and people from potential adverse impacts of projects. ADB addresses the following objectives in its safeguard policy:

- To avoid adverse impacts of projects on the environment and affected people, where possible;
- To minimize, mitigate and /or compensate for adverse project impacts on the environment and affected people when avoidance is impossible; and
- To help borrowers' and clients' to strengthen their safeguard systems and develop the capacity to manage environmental and social risks.

ADB's SPS sets out the policy objectives, scope and triggers, and principles for three key safeguard areas:

- Environmental safeguard
- Involuntary resettlement safeguard, and
- Indigenous peoples safeguard

A project's environment category is determined by the category of its most environmentally sensitive component, including direct, indirect, induced, and cumulative impacts. Each proposed project is scrutinized as to its type, location, scale, sensitivity and the magnitude of its potential environmental impacts. The level of detail and comprehensiveness of the EIA or IEE are commensurate with the significance of the potential impacts and risks.



25/09/2011
Engineer

3.10.4 RELEVANT STANDARDS

Table 7: Relevant Environmental Quality Standards

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. Type, Category, Size and Magnitude of the Project

The proposed project is a surface water source based gravity system. It also has treatment plant, ground reservoirs and an elevated reservoir with a distribution system. The service area is wards 1, 2 & 4 of Rolpa Municipality. It falls in category B of ADB environmental categorization.

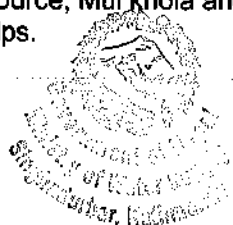
As the total design water demand is 22.09 lps the system will use gravity sources during the wet season (from June to November) and by pumping during the dry season. The water supply system has been designed for a base year population of 6,466 for the year 2019. The system has been designed to tap surface water source from an intake and using different water sources for a total design year population of 10,819 in 2039. Eight numbers of water storage reservoir tanks have been proposed at different locations considering in mind the elevation difference of the service area. The reservoirs with capacity of 15 cum, 30 cum, 40 cum, 120 cum, 20 cum, 140 cum, 100 cum and 80 cum with total of 545 cum storage capacity of reservoirs are designed for the collection and storage of water.

3.12. Water Source and Water Quality

Surface water sources are proposed, and all the proposed sources are perennial spring sources. Liwang area has numerous spring sources ranging from 5 lps of discharges to larger ones. Some of them are;

- Sattale Source (Spring source) dry season discharge 13.6 lps ,
- Mulpani Source (Spring source) dry season discharge 14.6 lps,
- Mulkhola Source (Spring source) dry season discharge 9.3 lps,
- Dhunge Bisaini source (Spring Source) dry season discharge 1.7 lps,
- Chkale patal spring source dry season discharge 3.6 lps,
- Rimkhola Source (Spring source) dry season discharge 5.3 lps.
- Dhanmuda I, II & III sources (Spring sources) dry season discharge 5.5 lps, and
- Jyamure Khola source (Spring source) dry season discharge 7.8 lps

Out of these, 4 sources; Sattale source, Mulpani source, Mul khola and Rim khola are proposed for tapping. The total proposed tapping yield is 22.09 lps.



24/11/2019 Page
Engineer

Water Quality Assessment / Treatment Facilities

Certified laboratory was used to conduct chemical, bacteriological and physical tests of the proposed surface water. Samples from the sources were tested in March 2018 for conducting laboratory analysis to test for other physical and chemical parameters with respect to the National Drinking Water Quality Standard (NDWQS) guidelines for potable drinking water (Annex 8). The following table exhibits the finding with respect to the NDWQS;

Table 8: Water Quality Assessment

1	pH at 20°C	7.8	8.1	7.8	7.8	6.5 - 8.5
2	Electrical Conductivity (µmhos/cm)	297	303	286	273	1500
3	Turbidity (NTU)	1	6	5	<1	5 (10)
4	Color (Chromacity Unit)	<0.05	<0.05	<0.05	<0.05	5 (15)
5	Taste	Unobjectionable				-
6	Odor	Unobjectionable				-
7	Total Dissolved Solids	192	138	198	186	-
8	Total Hardness as CaCO ₃ , (mg/l)	190	200	184	176	500
9	Carbonate Hardness as CaCO ₃	190	200	184	176	-
10	Total Alkalinity as CaCO ₃ , (mg/l)	220	230	215	205	-
11	Bicarbonate Alkalinity(mg/L)	220	230	215	205	-
12	Chloride, (mg/l)	<0.5	<0.5	<0.5	<0.5	250
13	Ammonia, (mg/l)	N.D.(<0.05)	0.06	<0.05	0.17	1.5
14	Nitrate, (mg/l)	1.48	0.96	0.37	0.74	50
15	Aluminium (mg/L)	<0.01	<0.01	<0.01	<0.01	-
16	Fluoride	<0.05	<0.01	<0.05	<0.05	-
17	Sulphate	<1	<1	<1	<1	-
18	Calcium, (mg/l)	39.28	41.68	39.28	37.67	200
19	Arsenic	N.D.(<0.01)	N.D.(<0.01)	N.D.(<0.01)	N.D.(<0.01)	-
20	Mercury	N.D.(0.0005)	N.D.(<0.0005)	N.D.(0.0005)	N.D.(0.0005)	-
21	Iron	N.D.(<0.05)	0.27	0.21	N.D.(<0.05)	-
22	Manganese, (mg/l)	N.D.(<0.02)	N.D.(<0.02)	N.D.(<0.02)	N.D.(<0.02)	0.3
23	Cadmium	N.D.(<0.003)	N.D.(<0.003)	N.D.(<0.003)	N.D.(<0.003)	-
24	Lead	N.D.(<0.01)	N.D.(<0.01)	N.D.(<0.01)	N.D.(<0.01)	-
25	Copper	<0.01	<0.01	<0.01	<0.01	-
26	Chromium	N.D.(<0.01)	N.D.(<0.01)	N.D.(<0.01)	N.D.(<0.01)	-
27	Zinc	0.02	0.02	0.02	0.03	-
28	E.coli count (MPN Index/ 100 mL)	Nil	Nil	>1100	Nil	-

Source: Laboratory Analysis Report, 2018

Sample tests of the sources indicate most of the parameters comply with the NDWQS value. This is to be noted water samples were collected in the month of February 2018 (dry season).



27 | Page
24/11/2018
Engineer

3.13. Project sub-systems and Project Components

Liwang Urban Water Supply and Sanitation Project has 8 sub-systems and these sub-systems are described below;

3.14.1 Project Sub-systems

Based on the topography, settlements and existing structures decentralized distribution systems has been adopted and are described below:

Purano Bamruk: This sub-system is proposed to serve part of the area situated in ward 1 and is able to cater 42 households and 230 populations with 3 rental population. Gravity surface sources (Mulkhola) will be used to feed an existing 15 cum reservoir through which water will be distributed.

Bamruk-Baddhichour: this sub-system is proposed to serve part of the area situated in ward 1 and is able to cater 83 households and 455 populations with 24 rental population. Gravity surface sources (Mulkhola) will be used to feed an existing 40 cum reservoir through which water will be distributed.

Mewang-Diubuje: this sub-system is proposed to serve part of the area situated in ward 4 and is able to cater 34 households and 186 populations with 15 rental population. Gravity surface sources (Mulkhola) will be used to feed an existing 10 cum reservoir through which water will be distributed.

Tudhikhe! Solabang: This sub-system is proposed to serve part of the area situated in ward 4 and is able to cater 218 households and 1195 populations with 16 rental population. Gravity surface sources (Sattale) will be used to feed an existing 140 cum reservoir through which water will be distributed.

Sikshya: this sub-system is proposed to serve part of the area situated in ward 4 and is able to cater 50 households and 274 Populations with 12 rental population. Pumping surface sources (Sattale) will be used to feed an existing 30 cum reservoir through which water will be distributed.

Shivalaya-Bichbazar: this sub-system is proposed to serve part of the area situated in ward 4 and is able to cater 263 households and 1441 populations with 48 rental population. Pumping surface sources (Sattale) will be used to feed an existing 170 cum reservoir through which water will be distributed.

Kavre Kharka: this sub-system is proposed to serve part of the area situated in ward 2 and is able to cater 201 households and 1102 populations with 27 rental population. Gravity surface sources (Mulpani) will be used to feed an existing 120 cum reservoir through which water will be distributed.

Seewang- Reuga: this sub-system is proposed to serve part of the area situated in ward 2 and is able to cater 169 households and 926 populations with 36 rental population. Gravity surface sources (Rimkhola) will be used to feed an existing 100 cum reservoir through which water will be distributed.

Government
Ministry of
Singhadur

Ministry of Water Supply and Sanitation
Liwang Urban Water Supply and Sanitation Project
Project Management Office

3.14.2 Components of the Project

Turbidity is likely to increase in rainy season and may reach the value of 100 NTU. Thus treatment process comprising of Pressure filter units and Chlorination units are proposed. Schematic diagram of the proposed treatment plant is as shown in Figure 2 below;

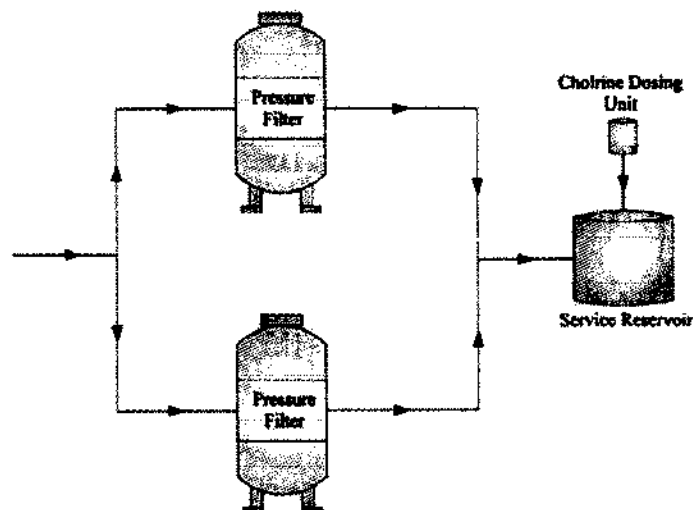


Figure 2: Schematic Layout of a Treatment System

Pressure filter made of mild steel is proposed to remove precipitated and suspended materials. Backwashing is to be done every week, and backwash is to be carried out also as per need during rainy seasons. Chlorine dosing unit is used for disinfection of the drinking water. The project components are detailed in the sub-section below;

i. Transmission mains

Transmission mains of 9,584 m have been estimated to convey water from the source to the distribution reservoirs of all the schemes. GI pipes are proposed for pumping schemes. Transmission pipes for all the gravity schemes are proposed to have HDP (PE) pipes. Following table describes the length and sizes of the transmission mains required.

Table 9: Transmission Main

SN	Description	Length (m)	
1	Mul Khola Source	4,008	
2	Sattale Source	2,612	
3	Mulpani Source	1,235	
4	Rim Khola Source	2,216	
	Total	10,071	

ii. Ground Reservoirs

The total storage requirement for the system at the end of the design period i.e. 2035 is 545 m³ which will be met by additional ground reservoirs. Most of the existing reservoirs are made of ferrocement and thus will not be used. Few which are in good condition and needs minor repair are proposed to use. The reservoirs will be constructed of RCC and have been designed as ground based. The following table summarizes the requirement of reservoir tanks sub-system wise;

Table 10: Requirement of Reservoir

SN	Distribution System	Reservoir Size		
		Existing Capacity (Cum)	Provided capacity (Cum)	Remarks
1	Purano Bamruk	20	15	Ferro-cement (Replace)
2	Bamruk-Badichaur-Mewang	10	30	Ferro-cement (Replace)
3	Mewang-Duibuje	40	40	Masonry Wall (Reuse)
4	Tudikhel-Solowang	40	120	Ferrocement (Replace)
5	Shikshya	NA	20	
6	Sibalaya-Bichbazaar	20	140	Ferro-cement
7	Kavraharka-Thalawang-Thaliwang	20	100	Ferro-cement (Replace)
8	Siwang-Reeuga	15	80	Replace
Total			545	

iii. Electrical Facilities

Settlements viz Siwalay, Sikshya etc are located in higher altitude than the available sources and thus needs pumping. Table 11 below explains the pumping head and discharge required;

Table 11: Settlements Requiring Pumping

SN	Settlements	Location	Pumping Head and Discharge					
			Existing Capacity (Cum)	Pumping Head (m)	Provided capacity (Cum)	Discharge (l/s)	Discharge (m³/hr)	Discharge (m³/day)
1	Purano Bamruk; Bamruk-Badichour, Mewang; Mewang-Deubuje	Mulkhola	180	3.31	10	50	50	50
2	Siwalaya-Bichbazaar; Sikshya	Sattale	65	6.67	11	50	50	50
3	Kavra Kharka-Thalawang-Thaliwang;	Mulpani	112	4.03	8	50	50	50
4	Siwang-Reuga	Rimkhola	132	3.08	8	50	50	50

Thus submersible pumps, including control panel, 50 KVA transformers are proposed. Voltage Stabilizer is also proposed to take care of fluctuation. Standby power backup generators are also proposed.

iv. Distribution Network

The distribution system comprises of a pipe network, which consists of mainly loops and branches in very few places. This network has been analyzed using EPANET 2, a design analytical software tool. Distribution pipes are laid on both sides of the metalled and major roads. Single line pipes are proposed in earthen and other roads. HDPE pipes have been predominantly used. Pipe class and size lesser than 6 kgf and 50 mm has not been proposed. Existing pipes will not be used as these are leaking. The total distribution pipe length of the proposed system is about 46.120 km.



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v. House Connections

The system has been designed predominantly as house to house connections and has been analyzed for a design capacity for a total of 1,914 house connections. However, initially during the construction phase, only 1,060 house connections are provided to satisfy the needs for the base year population.

vi. 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 214 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.

vii. Guard House:

Three guard houses are proposed considering the difficulties of terrain and elongated nature of service area. These guard houses will be located at sites of the generator/operator house.

viii. Office Building/Laboratory Room:

One office building, of 2.5 floors, consists of manager's room, cash counters and also a laboratory for water quality monitoring.

ix. O&M Equipment and Tools

The following equipment has been also considered in the project so that project works during the construction period and for operational activities are effectively carried out;

- Leakage detecting equipment - 1 set
- Electro-fusion machine for joining the HDPE pipes including portable
- Water quality testing laboratory equipment - 1 set
- Other tools and plants like: electric pipe cutters, pipe wrenches etc.

x. Sanitation Improvement

This component comprises of promotion of household sanitation and construction of a public toilet as described below;

Public Toilet

One public toilet with the capacity of 100 users is proposed as discussed with the WUSC and Municipality. It contains 5 urinals and 2 pans for male users & 4 female units in separate male and female compartments.

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 toilet as such were also found made temporarily eg 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.



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3.14. Proposed Schedule of Implementation

The work will be contracted to a contractor. The standard procedure for selection and tendering will be followed as per the norms of the Procurement Act and Regulations of Nepal. These will comprise of;

- tendering and approval of contract;
- presentation of security performance,
- field mobilization of workers, technicians, and professionals of the contractor;
- procurement and transportation of materials,
- construction of civil works and installation of electromechanical works, pipe works and
- Finishing works.

3.15. Land Requirement

The project components will be built in public/government lands. Transmission lines and distribution lines will be placed within RoW of the roads. Around 5806 square meters of land is required for different units of the sub-systems like reservoirs, treatment units and gurd house. For office building of WUSC around 500 square meters of land is required, and around 190 square meters of land is required for public toilets. This totals to 0.58 hectares of barren and open land in total will be converted to built-up areas.

Table 12: Land Requirement for Proposed Project Structures

Project Component	Sources/Structures	Location	Required land	Land Ownership Status	Remarks
Intake, Treatment Units, sump wells	Mulkhola	Ward No: 1	600 Sqm.	WUSC	
Intake, Treatment Units, sump wells	Rimkhola	Ward No: 2	305 Sqm.	WUSC	
Intake, Treatment Units, sump wells	Mulpani	Ward No: 2	410 Sqm.	WUSC	
Intake, Treatment Units, sump wells	Sattale	Ward No: 2	570 Sqm.	WUSC	
RVT	Purano Bamruk System	Ward No: 1 at Mulghara	300 Sqm.	WUSC	
RVT	Bamruk Badicharu System	Ward No: 1 at Ratamata	500 Sqm.	WUSC	
RVT	Mewang Deubuji System	Ward No: 1 at Dhunge Bisauni	200 Sqm.	WUSC	
RVT	Tudikhel Solobang System	Ward No: 2	570 Sqm.	WUSC	
RVT	Siwang Reuga System	Ward No: 2	410 Sqm.	WUSC	
RVT	Kavraharka-Thalibang System	Ward No: 2	505 Sqm.	WUSC	
RVT	Sikshya System	Ward No: 4	365 Sqm.	WUSC	
RVT	Shibalaya Bichbazar System	Ward No: 2	365 Sqm.	Private	
WUSC Building	San Star Tole	Ward No: 4	515 Sqm.	WUSC	
Sanitation Component	Public Toilet		190.8 Sq.m		

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 and good quality of water, and also from 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, regular household works and income generating activities.

Table 13: Saving in time in terms of economic values

SN	Time savings per household per year (working days)	Shadow price fo labour per day (Rs)	Economic Value: Benefit/year (Rs)
1	101	350	35,442

With the assumption that the shodow price of labour per days is Rs 350, the total saving per household per year would be Rs 35,442.

The impact will be augmented through regular maintenance of the water supply and sanitation system by the users' group (WUSC).

ii. Development of Market center

The availability of good supply of drinking water will accelerate the rate of development of Liwang as a leading market centre. In order to promote the development of market centre, municipalityshall ensure planned growth with required infrastructure facilities for healthy and hygienic environment in the market areas and regular operation & maintenance of the water supply and sanitation system.

iii. Appreciation of Land Value

One of the major benefits of the project is that along with the availability of reliable and safe drinking water and sanitation services, the increase in economic activities will instigate increase inland price. Liwang has fertile land and has irrigation facilities too.The availability of good drinking water could be one of the reasons for some many to investin business sector in the project area. Upon completion of the present project, migration from nearby hills is also expected. In order to promote land development in the area, the local people will be 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, their time will be saved. As therer will be adequate supply of safe drinking water, there will be marked reduction in the



Engineer

occurrence of infectious disease and water borne diseases in the project area. This will save more time of women which otherwise they would be spending in taking care of the ill ones in family. This will provide them more time to spend in economic and social activities, thus leading to empowerment. In order to augment the impact, the water supply system will be regularly maintained so that it operates smoothly, and awareness programmes will be given to the local people regarding health and hygiene with focus on gender.

v. Quality of Life Values

The project is expected to increase the existing quality of life values due to improvement in personal, household and community hygiene practices and health situations. The project will provide opportunities for jobs, will bring more investments and opportunities in the area, will provide good quality water, improved sanitation etc. Betterment in women's daily lifestyle through reduced water drudgery and improved health status of family will also be a positive aspect of this project implementation.

4.2. Adverse Impacts

4.2.1 Pre-construction Phase

The pre-construction works involve 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. WUSC already has acquired land required for the construction of structures. As the works involve review of design, estimate, discussions with concerned stakeholders and bidding processes, and no construction activities involved; there will be no adverse impacts.

4.2.2 Construction Phase

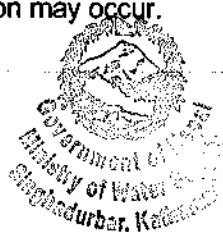
4.2.2.1 Physical Environment

i. Land Use Change

Around 0.58 ha of open land and barren land will be converted into built-up land. This will be a permanent change. And, since the land parcels are spread over in the project area, the impact is of low concern.

ii. Erosion, and land surface disturbance

Excavation and digging of trenches during construction may lead to erosion and caving, thus causing soil erosion, silt runoff, and unsettling of street surfaces. There is possible landslide area along the slopes from where the transmission line is to be laid. Sparsely vegetated land slopes at sites of Reeugha Upallo Gaun and Thaliwang are more prone to land failures. In addition to this, in the working sites, haphazard disposal of the excavated earth can disturb and damage the road surface. There will be road crossings using blocks and hume pipes at 4 sites. Vehicle movement will also damage the existing roads. 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.



36 page
24/11/2019
Engineer

iii. Topsoil conservation

Though there is very little intervention on the forest or agricultural land, at some places laying of pipelines may need short term interventions. Since formation of topsoil is very long natural process, efforts will be made to safeguard the topsoil.

iv. Damage to the Existing Facilities

During the construction time, while excavating the earth, existing water supply distribution pipelines and electricity poles may get damaged or may relocation in few places particularly in the bazaar area in spite of being careful. Movement of project vehicles may degrade existing roads especially at Liwang, Mewang and Reeugha areas.

v. Air and Noise pollution

The construction activity will comprise of construction of intakes, treatment units, generator houses and office building. Laying of transmission and distribution pipes, construction of storage reservoirs, transport and installation of pumps are other works to be carried out. Though there will be limited use of heavy equipments, plying of vehicles (use of power horns), use of generators and use of construction equipments will increase the emissions in the ambient air, and will also elevate noise nuisance. There will be some regular activities such as transportation and loading/unloading of construction materials. These impacts will be more concerning near core settlement areas, market areas and school areas.

vi. Impact on water bodies

There will be some impacts on water bodies located within the project area during the construction phase. Haphazard disposal of solid waste in the vicinity of water bodies, natural transportation of sediment and excavated materials to the water bodies, and leakage/disposal of oil & grease from construction equipment are some of the activities, which may occur and thus degrade the water quality. River crossing will be done at two sites along existing bridges, so there will be no impact on surface water bodies.

The excavation work for RVT and other structures will cause turbidity in water up to a certain extent. However the quantity is expected to be limited with respect to the discharge of water in the rivers. Thus, very minimal impact will be there for short period of time.

vii. Waste Management and Disposal

Generation of waste from campsites and temporary work-centers are likely to affect environment of the project area. Solid waste, chemical waste and other sanitary waste will increase during the construction phase. There will be small amount of spoil from excavation works, and trenches. It is estimated that there will be generation of around 1,100m³ of spoil. Waste generated from decommissioning of the temporary facilities, mainly workforce campsites, may cause degradation of land, loss of aesthetic values, and pollution of the local water resources.



4.2.2.2 Biological Environment

The project area has built up area along with agricultural land and forests. Only scattered plants of local species and fruit plants are available within the project activity area and thus minor impacts are anticipated only during the construction period. Most of the pipelines pass along the roadside and only a few numbers of plants and bushes have to be cleared up within the transmission pipe line stretches. Some of the impacts that are 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 core project area of the intake and reservoir sites will be minimized as it is located on open grass land, and some structures lie in the open areas of the Mewang community forest. During the construction, there will be only a loss of herbs and shrubs cover. Some of the topsoil and vegetation may also be lost during pipe laying works. No pipeline passes through the forest area. The project components require a very small area of land for implementation and environmental impacts on the vegetation and natural eco-system do not seem to be significant.

ii. Impact on Fauna

The project area has nearby forests where local species of wildlives are present. Population dynamics of resident and migratory birds and reptiles at the project site may 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.

iii. Impact on aquatic life

Some of the construction activities for intake and its protection works are proposed at the bank of the local streams. These construction activities will physically disturb the water quality for a certain period of time and may cause adverse impact on aquatic life, especially fish population. But these effects will be temporary in nature.

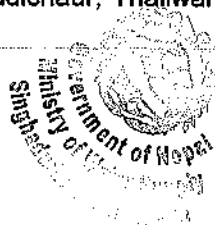
4.2.2.3 Socio-economic Environment

i. Disturbance to community activities

Construction activities, particularly construction works on roads will cause disturbances to the community activities like daily mobility, festival celebrations and conducting of social events. The free movement of vehicular traffic and pedestrians will be affected. Noise produced due to the operation of machines may disturb these events in project sites and its neighbourhood during construction periods. In order to minimize the disturbance to the community activities, a detailed

ii. Crop loss

During construction of access road, there may be damages to some of the locals' agricultural land. At sites of Mewang, Badichaur, Thaliwang, Reeuga Upallo Gaun and Kavrekharika there



24/11/2018
Engineer

will be pipelines laid through agricultural land. Around 3.5 ropanis of land may be temporarily affected and this will need crop compensation if the disturbance is during cultivation period of the land.

iii. Social Dispute and Dissatisfaction

There will be influx of outside workforce and any misunderstanding or any misconduct can cause problems with the local community. There is a possibility of social dispute in the community due to irresponsible behaviour of the workers such as gambling and drinking. On the other side, due to over-use of outside workers, the local population may not get adequate employment benefits from the project causing dissatisfaction and conflicts in the area.

iv. Occupational health and safety (OHS)

Life and health of workers, particularly of those involved in concreting, trench cutting, formwork and rebar fixing is of prime concern. Workers involved in mechanical works and all other works are also exposed to some level of health and safety risks.

v. Community Health and safety

Open disposal of waste, spillage of lubricants etc, and open trenches, unmanaged stockpiling, un-noticed entrance to active work-sites and vehicular movements will pose threat to community's health and safety. Such risks are higher for elderly and children. These risks will be or more concerns during rainy seasons and during the times of local festivals or social events.

4.2.3 Operation & Maintenance Phase

i. Risks from exposure to chemicals

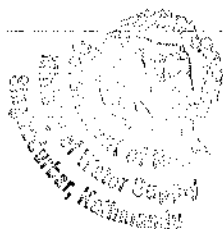
Exposure and ingestion of Bleaching Powder is harmful and the workers will have to deal with it during the operation of the system. Ingestions, inhalations, application to body parts, especially to the eyes, nose and mouths are of extreme health hazard to the workers handling bleaching powder.

ii. Impact on water bodies and aquatic life

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. 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.



[Signature]
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4.3. Indirect, Induced and Cumulative Impacts

4.3.1 During Construction

A: Indirect and Induced Impacts:

The volume of vehicle 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, good and services, particularly in the market area. Coupled with disruption of economic activities and social services from extended interrupted power supply due to relocation of power poles and/or likely accidental damages, agricultural production will be negatively affected. Regular dust falling on rice plants and other crops in the vicinity of subproject footprints would have some effect on the crops' yields.

B: Cumulative Impacts:

There are no known ongoing or proposed large scale developments in Liwang Town as yet. Hence, cumulative impacts will arise mainly from the construction of main subproject components and associated facilities.

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

Induced and Cumulative 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 increased water and sanitation facilities, there will be more immigration and investments, and the rate of urbanization will increase in long run. This cumulative impact will need to be addressed by the district or municipal level authorities in their long term planning documents. 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.



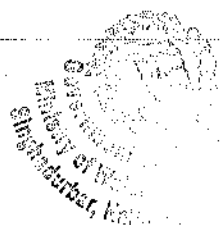
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4.4. Evaluation of the Impacts

The impacts are evaluated based on their impact levels, coverage of area and duration of the impacts. The evaluations are used to emphasize the need to address the concerns. Magnitude, geographical extent and duration of impacts are quantified, and the following table summarizes the evaluations of the impacts;

Table 14: Evaluation of Potential Environmental Impacts

Beneficial Impacts					
Construction stage					
Employment Opportunity and Increase of Income	Direct	M (20)	Lc (20)	St (5)	Significant (45)
Skill Enhancements	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 status	Direct	M (20)	Lc (20)	Lt (20)	Significant (60)
Saving of time	Direct	M (20)	Lc (20)	Lt (20)	Significant (60)
Development of Market Center	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					
Physical Environment					
Land use change	Direct	L (10)	Ss (10)	Lt (20)	Insignificant (40)
Land surface disturbance	Direct	M (20)	Ss (10)	Lt (20)	Significant (50)
Topsoil loss	Direct	L (10)	Ss (10)	St (5)	Insignificant (25)
Damage to existing facilities	Direct	M (20)	Ss (10)	Mt (10)	Insignificant (40)
Air Pollution	Direct	L (10)	Lc (20)	St (5)	Insignificant (35)
Noise nuisance	Direct	L (10)	Ss (10)	St (5)	Insignificant (25)
Water Pollution	Direct	L (10)	Lc (20)	Mt (10)	Insignificant (40)
Waste issues	Direct	M (20)	Lc (20)	Mt (10)	Significant (50)



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Biological Environment					
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)
Socio-economic Environment					
Disturbance to community activities	Direct	M (20)	Ss (10)	St (5)	Insignificant (35)
Crop loss	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 (20)	Ss (10)	Mt (10)	Insignificant (40)
Operation & Maintenance Stage					
Risk from 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. ANALYSIS OF ALTERNATIVES WITH AND WITHOUT PROJECT

5.1. With- and Without-Project Alternatives

The town is facing increased demand of water supply and if not met, it will be one of the major problems for the Rolpa municipality. The overall sanitary condition of the project area is reasonably satisfactory. But there is still room of improvement in sanitation sector as well. Doing nothing about these challenges would be allowing the subproject municipality to further develop as "under-served", put the health of its residents and the general public at more risks, and worsen its living environment. This would impede: (i) further social and economic development project municipality and (ii) Nepal's delivery of its commitment to SDG 6th to increase the proportion of population with sustainable access to safe drinking water and basic sanitation.

In overall, 'with project alternative' will bring about enhanced public health and living environment that will contribute to improved quality of life in the municipality. Improved water supply and sanitation will create an enabling environment for local economic development and improved social services that communities within the sphere of influence of the municipality will benefit from; thus, contributing to the overall local economic development of the district, and Province 5.

5.2. With Project Location Alternative

The project area is a major junction and booming market place connected to East-West highway at Bhalubang. Thus investment here in long term basic urban facility is very strategic. With the project, 1060 households in the municipality will have immediate and convenient access to reliable as well as adequate safe and potable water supply, and easy access to sanitation at public place so that it helps to improve health and sanitation status. As a result, good hygiene and sanitation practices will be promoted; there will be reduced health and safety risks.

5.3. Alternatives Relative to Planning and Design

The proposed project is a small scale intervention. The major components of water supply system as detailed in the feasibility study are: intake constructions and improvements (Mulkhola, Sattale, Mulpani and Rimkhola) as sources; treatment facilities with sedimentation unit, slow sand filter and disinfection unit; 7 new reservoirs and use of existing one with total 525 Cum capacity of reservoirs; distribution mains, system appurtenances, guard house, office building and compound fencing.

The feasibility study report considered for 20 sub-system. It was well discussed with all the stakeholders to reduce the numbers of subsystems and coverage area. Now only 8 sub-systems have been agreed and designed accordingly. On the other hand, major water sources like Mulpani, Mulkhola were not considered in the feasibility report. Now after discussion with water users committee, major water sources like Mulpani, Mulkhola are also considered in this detailed design report.



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The project is a combination of gravity flow, and pumping. The project area bears elevation difference of more than 300m. Tundikhel and Solowang area are located in lower elevation than the sources and thus can be run from gravity system. Most of the settlements are located are located in higher elevation and required pumping. Thus considering the topography, landuse, settlement pattern 8 separate distribution schemes are proposed.

The service area established as per pre-feasibility report consisted part of wards 2, 3, 4, 5 and 8 of former Liwang Municipality. After the feasibility study report the WRDSMC again discussed with the WUSC team and community people. The service area was redefined leaving some remote settlements as they are being served under Fund Board projects. Now the new service area has been defined as wards 1, 2 and 4 of Rolpa municipality.

Regarding the feasibility of distribution system, since the settlements are scattered and across the ridges, separate sub-systems with treatment plant and distributions systems have been proposed.

It was assessed that the proposed water supply system with adequate treatment units will have very small negative impact on the environment. However, there will be substantial improvement in personal hygiene thereby increasing the quality of life and community health. The WUSC has finalized the required site of land for RVT, treatment plant and other structures.

Initially, the treatment units with sedimentation, roughing filter and slowsand filters were proposed. The required land and the field conditions were assessed time and again. Finally, the conventional treatment units have been replaced with pressure filter due to limited land available at the site.

Apart from this, the project will not have any resettlement or relocation issue. Hence no further alternatives need to be assessed.



[Signature]
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6. MITIGATION MEASURES FOR THE ANTICIPATED IMPACTS

6.1. Mitigation Measures considered during Pre-construction Phase

The Rapid Environmental Assessment (REA) Checklist for water supply and sanitation was used to identify potential impacts/issues/concerns of the project as design (Annex 2). The REA identified the issues and concerns that should be considered during design, impacts that should be mitigated during construction and impacts that should be mitigated or enhanced during operation. Relating to design, the concerns would be the inadequate consideration/incorporation of the REA-identified impacts/issues/concerns that should be considered during design as listed in Table 15 below;

Table 15: REA checklist for IEE

- Unsatisfactory raw water quality	During the detailed engineering design stage, water samples from surface source were tested. This information has guided design of water treatment.
- Delivery of unsafe water to the distribution system	Design proposes basic primary treatment, pressure filter and disinfection using $\text{Ca}(\text{ClO})_2$ and provisions for lab unit and kits. 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 sub project design & continuing training there-after.
- Inadequate protection of intake structures	Perimeter fencing to keep animals away from grazing nearby. Intake to be located at least 30m upstream from sanitation facilities. Water quality monitoring should be conducted regularly (at least once very quarter).
- Health risks arising from inadequate design of facilities for receiving, storing and handling of Cl & 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.
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.
Risk to public and environmental health due to inappropriate siting and design of septage disposal pit.	The septage disposal pit (similar to sludge drying bed technology) is to be designed and constructed in accordance to international best practice and acceptable standards (e.g. USEPA standards etc). This includes; (i) locating disposal pits at least 300 m away from the nearest dwelling, and 30m down-stream 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.



[Signature]
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The considerations of these aspects during the design stage of project development have certainly helped reduce the adverse impacts, and the potential of scaling of such impacts.

6.2. Construction Phase

6.2.1 Physical Environment

i. Land use change

Only barren land and open waste land has been chosen for construction of the project units. Greenery promotion will be conducted to reduce the impacts of built-up areas. And, also the district level stakeholders will be suggested to incorporate the land use change aspects into its long term planning.

ii. Erosion and land surface disturbance

During execution of construction works, precautionary measures will be taken. Proper backfilling of excavated trenches will be done timely and the excavated soil will be stacked properly. Timely slope protection will be carried out at sites of Reeugha Upallo Gaun and Thaliwang is planned. Major construction activities will be avoided during the rainy periods. The project area has agricultural land, hence topsoil is very important. Efforts will be made to safeguard 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.

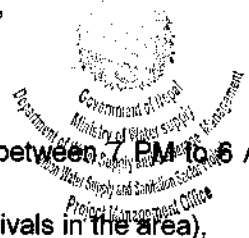
iii. Damage to the Existing Facilities

Considerations have been made during the design phase to reduce such 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. Market and core settlements of Liwang market and Reeugha market will face such impacts. Any affected facilities in these above mentioned area will be reinstated to the original condition.

iv. Air Pollution and Noise nuisance

Mitigating measures to reduce air and noise pollution are;

- o Providing information to the public about the work schedule,
- o Allowing the use of vehicles only complying with NVMES 2069,
- o Limiting the speed of vehicles
- o The use of power horns will be prohibited,
- o Equipment and vehicles will be regular maintained,
- o Prohibiting the operation of plants and construction vehicles between 7 PM to 6 AM in residential areas,
- o Avoiding work at culturally sensitive times (during religious festivals in the area),
- o Increasing the work force in sensitive areas so as to finish the work quickly,
- o Burning of solid wastes, particularly in workers camp/construction sites, will be prohibited
- o Use of firewood as fuel will be prohibited in the work-camps. Clean fuel (electricity, LPG gas) will be provided for cooking in the campsites.



24/11/2017
Engineer

v. 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 streams 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. Separate areas shall be allocated for the stacking of construction materials. Public land near the municipality office at ward 4 is proposed as a prime campsite and stockpile area.

vi. Waste Management and Disposal

Waste generated from the workers' camps will be segregated. 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 and properly disposed off. 3R Principles will be regulated. Recyclables will be sold to local scrap dealers. Only residue waste will be disposed. Regular monitoring of the workers camps will be carried out. Temporary sanitary toilets for the workers will be installed before starting the work. 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 labour camp and will be cleared after the completion of the construction works. Spoil will be disposed at designated sites for individual sub-systems. Public land which need leveling have been identified at Reeugha, Liwang and Mewang sites.

Waste generated from decommissioning of temporary facilities like campsites will be reused, reclaimed as much as possible, and the remaining residue will be disposed to the waste disposal stream of the municipality in coordination with the municipality office.

6.2.2 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 at Khadhya tole in ward number 4 and around treatment units. There is no need for felling of trees. However, 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 of cost of lookin after for 5 years.

ii. Impact on Fauna

The workforce will be sensitized on importance of 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.

iii. Impact on aquatic life

Washing of vehicles and clothes directly on rivers will be discouraged. Juke Khola, Charte Patal khola, Dhunge Bisauni khola, Lahari khola, Jyamure khola and Okhrenei khola are the major local rivers that may be polluted due to project activities. Disposal of waste and spoil on to water bodies will be strictly regulated. Fishing by workforce in the local rivers will be strictly restricted.

24/10/2011
Ministry of Water Supply
Singhadurbar, Kathmandu

Engineer

6.2.3 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. Sign-boards in Nepali and English languages will be placed at properly visible sites.

ii. Crop loss

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 between the affected land owner and the User' Committee. Local authority, the municipal office will be coordinated in this process.

iii. 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 and priority for employment. Wages will be settled based on District Wage Evaluation Committee with the list of employees.

iv. 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 water will be provided in the campsites
- Clean cooking fuel (LPG, electricity) will be provisioned for the workforce campsite
- 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, 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.

24/11/21
Government of Nepal
Ministry of Water Supply and Sanitation
Kathmandu
Engineer

v. Community Health and Safety

Avoiding any open disposal of waste and strictly prohibition of waste disposal to water bodies will be maintained. The temporary sanitation facilities will be at least 50 m away from any water source. The community will be made aware of any health concerns that may arise due to any project activity. Likewise, the campsites and stockpiles will be well fenced. The active working sites will be provided with visible barricades. Gurads will be deputed to stop unauthorized entry to these sites. Visible and easily understandable boards and messages will be placed to notify the local people about health risks. In the worksites, the trenches will be backfilled and compacted timely.

6.3. Operation & Maintenance Phase

i. Risks from exposure to chemicals

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 the contract document itself. First aid measures will be introduced for emergencies. Training on the handling and on dosage of the 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 mainly contains suspended solids a small pond of 20,000 litres capacity will be constructed for decantation and will be drained off to the river/ stream course after decantation. Septage disposal pits similar to sludge drying bed will be used for disposal of slurry.
- 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. Public toilet constructed under this project will be managed in initiation of the WUSC in coordination with the municipality. The local youth clubs can be mobilized.

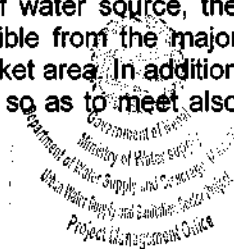
Operation and Maintenance (O&M) Manual will be prepared along with provision of O&M training to the WUSC and its team. Water Safety Plan (WSP) will be prepared for the project and the WUSC and its team will be trained on the WSP and total sanitation aspects.

iii. Impacts of operation of pumps and 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.



[Signature]
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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 on monthly, 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 have been 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 mitigation 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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7. ENVIRONMENT MANAGEMENT PLAN

7.1. Environment Management Plan and Its Objective

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.

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

7.1.1 Institutional Arrangement

Executing and Implementing Agencies

The Ministry of Water Supply (MoWS) will be the Executing Agency, working through the Department Water Supply and Sewerage Management (DWSSM), which will establish a Project Management Office (PMO) for the project headed by a Project Director. The DWSSM will also establish Regional PMO (RPMO) for the works in the western package.

The PMO will be responsible for overall project planning, management, implementation, monitoring and reporting for the project. The PMO will also be responsible for screening the proposed subprojects in accordance with the subproject selection criteria for the project, assisting the municipalities in conducting feasibility studies, reporting to and being point of liaison with ADB on the project; quality control of detailed design and construction supervision; procurement of civil works contracts; support for capacity building; and

overseeing safeguard compliance. The PMO will liaise with WUSC or the municipality to sign the management agreement prior to the award of contract for each subproject. The PMO will also engage all consultants under the project. The RPMO will report to the PMO and be supported and monitored by PMO to implement the projects in the field and manage contractors and consultants. The RPMO will manage the detailed design and construction supervision with support from DSMC that PMO would engage. A dedicated implementation core group will be established in the field in order to conduct day-to-day project management, planning and construction supervision. The TDF will coordinate with RPMO, WUSC and municipality at least on monthly basis.

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 Committees

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

Before Construction

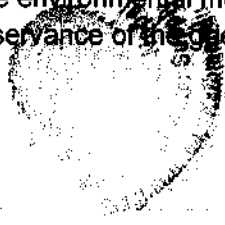
- (i) Facilitate public consultation and participation, information dissemination and social preparation.
- (ii) Provide available data to DSMC-ESS during IEE
- (iii) Assist in securing tree-cutting permits and/or registration of water source.
- (iv) Participate in training programs.

During Construction

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

During Operation

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



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Engineer

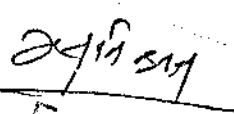


Civil Works Contracts and Contractors

Contractors are to carry out all environmental mitigation and monitoring measures outlined in their contract. The contractor will be required to submit to RPMO, for review and approval, a site-specific environmental management plan (SEMP) including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program as per SEMP; and (iv) budget for SEMP implementation. Non-compliance with, or any deviation from, the conditions set out in the EMP or SEMP constitutes a failure in compliance and will require corrective actions. The EARF and IEEs specify responsibilities in EMP implementation.

7.1.2 Environmental Management Plan

The EMP is based on the identified impacts, possible mitigations discussed with the stakeholders, and based also on institutional frameworks for Environmental Safeguards of this project. The following table shows the details of environmental management works with cost details, along with roles and responsibilities for the proposed activities;


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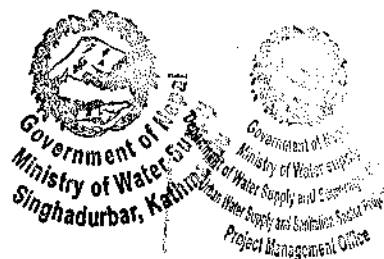


Table 16: Environmental Management Plan (EMP) Matrix

SN	Field/ Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsible Agency	Indicative Cost, NRs
Pre-Construction/Design Phase					
1	Selection of water supply source Designing of source/intake	Concerns over unsatisfactory raw water quality	(i) Water quality sampling/testing, and its reconfirmation (ii) Source to be located at least 30 m upstream of any sanitation facilities (iii) Source to be well protected		
2	Design of alignment for pipe-laying	Disturbance/damage to community structures/facilities, and disruption of services	(i) 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 (ii) Consultation with local authorities, offices like Division Road Office (iii) 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 (iv) Require construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services		
3	Designing of reservoirs and other facilities	Risk of tapping of contaminated water, and Seismic risks like cracking of reservoirs	(i) Design all reservoirs and structures under the project as per appropriate seismic resistance (ii) WUSC building and guard houses to be built as per National Building Code of Nepal		Included in Detailed Design cost
4	Designing of treatment units	Health hazards arising from inadequate design of facilities for receiving, storing and handling of CI & other chemicals	(i) Choosing of treatment unit with comparative analysis of the treatment options (ii) Design has included a "housed" dosing unit. Standard operation methods has been prescribed in design (iii) Preparation and implementation of WSP to be planned		
5	Sanitation Engineer	Contamination of drinking water source and other environmental receptors from household and public toilets	(i) The design of toilets includes septic tanks that are designed as per national standards and codes to allow for maximum retention of septage. This includes ensuring septic tanks are sealed and water tight. Toilets will be established at least 30m downstream of the		

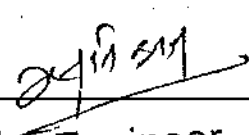
SN	Field/ Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsible Agency	Indicative Cost, NRs
		Risk to public and environmental health due to inappropriate location and design of septage disposal unit	drinking water source. (ii) The septage disposal pit (similar to sludge drying bed technology) is to be designed and constructed in accordance to international best practices and acceptable standards (e.g. US EPA standards, etc). This includes; (a) locating disposal pits at least 300m away from the nearest dwelling, (b) pits are to be established only in relatively flat land with no more than 8% slope; and (c) site selected for establishment of pits should not be where food crops are grown.		
6	Relevant permits	Failure to obtain Necessary consents, permits, NOCs, etc can result to design revisions and/or stoppage of works	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 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.		
7	Construction workcamps, stockpile areas, and storage areas, and disposal areas.	Disruption to Traffic flow and sensitive receptors; and causing pollution	(i) Determine locations prior to award of construction contracts. (ii) Locations should not be too close to residential areas, schools or medical centers; and should not be disturbing water bodies, forest areas and agricultural land		
8	EMP Implementation Training <i>[Signature]</i> Engineer	Impacts to the environment, workers, and community	(i) Project manager and all key workers will be required to undergo EMP implementation including spoils management, standard operating procedures (SOP) for construction works; health and safety (H&S), core (ii) Labor laws, applicable environmental laws, etc.	DSMC contract	



SN	Field/ Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsible Agency	Indicative Cost, NRs
<i>(Continued...)</i>					
Construction Phase					
1	Construct workforce camp establishment	Haphazard camps resulting in social stress and degradation of local environment Occupational health and safety may be compromised	(i) Establish workforce camps in designated sites only and in consultation with local community. (ii) All camps are to include sanitary facilities for men and women. (i) Maintain necessary living accommodation and ancillary facilities in functional and hygienic manner in work camps (ii) Provide potable water for drinking and cooking all the workers (iii) Provide clean fuel for cooking (e.g. LPG, electricity) (iv) Provide first-aid kit/box Provide toilet facilities and prohibit open defecation.		Civil works contract
2	Construction of toilets in the camps	Water pollution; hygiene concerns for the local community			
3	Use of construction materials	Impact on natural resources	(i) The contractor will not have its own quarry site, or crusher. (ii) Contractor is required to use the construction materials only from sources with environmental clearance and license to operate		
4	Storing of materials in the project area	Stockpiling issues	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, packaging materials, plastic bags etc.		
		Leakage and spillage issues	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
		Disturbance to community activities/safety	(i) Covering of stacked spoil and soil (ii) Limit the time of temporary stacking of construction materials in residential and market areas		

Initial Environmental Examination (IEE) of Liwang Urban Water Supply and Sanitation Project

SN	Field/ Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsible Agency	Indicative Cost, NRs
5	Employment aspects	Local people may be deprived of opportunities, minors may be employed	(iii) Stockpiles maintained only at designated sites (i) Employ to local people will be prioritized (ii) Women will be encouraged to work in project-jobs (iii) Core labour standards will be followed. Wage as per District Wage Determination Committee will be provisioned, and equal pay for men & women will be complied (iv) Child labour will be strictly prohibited (v) On the job training will be provided		
6	Transportation of materials	Traffic congestion and public annoyance	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
7	Disposal of spoil and waste in the open and into the water bodies/river	Water and land pollution	(i) Prepare and implement a Spoil Management Plan (ii) Prioritize re-use of excess spoils and materials in construction activities. If spoils will be disposed, consult with DCC on designated disposal areas. (iii) All earthworks must to 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. (iv) Take all precautions to prevent entering of wastewater into streams, water courses, or irrigation system. Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies. (v) While working across or close to any water body, the flow of water must not be obstructed. Ensure no construction materials like earth or stone are disposed in any manner that may block the flow of water of any watercourse and cross drainage channels. (vi) Provide designated areas with collection bins for wastes. (vii) Prohibit washing of vehicles next to rivers and streams. (viii) Regular water quality monitoring.		
8	Handling of toxic materials	Occupational health and safety concerns	Provide training to workforce on safe handling of toxic materials and OHS measures		Civil works contract


Engineer

 Department of Water Supply and Sanitation
 Government of Nepal
 Ministry of Water Supply and Sanitation
 Urban Water Supply and Sanitation Project

SN	Field/ Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsible Agency	Indicative Cost, NRs
9	Movement of vehicles	Air quality deterioration, and damage to existing roads	(i) Dust suppression on roads or at open sites by sprinkling water as required at regular intervals. (ii) Require trucks delivering aggregates and cement to have tarpaulin cover (iii) Limit speed of construction vehicles in access roads and work sites to maximum of 30 kph (iv) Coordinate with local authority and local communities for safe traffic management (v) Notify affected sensitive receptors by providing sign boards informing nature and duration of construction activities and contact numbers for any complaints (vi) Priority will be given to local vehicles (public and private), and routes will be selected accordingly (vii) Schedule truck deliveries of construction materials during periods of low traffic volume (viii) Traffic Management Plan will be prepared (ix) Routine monitoring of dust (total suspended particulates) to meet air quality standards; and limit vehicle speed. (x) See that vehicles comply with the National Vehicle Mass Emission Standards, 2056 (xi) Regular maintenance works		100,000
10	Movement of vehicles Operation of construction machineries and equipment Horn honking	Noise and vibration	(i) Monitoring of noise levels regularly at site to meet the noise standards (ii) Fit mufflers in vehicles to control noise. (iii) Limit the speed of vehicles and decreasing drop-heights (iv) Regular maintenance of equipment. (v) Restrict noisy activities to daytime. Overtime work should avoid using noisy/high noise generating equipment. (vi) Limit engine idling to maximum 5 minutes. (vii) If it is not practicable to reduce noise levels to or below noise exposure limits, the contractor must post warning signs in the noise hazard areas. Workers in a posted noise hazard area must wear hearing protection.		20,000

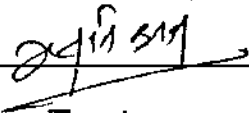

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 Department of Water Supply and Sanitation
 Liwang Urban Water Supply and Sanitation Project
 Project Management Office

24/11/2017
 Engineer

Government of Nepal
 Ministry of Water Supply and Electricity
 Department of Water Supply and Sanitation
 Liwang Urban Water Supply and Sanitation Project
 Project Management Office

Initial Environmental Examination (IEE) of Liwang Urban Water Supply and Sanitation Project

SN	Field/ Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsible Agency	Indicative Cost, NRs
			(viii) Compensate and repair damages caused by vibration during construction activities.		
11	Pipe laying	Slope instability	(i) Maintaining the slope and slope stabilization/protection works (ii) Construction of Gabion walls in case instable slopes (iii) Vegetation protection, greenery promotion (iv) Pipe-laying will be conducted in coordination with Division Road Office		275,000 Also in cost of civil works contract
12		Vegetation clearance	(i) Avoid tree cutting (ii) Obtain necessary tree cutting permits, if at all needed under unforeseen conditions, and if cut, will plant tree saplings at the rate of 25 saplings for each felled tree. Will also compensate all private trees and community forests if affected		
13		Disturbance to community Impacts to business activity including temporary relocation of vendors	(i) Prior to construction, hold community meetings to inform them of construction works. (ii) Distribute project information so that the locals can understand and cooperate accordingly (iii) Advance-notice should be provided at least 1-2 weeks in advance. (iv) Place WUSC phone hotline on signs in visible areas. Make community fully aware of grievance mechanism and provide contact info of PMO/ICG unit. (v) Maintain access to avoid disturbance to residents and businesses by providing planks and leaving spaces for businesses and residents to maintain access. (vi) Manage traffic flows, conduct work at night where possible. (vii) Trenches open for only 1-3 days & works should be quickly completed. (viii) Avoid full street closure to fullest extent possible. (ix) Temporary sites to be restored to natural and stable conditions as per agreement with land owner (x) Provide employment opportunity to the affected people to the extent possible		25,000


Engineer



SN	Field/ Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsible Agency	Indicative Cost, NRs
			(xi) Avoid disturbance to tourist areas If re-surfacing of disturbed roads cannot be done immediately, spread of crushed gravel over backfilled surfaces		
14	Construction of project components	Dust nuisance Disturbance/damage to community/private services and infrastructures	(i) Compensate or reinstate/relocate community/private assets that are disturbed such as irrigation canals, electricity poles, drinking water pipes, etc. to the satisfaction of the people. (ii) If construction work is expected to disrupt users of community water bodies, notice to the affected community shall be served 7 days in advance and again 1 day prior to start of construction. (iii) Ensure any damage to properties and utilities will be restored or compensated to pre-work conditions. (iv) 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.) (i) All efforts shall be made by evaluation of minor design adjustments/alternatives (as applicable) to avoid tree cutting (ii) Prohibit workers from harvesting, cutting trees for firewood and poaching from forests and fishing from rivers and from (iii) Conduct greenery promotion activities as per need, and maintain the saplings for the duration of contract (i) Provision of PPEs and monitoring of the use of the same at work sites (ii) Awareness programs will be conducted to ensure use of PPEs, and to promote hygiene behaviours (iii) Conduct periodic medical screening (iv) Mark and provide sign boards for risk areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; (v) Provide medical insurance coverage for workers		800,000
		Biodiversity loss			100,000
		Occupational health and safety			

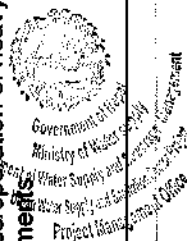


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SN	Field/ Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsible Agency	Indicative Cost, NRs
		Chance of disturbance to physical and cultural heritage	Stop work immediately to allow further investigation if any chance finds are suspected		
15	Influx of outside workforce, money and unwanted activities	Increase in crime and community stress	(i) Prohibit gambling and alcohol consumption in contractors' campsites. (ii) Instruct the outside workforce to respect the local cultures, traditions, rights etc. (iii) 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, transmissible diseases etc.)	(i) Ensure measures (fencing and/or barriers) to protect public from construction site. (ii) Provide regular health check-ups, proper sanitation and hygiene, health care, and control of epidemic diseases to the workforce. (iii) Launch awareness programs concerning human trafficking and the possibility of spread of STDs and HIV/AIDS using brochures, posters, and signboards; Social safeguards and GESI aspects (iv) Make available first aid kits, and fire extinguishers in campsites (v) Make available protection gears to all construction workers and compensate for the loss of life or any type of injuries (vi) Provide insurance to the workers and training in OHS and community health and safety. (vii) Ensure all work areas are clearly demarcated and marked and protect public from getting near to the trenches. (viii) Provide alternate potable water supply during maintenance works and notify the public in advance.		Civil works contract 25,000
16	Plying of project vehicles/operation of heavy equipments	Traffic congestion (temporary disruption to local access due to open trenches, excavation across roads or road closures due to	(i) Develop and implement a traffic plan and road safety plan to minimize traffic flow interference from construction activities (ii) Coordinate with local authorities (police, municipality, local area committees, etc.) to manage traffic during construction period		

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SN	Field/ Project Activity	Potential Environmental Impacts (construction).	Proposed Mitigation Measures	Responsible Agency	Indicative Cost, NRs
			(iii) Provide advance public awareness and public notification of construction activities, schedule, routing, and affected areas including road closures (iv) Place alternative routing signage in Nepali and English. (v) Arrange for night time construction for activities in congested/ heavy daytime traffic areas (vi) Arrange for onsite "grievance handling" through use of liaison officers (vii) Undertake trench closure and facilitate surface rehabilitation or paving as quickly as feasible		
17	Employment opportunities, project activities in settlement and market areas	Social disharmony; Sanitation issues, and gender issues	(i) Awareness activities for environmental conservation; (ii) WASH trainings; social safeguards meetings		50,000
Operational Phase					
1	Operation of the system; Operation of treatment units	Health risks to the workers	(i) Preparation and implementation of O&M Plan of the system (ii) Develop and Implement Water Safety Plan and promote hygiene behaviours (iii) Provide regular health checkups, proper sanitation and hygiene, health care, and control of epidemic diseases to the staff (iv) Provide training in OHS and Community Health and Safety (v) Make available first aid kits in worksites		WSP cost is incorporated in the Civil contract
2	Cleaning/backwashing of the system	Pollution of local surface water bodies	Maintenance works as per O&M manual, and ensure the silt trap units in sites where treatment units are installed		

24/11
Engineer



Ministry of Water Supply
and Sanitation
Kathmandu
Project Management Office

7.2. Environmental Monitoring Program

Environmental monitoring will be done during construction on three levels:

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

In addition to regular monitoring onsite (at town level) by the PMO and DSC-ESS on the EMP implementation of the mitigation measures, monitoring of key environmental parameters is proposed. Table 17 presents the indicative environmental monitoring plan for the subproject which includes relevant environmental parameters, with a description of the sampling stations, frequency of monitoring, applicable standards, and responsible agencies. This will be updated during detailed design to ensure EMP and monitoring program is commensurate to the impacts of the subproject.



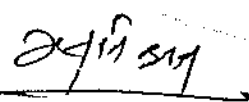
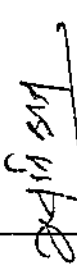
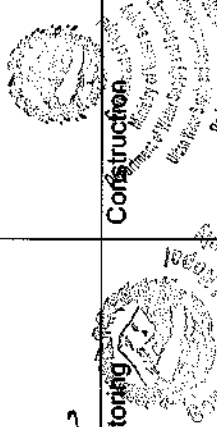
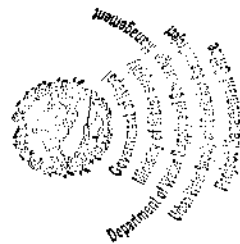

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Table 17: Environmental Monitoring Program

Source-based monitoring							
SN	Field and Source	Stages/Phases	Parameters	Location	Frequency	Standards	Responsibility
1	Campsite monitoring	Construction, Post-construction	OHS aspects; SWM; Drinking water quality; Provisions of space & light; Code of conduct; First aid facilities Waste Disposal (Number of bins placed; any 3R activities; composting units like Pit composting)	Temporary campsites; rented rooms/flats of workforce	2 weekly	NDWQS 2005, WHO Guideline values	Joint Monitoring Team (Biannually by RPMO/PMO)
2	Monitoring in work fronts	Construction	OHS aspects; Air quality; noise levels	All active working sites	Weekly	NAAQS 2003, WHO Guidelines	
3	Monitoring in project area where project activities are ongoing, or where vehicles are plying	Construction	Air quality; noise levels	All roads where project vehicles ply	Weekly	NAAQS 2003, WHO Guideline values	
4	Stockpile/workshops	Construction	Spillage/seepage; Fencing/safety aspects	Designated stockpile area, informal stockpiles,	Monthly	Contract Specifications	
5	Disposal site monitoring		Authorization; Landscape and aesthetic values	Designated disposal sites	2 weekly	Contract Specifications	
6	Sanitation facilities	Construction	Standard design; Separate toilets for men/women; Provision of septic tanks	Campsite, temporary work fronts	2 weekly	Contract Specifications	
7	Workforce monitoring  Engineer	Construction 	Number of workers; Skilled/unskilled workers; Local/outside workers; Male/female workers	All active working sites	2 weekly	Contract Specifications	

Sink-based monitoring						
SN	Field and Sink	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	Sources/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)

Monitoring of the environmental compliances during construction and operation phases will be source based monitoring, and monitoring of the environmental impacts will be sink based monitoring, and the environmental monitoring aspects for this project has been designed accordingly.



[Signature]
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Department of Water Supply and Sanitation, Kathmandu

7.2.1 Environmental Monitoring Cost

The project level monitoring team will submit its report to MoWS and this will be shared to MoFE. Total cost of environmental monitoring (field visits, observation, review of reports and report preparation) is estimated NRs. 335,000.

Table 18: Environmental Monitoring Cost

Team Leader/Environmental Specialist	1	335,000 (Lumpsum)
Water Resource Engineer	1/2	
Socio-economist	1/2	
Cost of Monitoring by MoWS	1	
Support staff	1	
Transportation cost		
Report preparation & sampling/lab. Test		

7.2.2 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.

7.3. 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 workshops on relevant topics.

WUSC does not have the capacity to monitor the quality of supplied water as prescribed in the NDWQS and its Directives. 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

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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 subproject 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 projects; (iii) review of IEEs and integration into the project detailed design; (iv) improved coordination within nodal departments; and (v) monitoring and reporting system. The contractors will be required to conduct environmental awareness and orientation of workers prior to deployment to work sites. The proposed training project along with the frequency of sessions is presented in Table 19 below;

Table 19: Training Program for Environmental Management

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 of ADB and GON	To share the experiences and best practices aimed at learning lessons and improving implementation of EMP
Contents	Module 1: Orientation • ADB Safeguards Policy Statement • Government of Nepal Environmental Laws and Regulations Module 2: Environmental Assessment Process • ADB environmental process, identification of impacts and mitigation measures, formulation of an environmental management plan (EMP), implementation, and monitoring requirements • Review of environmental	• Roles and responsibilities of officials/contractors/consultant s towards protection of environment • Environmental issues during construction • Implementation of EMP • Monitoring of EMP implementation • Reporting requirements	Experiences on EMP implementation – issues and challenges Best practices followed

24/11/2018
 Engineer

	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, PIUs, and (provide if PMC or DSC)
Participants	Executing and implementing agencies, PMO, and PMO staffs (technical and environmental) involved in the project implementation	PMO PIUs Contractors	PMO PIUs Contractors

7.4. 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.

The infrastructure involved in each scheme is generally straightforward to build. Environmental monitoring during construction will also be straight forward 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 indicative costs of EMP implementation are shown in Table 20;

Table 20: Indicative Cost of EMP Implementation

A. Mitigation Measures							
1	Protection works and rehabilitation works	Construction				5,75,000	Contractor's contract
2	Grennery promotion/plantation	Construction				1,00,000	
3	Compensation and reinstatement	Construction				2,25,000	
B. Monitoring Measures							
1	Water Quality	Pre-construction/ - Construction	Sample	10	8,000	80,000	Contractor's contract
2	Air Quality Monitoring	Pre-construction/ - Construction	Sample	10	10,000	100,000	Contractor's contract

Engineer

		Construction					
3	Noise level Monitoring	Pre-construction/ - Construction	Sample	L/S		20,000	Contractor's contract
C Capacity Building							
	(i) Orientation workshop for officials involved in the project implementation on ADB Safeguards Policy Statement, Government of Nepal environmental laws and regulations, and environmental assessment process;	Immediately upon engagement of the PMO-ESS DSMC) prior to award of civil works contracts					
	(ii) induction course to contractors, preparing the EMP implementation and environmental monitoring requirements related to mitigation measures; and taking immediate action to remedy unexpected adverse impacts or ineffective found during the course of implementation; and mitigation measures	After the first training, and within 6 months of start of project contract					Covered under PMC or DSMC contract
	(iii) lessons learned information sharing	Prior to start of Phase 2 and upon completion of the project					
D. Human Resources Costs							
1	PMO Environment Safeguards Officer	Construction phase	1				Budget covered through PMC
2	RPMO Environment Safeguard Assistants	Construction phase	2				Budget covered through DSMC
3	PMO Environmental Safeguard Expert	Responsible for environmental safeguards of the project at PMO level	P/M				Remuneration and budget for travel covered in the PMC contract
4	DSMC Environmental Safeguard Specialist	Responsible for environmental safeguards of the project at RPMO level	P/M				Remuneration and budget for travel covered in the DSMC contract
E. Administrative Costs							
1	Legislation, permits, and agreements	Permit for excavation, tree-cutting permits, etc	Lump sum				These consents are to be obtained by contractor at his own

24/11/24
Engineer

							expense.
2		Environmental clearances as per EPA 1997 and EPR, IEE presentation at review committee related expenses	Lump sum	1			PMO cost
F. Other Costs							
1	Public consultations and information Disclosure	During pre-construction and construction phase, including public awareness campaign through media	As per requirement		Lump sum		Covered under DSMC Contract
2	GRM implementation	Costs involved in resolving complaints (meetings, consultations, communication and reporting/information dissemination)	Lump sum				PMO cost
3	Any unanticipated impact due to project Implementation	Mitigation of any unanticipated impact arising during construction phase		Lump sum	Contractor's liability	As per insurance requirement	Civil works contract-contractor's insurance defect liability period
4	Social Safeguard and GESI activities	Costs involved in resolving complaints (meetings, consultations, communication, and reporting/Informing	As per requirement	Lump sum		25,000	Civil works contract
5	Awareness Activities					50,000	Civil works contract
6	Internal Monitoring; Notices and meetings					25,000	Civil works contract
Total						12,00,000	

7.5. Implementation Schedule

Environmental management will be implemented from the detailed design phase through to procurement, construction and operation. Table 21 presents the indicative time frame of key EMP activities in relation to subproject implementation schedule.

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Table 21: Environmental Management Implementation Schedule

SN	Activity	Indicative Time Frame
1	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
2	ENVIRONMENTAL MANAGEMENT	
2.1	Overall	
i	Design Review and Technical Audit Consultant (DRTAC)-Engagement of Environmental Specialist	Starting Q4 Y0 (5 yrs of intermittent inputs)
ii	PMO's submission of Environmental Monitoring Report (EMR)	
iii	Monthly EMR for subproject's MPR	8 th day after effective month
iv	Semi-Annual EMR during construction for submission to ADB	8 th day after effective 6-month period
v	Annual EMR for submission to ADB	8 th day after effective year
2.2	Prior to Construction Mobilization	
i	Finalization of EMP, (if applicable) revision of IEE	Q2 Y0
ii	ADB review & approval of revised IEE & EMP.	Q 2 Y0
iii	Obtaining Government's approval of IEE Report	Q2 Y0 – Q3 Y0
iv	Community preparation (including disclosure of Final IEE & its EMP)	Q4 Y0
v	Establishment of baseline data (as set in the EMP)	Q4 Y0 (shall have been done prior to award of contract)
Vi	Preparation of C-EMP by selected Contractor, review of C-EMP against SPS-compliant EMP.	Q4 Y0, before Notice to Proceed is given
2.3	Construction Period	
	Mobilization to Demobilization	
i	Implementation of mitigation measures and conduct of environmental effects monitoring following SEMP	Q4 Y0 – Q4 Y2
ii	Submission of 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
2.4	Operation Period (potentially could start even before DLP is over)	
i	Implementation of mitigation measures & monitoring activities as specified in the EMP	Starting anytime between Q3 Y3 & Q1 Y4
ii	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

7.6. 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.

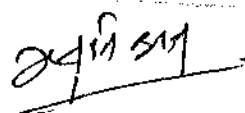
RPMO will submit monthly monitoring and implementation reports to PMO, who will take follow-up actions, if necessary. PMO will submit semi-annual monitoring reports to ADB. The suggested monitoring report format is in Annex. Project budget will reflect the costs of monitoring and reporting requirements. 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.

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




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7.7. Information Disclosure, Consultation And Participation

Public Consultation

In order to ensure public involvement, the following procedures were followed during the IEE report preparation:

- A 15 days public notice was published in the national daily newspaper seeking written opinions from concerned municipality 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 (*muchulka*) was collected.
- The IEE team discussed with the local communities and related stakeholders like municipality, WSSDO etc during the field survey to collect their concerns and suggestions.
- A meeting was held in Liwang regarding the project. DSMC members explained about the project and the probable environmental impacts.
- The minutes of meeting regarding the same is attached in Annex 5.
- Consultation will be a continuing process throughout activity implementation and in environmental monitoring activities. Additional consultations will include key informant interviews and random interviews with affected persons/households

Table 22: List of People and Institutions Consulted

1	Liladhar Acharya	Chairperson, WUSC
2	Nanda Kumar Acharya	Vice Chairperson, WUSC
3	Tulasa Acharya	Treasurer, WUSC
4	Mahesh Neupjane	Secretary, WUSC
5	Dilmani Bhandari	Member, WUSC
6	Tanka Acharya	Member, WUSC
7	Lal Bahadur Kuwar	Member, WUSC
8	Gita Acharya	Member, WUSC
9	Lalmani Kunwar	Staff, WSS
10	Lal Kumari Pun	Beneficiary, ward 2
11	Prem Kumari Budha Magar	Beneficiary, ward 2
12	Kaji Khadka	Beneficiary, ward 2
13	Balsari Dangi	Beneficiary, ward 4
14	Mina K.C.	Beneficiary, ward 4
15	Binaita Pun Magar	Beneficiary, ward 4
16	Shiva Raj Pokhrel	Beneficiary, ward 1
17	Kamala Kunwar	Beneficiary, ward 1
18	Sharada Mahara	Beneficiary, ward 1

Issues Raised and Suggestions

- ✓ Timely implementation of project so that the environmental impacts do not get more aggravated,
- ✓ Minimal loss of vegetation, and suggested for greenery promotion,
- ✓ Construction Equipments should be of standard level, impacts on environment should be minimal and any impacts on the environment should be mitigated by the contractor

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Information Disclosure

The draft IEE will be kept at the information centre of Rolpa Municipality, Rolpa for public disclosure. Information will also be disseminated through person to person contacts and interviews and group discussions. Available institutions at the local level will also be informed through notices pasted on notice boards of the concerned ward offices, schools, health posts and public places. The approved IEE report will be accessible to interested parties and general public through websites www.stwsssp.gov.np.

Following offices will get the IEE report:

- Rolpa Municipality, Rolpa District, Rapti zone
- Water Supply and Sanitation Division Office (WSSDO) - Rolpa
- Ministry of Water Supply, Kathmandu

For the benefit of the community, the summary of the IEE will be translated in the local language and made available at locations specified.

7.8. 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

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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 viz 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 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 PIU 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 PIU 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 3 below;

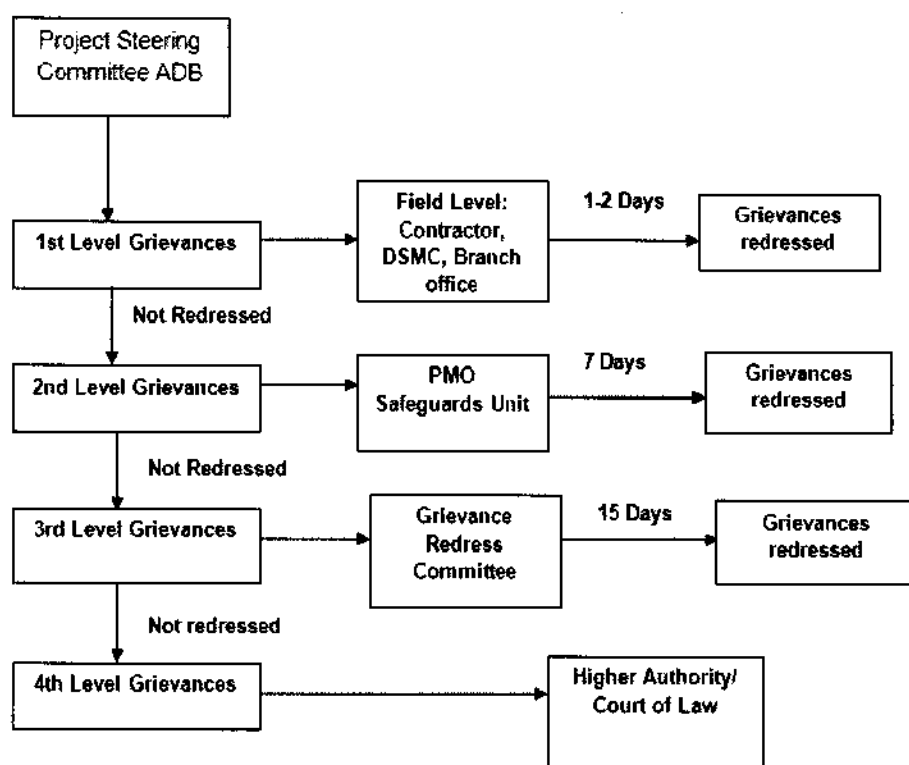


Figure 3: Grievance Redress Mechanism

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.

[Signature]
 Engineer

Government of Karnataka
 Ministry of Water Supply
 Department of Water Supply and Sanitary Management
 Urban Water Supply and Sanitation Sector Project
 Project Management Office

8. CONCLUSION

IEE study shows that the proposed project is not an environmentally critical intervention. The IEE indicates that;

The project area does not lie within or is not situated adjacent to environmentally sensitive areas. However disturbances to biological resources must be limited to possible extent.

Degree of negative impacts is expected to be local, confined within the 'areas of influence'. Cutting and excavation works, cutting, etc are some of the prime concerns. Slope instability and spoil disposal are also among the foreseen challenges to the local environment. With mitigation measures in place, the potential adverse impacts during construction phase would be site-specific and short term.

The adverse impacts are foreseen to be of temporary and short-term nature which would be manifested only during peak construction time. These will not be sufficient to threaten or weaken the surrounding resources. Preparation and implementation of an EMP would mitigate the impacts and would lower their significance to acceptable levels. Simple mitigation measures, basically integral to socially and environmentally responsible construction practices, are commonly used at construction sites and are known to the contractors. The designed mitigation measures are affordable and easy to implement on time.

During operation phase, accidental chance of delivery of unsafe water is a major concern. This can be mitigated with good operation and maintenance, prompt action on leaks, and complying with the required quality monitoring of supplied water as per national standards.

The proposed project will have following beneficial results: (i) improved access to reliable supply of safe drinking water; (ii) promotion of good hygiene and sanitation practices; and (iii) enhanced public health and improved quality of life.

In light of the above findings, the classification of the *Liwang Urban Water Supply and Sanitation Project* as Category B is confirmed and no further special study or EIA needs to be undertaken to comply with the Safeguard Policy Statement (2009) of ADB and EPR (1997) of the Government of Nepal.


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REFERENCES

Environment Protection Act, Government of Nepal, 1997

Environment Protection Rules, Government of Nepal, 1997 (and amendments)

Final Feasibility Study of Liwang Small Town Water Supply and Sanitation Project

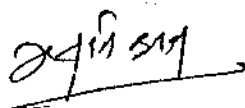
Detailed Engineering Design Report of Liwang Project, 2018

Environmental Assessment and Review Framework, Third Small Towns Water Supply and Sanitation Sector Project, 2014, Asian Development Bank

Safeguard Policy Statement, June 2009, Asian Development Bank

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




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ANNEXES

- Annex 1: Approved Terms of Reference
- Annex 2: Checklist, Sample Forms, Formats and Reporting Templates
- Annex 3: Project Location, Service Area and Schematic Layouts
- Annex 4: Public Notice, Muchulka & Recommendation Letter
- Annex 5: Public Consultations
- Annex 6: Survey Questionnaire
- Annex 7: Chlorine Use Guideline
- Annex 8: Water Quality Test Report
- Annex 9: Checklists
- Annex 10: Photographs
- Annex 11: Comments from MoWS, and Comments Incorporation Matrix


Engineer

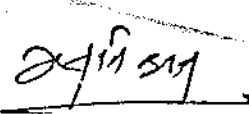




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Engineer



ANNEXES


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ANNEX 1: APPROVED TERMS OF REFERENCE (TOR)





नेपाल सरकार

खानेपानी मन्त्रालय

(खानेपानी तथा स्वास्थ्य माहाशाखा)

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फोन नं. ४२११६९३

फ्याक्स नं. ९७७-१-४२११६९

सिंहदरबार,
काठमाडौं, नेपाल ।

प. संख्या :- ०७४/०७५

चलानी नं. ४४३

मिति:- २०७५/१/२६

विषय: प्रारम्भिक वातावरणीय परिक्षण (IEE) को कार्यसूची (ToR) स्वीकृती सम्बन्धमा ।

श्री खानेपानी तथा ढल निकास विभाग,
पानीपोखरी, काठमाडौं ।

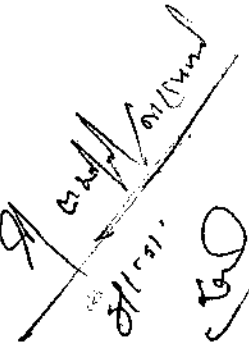
प्रस्तुत विषयमा तहाँवाट स्वीकृतिका लागि मन्त्रालयमा प्राप्त रोल्पा जिल्लामा प्रस्तावित लिवाङ्ग, रोल्पा नगर तेस्रो साना शहरी खानेपानी तथा सरसफाइ आयोजना को प्रारम्भिक वातावरणीय परिक्षण (IEE) अध्ययनको लागि तयार गरिएको कार्यसूची प्रतिवेदन (ToR) नेपाल सरकार (सचिवस्तर) को मिति २०७५/१/१० को निर्णयानुसार स्वीकृत गरिएको व्यहोरा निर्देशानुसार अनुरोध छ ।

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श्री आयोजना व्यवस्थापन कार्यालय,
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(स्वीकृत कार्यसूची (ToR) को १ प्रति संलग्न गरिएको)


विदुर भा
(इन्जिनियर)


१/२६


१/२६





TERMS OF REFERENCE (ToR)
for
INITIAL ENVIRONMENTAL EXAMINATION
of
**LIWANG SMALL TOWN WATER SUPPLY AND SANITATION
PROJECT**
LIWANG, ROLPA DISTRICT

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

Submitted by:
Building Design Authority P. Ltd.
JV Plus Engineers & Architects P. LTD
Kamaladi, Kathmandu, Nepal

November, 2017



Table of Contents



1. NAME AND ADDRESS OF THE PROPONENT.....	1
2. BACKGROUND AND DESCRIPTION OF THE PROJECT.....	2
2.1 Project Background.....	2
2.2 Objective of TOR.....	2
2.3 Description of the Project.....	3
2.4 Salient Features.....	7
2.5 Proposed Water Supply System and its Components.....	11
2.6 Relevancy of the Project Proposal.....	20
2.7 Project Area Delineation.....	22
3. PROCEDURES TO BE ADOPTED FOR THE STUDY.....	21
3.1 Desk Study and Literature Review.....	21
3.2 Field Study and Site Inspection.....	22
3.3 Data Analysis and Impact Quantification.....	22
3.4 Public Consultation Program and Public Notice.....	22
3.5 Report Preparation.....	23
4. POLICIES, LAWS, RULES, DIRECTIVES AND GUIDELINES.....	24
5. REQUIRED TIME, ESTIMATED BUDGET AND SPECIALISTS REQUIRED FOR PREPARING THE REPORT.....	26
5.1 Time Schedule.....	26
5.2 Estimated Budget.....	26
5.3 Human Resources Required.....	27
6. ANTICIPATED IMPACTS OF THE PROPOSED PROJECT ON THE ENVIRONMENT.....	30
7. ALTERNATIVE ANALYSIS.....	33
8. MATTERS CONCERNING THE PREVENTION OF THE IMPACTS OF THE IMPLEMENTATION OF THE PROPOSAL ON THE ENVIRONMENT.....	34
9. MATTERS TO BE MONITORED WHILE IMPLEMENTING THE PROJECT.....	34
10. OTHER NECESSARY MATTERS AND THE REPORT.....	38





List of Tables

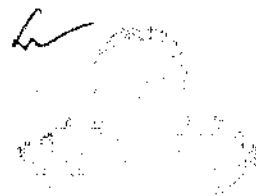
Table 2-1: Population of the Concerned Wards of the Project Town	5
Table 2-2: Salient Features of Liwang Water Supply and Sanitation Project	7
Table 2-3: Subsystem wise Population projection	11
Table 2-4: Source and tapping design discharge	12
Table 2-5: Water Quality Assessment	12
Table 2-6: Type, numbers and detailed dimensions of treatment units proposed	15
Table 2-7: Transmission Main	16
Table 2-8: Requirement of Reservoir	17
Table 2-9: Settlements requiring pumping	17
Table 2-10: Distribution Pipe Network	18
Table 2-11: IEE Conditions as per EPR	21
Table 2-12: Project Area Delineation	22
Table 5-1: Proposed Work Schedule	28
Table 6-1: Prioritized Issues	31

List of Figures

Figure 2-1: Project Location and Proposed Service Area	4
Figure 2-2: Schematic Diagram of Proposed Treatment Process, Liwang, Rolpa	14

List of Annexes

Annex I:	Schematic Layout Plan for the Proposed Project
Annex II:	ADB's REA Checklist
Annex III:	Environmental Checklists & Socioeconomic Questionnaires for the IEE Study



List of Abbreviations

ADB	Asian Development Bank
CBS	Central Bureau of Statistics
DC	Direct Current
DDC	District Development Committee
DI	Ductile Iron
DL	Distribution Line
DMA	District Meter Area
DSMC	Design Supervision and Management Consultant
DTW	Deep Tube Well
DWSS	Department of Water Supply & Sewerage
EA	Executing Agency
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environment Protection Act
EPR	Environment Protection Rules
ES	Environmental Safeguards
FGD	Focus Group Discussion
GI	Galvanized Iron
GoN	Government of Nepal
GRC	Grievance Redress Committee
HDPE	High Density Polyethylene Pipe
HH	Household
HP	Horse Power
IA	Implementing Agency
IEE	Initial Environmental Examination
IO	International Organization
kV	Kilo Volt
kVA	Kilo Volt Ampere
MoWSS	Ministry of Water Supply and Sanitation
NDWQS	National Drinking Water Quality Standard
NGO	Non-Governmental Organization
NPR	Nepalese Rupee
O&M	Operation & Maintenance
OBA	Output Based Aid
OHT	Over Head Tank
PAM	Project Administration Manual
PMO	Project Management Office
RCC	Reinforced Cement Concrete
RPMO	Regional Project Management Office
RVT	Reservoir Tank



ToR for Initial Environmental Examination of Liwang Small Town Water Supply and Sanitation Project

SS	Stainless Steel
STW	Shallow Tube Well
TDF	Town Development Fund
TL	Transmission Line
ToR	Terms of Reference
TSTWSSSP	Third Small Towns Water Supply & Sanitation Sector Project
VDC	Village Development Committee
WASH	Water, Sanitation and Hygiene
WSSDO	Water Supply and Sanitation Division
WTP	Water Treatment Plant
WUA	Water Users' Association
WUSC	Water Users' & Sanitation Committee





Chapter 1

1. NAME AND ADDRESS OF THE PROPONENT

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

This Terms of Reference (TOR) has been prepared in order to carry out an IEE for Liwang Small Town Water Supply and Sanitation Project in Rolpa District. The proposed proponent is the Project Management Office (PMO), Third Small Towns Water Supply and Sanitation Sector Project (TSFWSSSP) of the Department of Water Supply & Sewerage. The Ministry of Water Supply and Sanitation, Government of Nepal is responsible for the preparation of the IEE report. The name and address of the proponent is given below:

Name of the Proponent:

Project Management Office
Liwang 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: 4425848, 4412348
Fax: 4413280
Email: info@stwspp.gov.np
Website: www.stwspp.gov.np



Chapter 2

2. BACKGROUND AND DESCRIPTION OF THE PROJECT

2.1 Project Background

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 operation and maintenance activities of the water supply sector. Demand responsiveness is demonstrated by the willingness to pay for improved service delivery and ultimately aims at 30% cost recovery. Community management is essential for making the community empowerment so that the community can take full responsibilities on the financial, technical and managerial aspects on the operation & maintenance activities.

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 a minimum of 5% of the civil works contract in the form of upfront cash contribution. The remaining 25% is to be borrowed from 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 the Water Users and Sanitation Committee in the formulation, implementation and operation and maintenance of the water supply, sanitation and drainage facilities.

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

2.2 Objective of TOR

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

- To identify the major issues that may arise as a result of proposed works on the bio-physical, socioeconomic and cultural environment of the project area,
- To recommend practical and site specific environmental mitigation and enhancement measures prepare and implement the environmental monitoring plan for the project.
- To provide information on the general environmental setting of the Liwang Town area and to make sure that IEE is sufficient for the proposed water supply project.



2.3 Description of the Project

2.3.1 Location and Accessibility of the Project Area

The proposed Liwang town project lies in the Rolpa district of Rapti Zone. Liwang is district headquarter of the district. It is located in the southwestern mid hill part of the country. The project town is surrounded by Gajul and Mishri VDC in the East, Jankot and Kotgad in the West, Dhawang and Homa in the West and Jedwang in the South. All-weather road is connected to the town from Bhaluwang, a small business centre located at East-West Highway.

The location of the project area is 28°18' North 82°38' East. The altitude of the project area is varying from 1,300 m - 1,500 m above mean sea level.

2.3.2 Proposed Service Area

The proposed town project covers Ward Nos. 5, 6, 7 and 8 of Liwang municipality of Rolpa district. During household's survey done by the consultants the households within service area were accounted as 1,060; permanent population 5,807 and temporary (rental) 188 with totaling to 5,988 population.

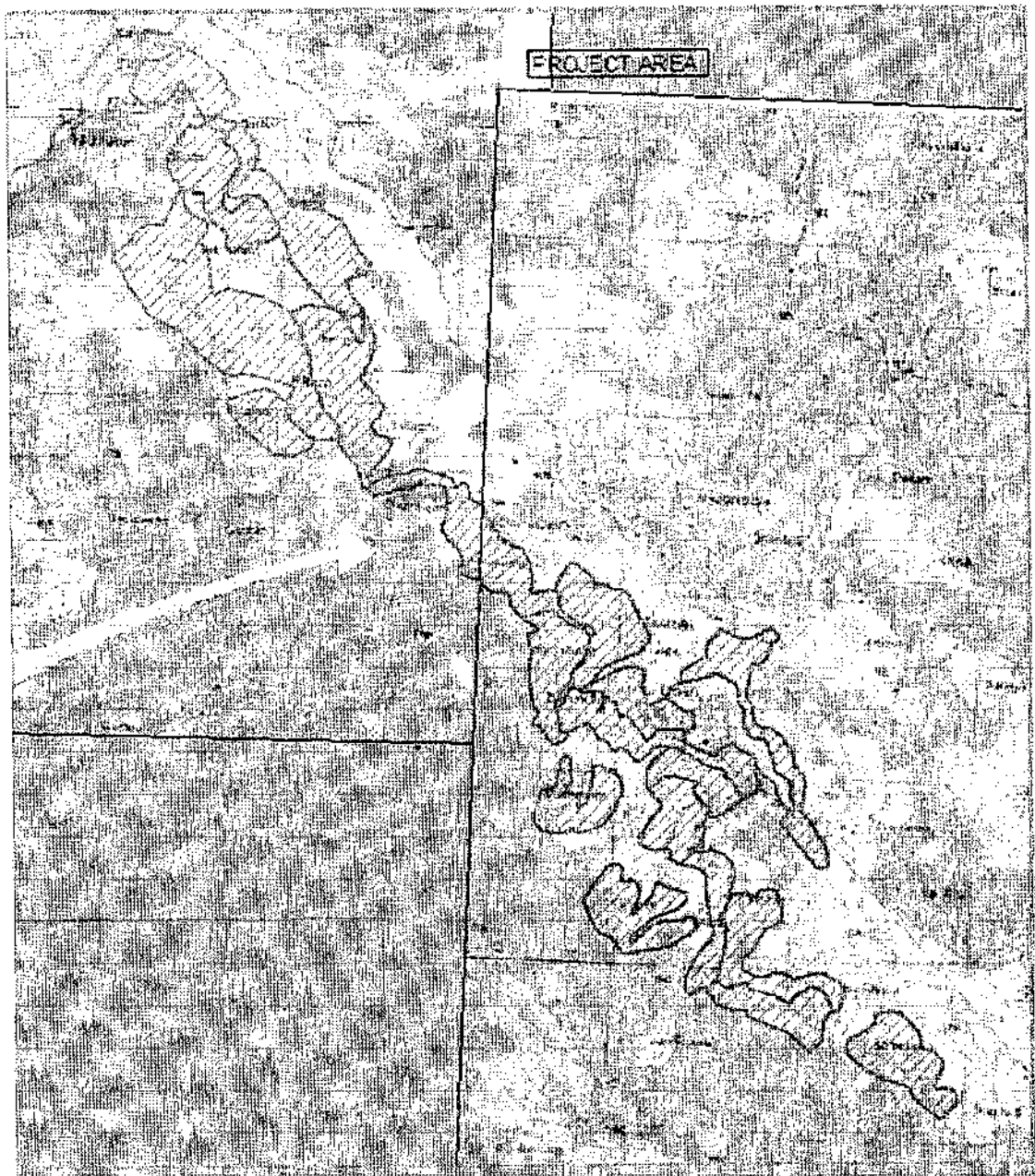


Figure 2-1: Proposed service area



2.3.3 Existing Environmental Conditions

2.3.3.1 Physical Environment

Topography, Geology and Climate:

Liwang is situated in the mid-hill region. It is situated in the Mahabharat range. It has subtropical type of climate. Almost 80% of rainfall occurs during monsoon (June to September). The altitude of the project area varies from 1,300 m - 1,500 m above mean sea level.

Geologically the rocks exposed of Liwang are of Precambrian to lower Paleozoic consists of shallow marine sediments, phyllite, sandstone with quartzite and calcareous sandstone. It has stromatolitic limestone and black slates.

2.3.3.2 Biological Environment

Vegetation

The dominant forest and fodder species reported in the project area are *Pinus roxburghii* (Salla), *Alnus nepalensis* (Uttis), *Schima wallichii* (Chilaune), *Thysolaena maxima* (Amliso), *Ficus semicordata* (Khnew) and *Sesium inegne* (Khiro).

Non-timber forest products (NTFPs) are defined as any kind of product derived from forest species other than timber and fuelwood. The main NTFP species found along the road alignments are Timur (*Zanthoxylum armatum*), Allo (*Girardinia diversifolia*), Chiuri (*Diploknema butyracea*) are the major NTFPs of the project area.

Wildlife

Vulpes sp. (Fox), *Macaca mulatta* (Monkey), *Felis chaus* (Jungle Cat), *Ratufa sp.* (Squirrel) are the common wildlife found in the surrounding forest along the road alignment. Dhukur, Jureli, *Corvus splendens* (Crow), *Passer domesticus* (Sparrow), *Columba livia* (Pigeon) are the birds found in the project area.

2.3.3.3 Socio-economic and Cultural Environment

Population and Demographic Characteristics

The proposed town project covers Ward Nos. 5, 6, 7 and 8 of Liwang municipality of Rolpa district. The service area accommodates a total population of 5988; of which 5807 is permanent population and 181 is rental population. Major settlements/toles of the service area REGugha, Mulpani, Simalbang, Sibang in ward number 5, Thalibang, Kabhrekharka, Pipalchautara, Khanepani tole, Bich Bazar Tole in ward number 6, Loktantrik Chowk, Jilla Bikas Tole, Solabang, Bich Bazaar, Balmandir Tole, Shivalaya Tole, Kadya Tole, Kami Tole, Kalimati Tole in ward number 7 and Nebang, Bamruk, Dharapani in ward number 8.

Table 2-1: Population of the Concerned Wards of the Project Town

S.N.	Sub-systems	Household	Population
1	Purano Bamruk	42	230
2	Bamruk-Baddhichaur	83	455
3	Mewang- Diubuje	34	186
4	Todhikhet Solabang	218	1195
5	Sikshya	50	274
6	Shivalaya-Bichbazar	263	1441
7	Kavre Kharka	201	1102
8	Seewang- Reuga	189	926
Total		1060	5807

Source: Socio-economic Survey, January 2016

There are total 1060 households in the area with an average household size of 5.04. Male population is slightly higher (50.32 %) than the female population (49.68 %).

2.3.4 Existing Water Supply

The existing water supply scheme covers wards 5, 6, 7 and 8 of Liwang Municipality, which supplies water through nearly 590 private and community taps. The present water supply and sanitation situation is not satisfactory. The town project areas have piped water system to serve some households and the remaining of the community depends upon springs and streams. The quality of water delivered through the existing system in the project area is not satisfactory. Treatment facilities are not provided.

The existing piped water supply system was started in 2040 B.S (1983 AD) with 16 numbers of public tap to bazaar area. Later in 2042 BS (1985 AD) British welfare scheme enhanced the scheme. The existing Liwang water supply system as constructed under DWSS and in 2047 BS (1990 AD) the scheme was handed over to WUSC. Since then the WUSC is serving by distributing water to the community.

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.



2.4 Salient Features

The detailed salient features of the water supply project in Liwang are shown in table below:

Table 2-2: Salient Features of Liwang Water Supply and Sanitation Project

S.N.	Items	Description																		
1	Name of the Project	Third Small Towns Water Supply & Sanitation Sector Project, Liwang Small Town Water Supply and Sanitation Project, Liwang - Rolpa																		
2	Type	Pumping and Gravity type using spring water as source																		
3	Study Level	Detailed Engineering Design Report																		
4	Location Area																			
	Region/Province	Mid-West Development Region/Province 5																		
	Zone	Rapti																		
	District	Rolpa																		
	VDC/Municipality	Now Liwang																		
	Wards	Wards 5,6,7,8																		
5	Available Facilities																			
	Road	Rapti Highway (connected to East-west highway in Bhaluwang)																		
	Nearest Airport	Wadachour, Rolpa																		
	Existing Water Supply System	Partially covered by piped water supply system, springs are used.																		
	Electricity	Available																		
	Communication	Available																		
	Health Services	Available																		
	Banking Facilities	Available																		
6	Source Characteristics																			
	Source Name and Type	All Spring Sources : Mulkhola, Mulpani, Sattale, Rim Khola																		
	Source Location	Ward No 6, 7, 8																		
	Proposed Tapping yield (lps)	<table> <tr> <th>S.N</th><th>Sources</th><th>Proposed Tapping (lps)</th></tr> <tr> <td>1</td><td>Mulkhola</td><td>8.31</td></tr> <tr> <td>2</td><td>Mulpani</td><td>4.03</td></tr> <tr> <td>3</td><td>Sattale</td><td>6.66</td></tr> <tr> <td>4</td><td>Rimkhola</td><td>3.08</td></tr> <tr> <td colspan="2">TOTAL</td><td>22.08</td></tr> </table>	S.N	Sources	Proposed Tapping (lps)	1	Mulkhola	8.31	2	Mulpani	4.03	3	Sattale	6.66	4	Rimkhola	3.08	TOTAL		22.08
S.N	Sources	Proposed Tapping (lps)																		
1	Mulkhola	8.31																		
2	Mulpani	4.03																		
3	Sattale	6.66																		
4	Rimkhola	3.08																		
TOTAL		22.08																		
7	Project Components																			
	Storage Reservoirs	Multiple distribution system is adopted , 8 distribution reservoirs ranging from 10 Cum to 170 Cum (Total capacity is 625 Cum)																		
	Valve Chamber (Nos.)	Type1 (1500x900x1000) : 16 # Type 2 (900 x900x1000) : 198 # Pipe valves(125mm dia) : 45 #																		

S.N.	Items	Description																		
	Community Stand Posts	Nil																		
	Designed Household connection	1,931																		
	Household Connection (Nos.)	1,060 (during construction phase)																		
	Total Length of pipe (Km)	Transmission: <table><tr><th>Pipes</th><th>Length (m)</th></tr><tr><td>100 mm GI</td><td>840</td></tr><tr><td>80 mm GI</td><td>1496</td></tr><tr><td>65 mm GI</td><td>2817</td></tr><tr><td>50 mm GI</td><td>323</td></tr><tr><td>40 mm GI</td><td>2466</td></tr><tr><td>GI TOTAL</td><td>7,942</td></tr><tr><td>110 mm HDPE</td><td>1,642</td></tr><tr><td>G. TOTAL</td><td>9,584</td></tr></table> Distribution Networks: (All HDP pipes) Ranging from 160mm to 40 mm : length 46,968 m Total Pipe length (9,584 +46,968) = 56,552 Km	Pipes	Length (m)	100 mm GI	840	80 mm GI	1496	65 mm GI	2817	50 mm GI	323	40 mm GI	2466	GI TOTAL	7,942	110 mm HDPE	1,642	G. TOTAL	9,584
Pipes	Length (m)																			
100 mm GI	840																			
80 mm GI	1496																			
65 mm GI	2817																			
50 mm GI	323																			
40 mm GI	2466																			
GI TOTAL	7,942																			
110 mm HDPE	1,642																			
G. TOTAL	9,584																			
	Electrical	Submersible pumps of 8 KW (2 numbers) 11 KW (2 numbers) Transformer 50 KVA (4 in numbers) DG set 50 KVA (4 in numbers)																		
	Treatment Unit	Sedimentation Unit ,Slow Sand Filter and Chlorination Unit (4 sets in each sources)																		
	Fire hydrants	10 numbers																		
8	Social Status																			
	Survey Year Population (2016)	5,807 (permanent), 1,81 (floating) [Total 5,988]																		
	Base Year Population (2019)	6,270 (permanent), 1,96 (floating) [Total 6,466]																		
	Design Year Population (2039)	10,483 (permanent), 333 (floating) [Total 10,816]																		
	Household Numbers (2016, 2039)	1,060 in 2016, and 1931 in 2039																		
	Average Family Sizes	5.43																		
9	Total Water Demand																			
	Survey year 2016	Total 1047.17 (m ³ /day) [12.12 lps]																		
	Base Year 2019	Total 1117.15 (m ³ /day) [12.93 lps]																		
	Design year 2039	Total 1903.39 (m ³ /day) [22.03 lps]																		
10	Total Cost of the Project (NRs.)	360.817 million with 15% contingencies & 13% VAT																		
	Water Supply Sector	NRs 356.362 million																		
	Sanitation Sector	NRs 4.455 million																		



ToR for Initial Environmental Examination of Liwung Small Town Water Supply and Sanitation Project

S.N.	Items	Description										
11	Cost Sharing Arrangement for water supply component (NRs)	NRs 356.362 million										
	1) GoN Grant @ 70%	Rs 249.453 million										
	2) WUSC Contribution											
	a) upfront cash contribution @ 5%	Rs 17.818 million										
	b) Loan through TDF @ 25%	Rs 89.091 million										
12	Cost Sharing Arrangement for Sanitation Component (NRs)	4.455 million										
	1) GoN / ADB Grant @ 85%	Rs 3.786 million										
	2) Local Body (WUSC, VDC & others) 15%	Rs 0.669 million										
13	Per capita Investment (for water supply sector including floating population) NRs	a) Survey Year : 59,512.69 b) Base Year : 55,113.21 c) Design Year : 32,947.67										
14	Monthly Tariff	<table><tr><th>Band</th><th>NRs per Cum</th></tr><tr><td>Minimum up to 6 Cum</td><td>26.00</td></tr><tr><td>More than 6 cum up to 10 Cum</td><td>39.00</td></tr><tr><td>More than 10 Cum up to 20 Cum</td><td>68.00</td></tr><tr><td>More than 20 Cum</td><td>87.75</td></tr></table>	Band	NRs per Cum	Minimum up to 6 Cum	26.00	More than 6 cum up to 10 Cum	39.00	More than 10 Cum up to 20 Cum	68.00	More than 20 Cum	87.75
Band	NRs per Cum											
Minimum up to 6 Cum	26.00											
More than 6 cum up to 10 Cum	39.00											
More than 10 Cum up to 20 Cum	68.00											
More than 20 Cum	87.75											
15	Project Status	Detailed Engineering Design Stage										

2.5 Proposed Water Supply System and its Components

Liwang Water Supply and Sanitation sub-project has been conceptualized as a piped water supply system using spring water as sources. The water supply service area is elongated type. It bears elevation difference of more than 300m. Tundikhel and Solowang area are located in lower elevation than the sources and thus can be run from gravity system. Most of the settlements are located in higher elevation and required pumping. Thus considering the topography, landuse, settlement pattern & separate distribution schemes are proposed. The following table summarizes the subsystem wise population projection up to the design year 2039:

Table 2-3: Subsystem wise Population Projection

SN	Distribution sub Systems	Survey Year (2016)			Base Year (2019)			Design Year (2039)		
		Perman ent	Rental	Total	Permane nt	Floatin g	Total	Permane nt	Floatin g	Total
1	Purano Bamruk	230	3	230	245	3	249	379	5	384
2	Bamruk- Badichaur- Mewang	455	24	479	490	26	516	603	42	645
3	Mewang-Duribue	185	15	201	201	16	217	334	29	363
4	Tudikhel- Solowang	1195	16	1211	1278	17	1295	2010	28	2038
5	Shikshya	274	12	286	289	13	312	541	24	565
6	Siwajaya- Bichhazaar	1441	48	1489	1555	52	1607	2604	87	2691
7	Kavrakharika	1102	27	1129	1200	29	1229	2128	52	2180
8	Siwang-Reeuga	925	36	962	1002	39	1041	1688	65	1753
	Grand Total	5,807	181	5,988	6,270	196	6,466	10,483	333	10,816

2.5.1 Water Sources

Liwang area has numerous spring sources ranging from 15 lps of discharges to smaller one. Some of them are:

- Sattale Source (Spring source) dry season discharge 13.6 lps,
- Mulpani source (Spring source) dry season discharge 14.6 lps,
- Dhunge Bisaini source (Spring Source) dry season discharge 1.7 lps,
- Chkale patal spring source dry season discharge 3.6 lps
- Rim Khola spring source dry season discharge 5.8 lps and others



All the above mentioned sources are spring sources and perennial type. The water supply scheme is conceptualized to use spring sources. Four spring sources as mentioned in the Table 2-4 below provide the tapping discharge.

Table 2-4: Source and tapping design discharge

SN	Sources	Dry Season Discharge (lps)	Proposed to Tap (lps)		
			Gravity scheme	Pumping scheme	Total (lps)
1	Mulkhola	9.3	5.00	3.31	8.31
2	Sattale	13.6		6.66	6.66
3	Mulpani	14.6		4.03	4.03
4	Rimkhola	5.3		3.08	3.08
TOTAL			5.00	17.08	22.08

2.5.2 Water Quality Assessment / Treatment Facilities

The Nepal Environmental and Scientific Services (NESS) Laboratory was used to conduct the chemical, bacteriological and physical tests of the proposed surface water. Samples from various available sources were collected in February 2016 and laboratory tested. Table 2-5 gives the findings with respect to the NDWQS:

Table 2-5: Water Quality Assessment

SN	Parameters	Mulkhola Source, Meban	Sattale Source	Mulpani Source	Rim Khola Source, Reuga	NDWQS, Nepal
1.	pH at 25°C	7.6	8.2	8.1	8.2	6.5 – 8.5
2.	Electrical Conductivity, (µmhos/cm)	246	260	252	240	1500
3.	Turbidity (NTU)	<1	<1	<1	<1	5
4.	Total Hardness as CaCO ₃ , (mg/l)	185	197	189	183	500
5.	Total Alkalinity as CaCO ₃ , (mg/l)	184	195	189	179	-
6.	Chloride, (mg/l)	1.46	0.97	0.97	0.97	250
7.	Ammonia, (mg/l)	<0.05	<0.05	<0.05	<0.05	1.5
8.	Nitrate, (mg/l)	1.03	1.25	1.25	0.96	50
9.	Calcium, (mg/l)	38.87	41.26	38.87	36.47	200

SN	Parameters	Mulkhola Source, Meban	Sattale Source	Mulpani Source	Rim Khola Source, Reuga	NDWQS, Nepal
10.	Magnesium, (mg/l)	0.07	0.09	0.09	0.12	0.3
11.	Iron, (mg/l)	N.D. (<0.02)	N.D. (<0.02)	N.D. (<0.02)	N.D. (<0.02)	0.2



2.5.3 Treatment Process

The water treatment process has been selected based on the raw water quality. Hence, the treatment system consisting of Sedimentation Unit, Slow Sand Filter and Disinfection unit is proposed to make the water safe for drinking purpose. The schematic diagram of the proposed treatment plant is shown in Figure 2-2.

1. Sedimentation:

Although the water quality of the sources is generally good during the dry season with low concentration of the suspended solids and turbid, its water quality may worsen during the rainy season with an increase in turbidity. The sedimentation tank will remove the suspended solids including precipitated minerals. The horizontal flow rectangular sedimentation tank will be R.C.C. with 3 hours detention time. The proposed sedimentation tank is expected to remove 70% of the suspended solids.

2. Slow Sand Filter:

R.C.C Slow sand filter (SSF) is proposed to remove fine suspended solids thereby reducing the turbidity of water. The slow sand filter is to be packed with sand and gravel. An under-drainage system is installed below the gravel support to collect the filtered water. The filtration rate of $0.20 \text{ m}^3/\text{m}^2/\text{hr}$ has been adopted. The slow sand filter is expected to reduce the turbidity of water as per NDWQS. A large number of coliforms is expected to be removed in the slow sand filter.

3. Disinfection:

Although the SSF removes coliforms to a certain extent, the effluent of the SSF might still contain bacteria. These bacteria are killed by the disinfection process and make the water potable. Disinfection by using bleaching powder in the reservoir has been proposed. Bleaching powder is to be dosed (1 mg/L) from a dosing tank.

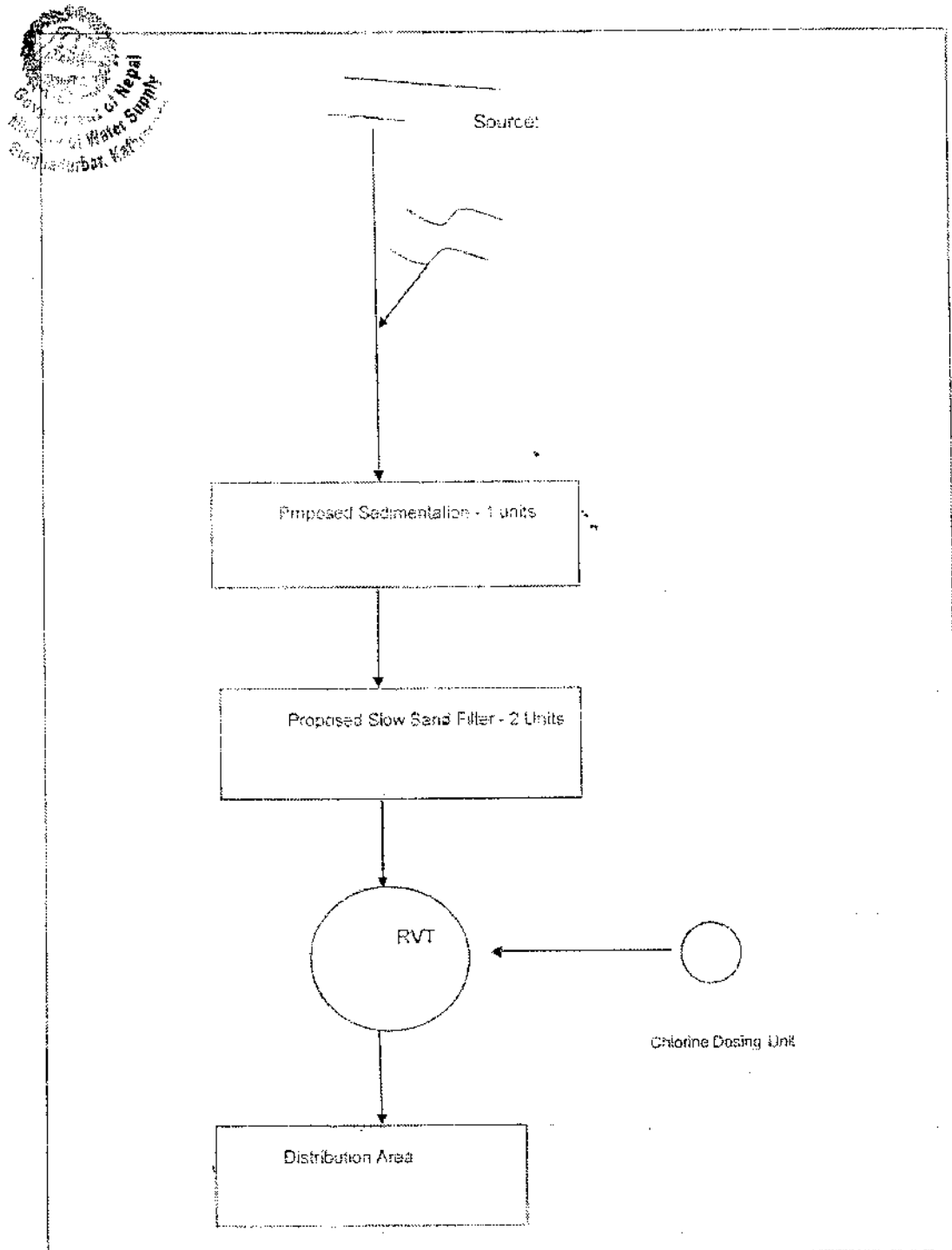


Figure 2.2: Schematic Diagram of the Proposed Treatment Process, Liwang, Rolpa



2.5.4 Transmission mains

Transmission mains of 9,584 m have been estimated to convey water from the source to the distribution reservoirs of all the schemes. GI pipes are proposed for pumping schemes. Transmission pipes for all the gravity schemes are proposed to have HDPE (PE) pipes. Following table describes the length and sizes of the transmission mains required.

Table 2-6: Transmission main

SN	Description	Diameter (mm)	Length (m)
1	Mul Khola Source-PB-BBM Transmission	80 mm GI	261
		65 mm GI	674
		50 mm GI	323
		40 mm GI	908
2	Mul Khola Source-TD-SW Transmission	110 mm HDPE	1642
3	Sattale Source Transmission	100 mm GI	840
		40 mm GI	1558
4	Mulpani Source Transmission	80 mm GI	1235
5	Rim Khola Source Transmission	65 mm GI	2143
TOTAL			9,584

2.5.5 Distribution Reservoirs

The total storage requirement for the system at the end of the design period i.e. 2038 is 625 m³ which will be met by additional ground reservoirs. Most of the existing reservoirs are made of ferrocement and thus will not be used. Few which are in good condition and needs minor repair are proposed to use.

The reservoirs will be constructed of RCC and have been designed as ground based. The following table summarizes the requirement of reservoir tanks sub-system wise:

Table 2-7: Requirement of Reservoir

SN	Distribution System	Reservoir Size		
		Existing Capacity (Cum)	Provided capacity (Cum)	Remarks
1	Purano Bamruk	20	15	Ferro-cement (Replace)
2	Bamruk-Badichaur-Mewang	10	40	Ferro-cement (Replace)
3	Mewang-Dubuje	40	10	Masonry Wall (Reuse)
4	Tudikhel-Solawang	40	140	Ferrocement (Replace)
5	Sikshya	NA	30	
6	Siwalaya-Bichbazaar	20	170	Ferro-cement
7	Kavraknarka-Thaliwang-Thaliwang	20	120	Ferro-cement (Replace)
8	Siwang-Reuga	15	100	Replace
TOTAL			625	

2.5.6 Electro-mechanical Facilities

Settlements viz Siwalay, Sikshya etc are located in higher altitude than the available sources and thus needs pumping. The table 2-8 below explains the pumping head and discharge required.

Table 2-8: Settlements requiring pumping

SN	Settlements	Sources	Gross Pumping head (m)	Pumping discharge (lps)	Pump (KW)	Transformer (KVA)	Stabilizer (KVA)	Standby-electric generator (DG set KVA)
1	Purano Bamruk; Bamruk-Badichaur, Mewang-Mewang-Deubuje	Mulkhola	180	3.31	10	50	50	50
2	Siwalaya-Bichbazaar, Sikshya	Settale	65	6.67	11	50	50	50
3	Kavra Kharka-Thaliwang-Thaliwang	Mulpani	112	4.03	8	50	50	50
4	Siwang-Reuga	Rimkhola	132	3.08	8	50	50	50

Thus submersible pumps, including control panel, 50 KVA transformers are proposed. Voltage Stabilizer are also proposed to take care of fluctuation. Standby power backup generators are also proposed.

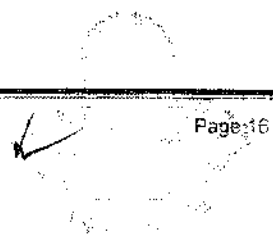


2.5.7 Distribution Network

The distribution system comprises of a pipe network, which consists of mainly loops and branches in very few places. This network has been analyzed using EPANET 2, a design analytical software tool. Distribution pipes are laid on both sides of the metalled and major roads. Single line pipes are proposed in earthen and other roads. HDPE pipes have been predominantly used. Pipe class and size lesser than 6 kgf and 50 mm has not been proposed. Existing pipes will not be used as these are leaking. The total distribution pipe length of the proposed system is about 46,968 km.

Table 2-9: Distribution pipe network

S.No	Description	Quantity (m)
1	160 mm dia HDPE pipe (6 kg/sqcm)	199
2	140 mm dia HDPE pipe (6 kg/sqcm)	1218
3	140 mm dia HDPE pipe (10 kg/sqcm)	345
4	125 mm dia HDPE pipe (6 kg/sqcm)	631
5	125 mm dia HDPE pipe (10 kg/sqcm)	965
6	110 mm dia HDPE pipe (6 kg/sqcm)	1003
7	110 mm dia HDPE pipe (10 kg/sqcm)	395
8	90 mm dia HDPE pipe (6 kg/sqcm)	5594
9	90 mm dia HDPE pipe (10 kg/sqcm)	1133
10	75 mm dia HDPE pipe (6 kg/sqcm)	4342
11	75 mm dia HDPE pipe (10 kg/sqcm)	1134
12	63 mm dia HDPE pipe (6 kg/sqcm)	2717
13	63 mm dia HDPE pipe (10 kg/sqcm)	1166
14	50 mm dia HDPE pipe (6 kg/sqcm)	11081
15	50 mm dia HDPE pipe (10 kg/sqcm)	10626
16	50 mm dia HDPE pipe (12.5 kg/sqcm)	607
17	40 mm dia HDPE pipe (10 kg/sqcm)	3707
18	40 mm dia HDPE pipe (12.5 kg/sqcm)	105
Total		46,968.00



2.5.8 House Connections

The system has been designed predominantly as house to house connections and has been analyzed for a design capacity for a total of 1,923 house connections. However, initially during the construction phase, only 1,060 house connections are provided to satisfy the needs for the base year population.

2.5.9 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 214 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.

2.5.10 Guard house

Two guard houses are proposed considering the difficulties of terrain and elongated nature of service area.

2.5.11 Office Building / Laboratory Room

One office building consisting manager's room, cash counters is proposed. Similarly one laboratory room is also proposed.

2.5.12 O&M Equipments and Tools

An assessment was done for the needed items. The TSTWSSSP has also some guide lines on it. The following equipment have also been 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) Electro-fusion machine for joining the PE pipes including portable Generator - 1 set
- c) Water quality testing laboratory equipment - 1 set
- d) Other Tools and Plants like: electric pipe cutters, pipe wrenches etc.

2.5.13 Protection and Plantation works

Plantation works are proposed in the vicinity and upstream of water sources. Few are also proposed in the office building area to improve the aesthetic look.

2.5.14 Sanitation Improvement

This component comprises, waste water management, solid waste management, public toilet *etc* and are described below;

A: Public Toilet

One public toilet with the capacity of 100 users is proposed as discussed with the WUSC and Municipality. It contains 5 urinals and 2 pans for male users while & 4 female units in separate male and female compartments.

B: 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 toilet as such were also found made temporarily eg 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.

C: 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 borehole 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 have latrines constructed but do not want to contribute.

2.5.15 Capital Cost of the Project Facilities

The total project cost (water supply and sanitation components) for the proposed water supply project has been estimated as Rs 360.817 million. The cost has been based on district rate of Rolpa (FY 073/74).

2.6 Relevancy of the project proposal:

Any development project has some environmental implications, whether beneficial or adverse. Therefore, it is pertinent to identify the complications/changes apparent in the environmental condition along with the favorable or adverse impacts resulting from the activities associated with the project over the physical, biological, socio-economic and cultural environment 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.

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



ToR for Initial Environmental Examination of Liwang Small Town Water Supply and Sanitation Project

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

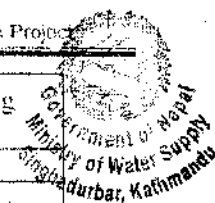
Threshold Limits for Conducting IEE

For Drinking Water Supply Project, according to the Environment Protection Rules, 2054 BS (and its amendments), Schedule-1 (Clause G; Drinking Water), IEE is required for the following conditions:

Table 2-10: IEE conditions as per EPR

Particulars	Status for proposed Liwang 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.	Within Range (Max. 13.14 lps, i.e. 0.46 cu.ft)
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.	Design population 10,816 (Within Limits)
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	Not applicable

Particulars	Status for proposed Liwang Town Project
influenced areas	
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.



For Drinking Water Supply Project: IEE is required for the water supply scheme having population between 10,000 - 100,000. The population of the project falls within this range. Further, this is an upgrading of the existing system. Service areas have been added and new sources are to be tapped. People will not be displaced with the construction /operation of the project.

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 FI/OP, 2010).

2.7 Project Area Delineation

Project sites as well as environmental impacts that could be caused due to project construction and implementation on the physical, biological, socio-economic and cultural aspects are considered while delineation of project area. Adverse and beneficial impacts are expressed on the basis of the proximity of activity and magnitude of impact. Based on the environmental impacts of the project, the project-affected areas are classified in Table 2-11:

Table 2-11: Project Area Delineation

Category	Reason	Project Affected Areas
A Direct Impact Zone	Construction areas of project activities (construction, camp facilities, excavation, stock piling)	500 m both upstream and downstream of structures/pipelines of the project area
B Indirect Impact Zone	Area that joins all sections of the proposed project	Liwang VDC
C Zone of Influence	Area other than category A & B	Rolpa District



CHAPTER 3

3. PROCEDURES TO BE ADOPTED FOR THE STUDY

The IEE approach, methodology and procedure adopted to prepare a comprehensive IEE report will generally follow the provisions of the EPA and EPR and related national and sectoral guidelines. The IEE study will focus on impact identification, prediction and finally evaluating the extent and weightage of the impact. The Consultant will follow the following methodology for the preparation of the report:

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

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

4. Collection and review of secondary information from various sources
5. Initial interaction and consultation with the local community and district level stakeholders
6. Delineation of the geographical boundary of the influence area on the topographical map
7. Preparation of sub-project specific checklists
8. Collection and review of secondary sources of information from various sources

Secondary information will be collected through published and unpublished reports and interpretation of maps and photographs.

During the IEE report preparation, the Consultant's Environmental Team meet, discuss and interact with concerned staff of the Government of Nepal, DDC, and VDCs in the district headquarter, teachers, community based organization members and knowledgeable key persons of the surrounding areas within the Zone of Influence (ZoI) on:

1. Delineation of the geographical boundary of the Zone of Influence area on the topo-map
2. Preparation of a project specific checklist

3.2 Field Study and site inspection

A checklist is prepared to collect physical, biological, socio-economic and cultural environment-related information in the field. In addition, a Zol household survey questionnaire will collect socio-economic information of the households.



Physical and Chemical - Topography, land use, air noise and water quality, geology, hydrology, soil type, etc., use of various chemicals including fuel, lubricants, oil, acids, cement etc.

Biological- Flora/fauna, endangered species, NTFPs etc

Socio-Economic and Cultural - Population, ethnicity, existing infrastructure, health facility, public utilities, economic status, etc.

3.3 Data Analysis and Impact Quantification

- **Impact Identification**

In order to identify the impact a preliminary exercise to solicit information from planners, policy makers, project components, concerned authorities and the user community will be conducted. Similarly, the reports on hydrology and geo-hydrology, meteorology, geology and others related to the environment will also be reviewed.

- **Impact Prediction**

The Consultant shall address the impact details by furnishing information on the physical, biological, socio-economic and cultural environments. A description of relevant parts of the project, using maps with appropriate scales 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.

- **Impact Evaluation**

To evaluate the occurrence of the impact, information on mitigation and costs associated with construction activities (during design, construction and operation and maintenance activities) shall be included.

3.4 Public Consultation Program and Public Notice:

Public consultation programs in the project area will be organized to inform the broader communities and to collect the feedbacks and suggestions regarding the issues. This program mainly focus 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.

The proponent will affix a notice in the office of Liwang VDC and concerned ward offices, the Office of DDC, schools in the project area, hospitals and health post requesting the concerned authorities and



Individuals to offer their written opinion and suggestions within fifteen days with regard to the possible impact of the implementation of the proposal on the environment. The notice will also be published in the national daily newspaper. Deeds of the fixing of notice from the concerned offices will be collected and included within the report.

3.5 Report Preparation:

The Consultant will submit the IEE Draft report within 45 days after the approval of TOR. The draft IEE report will be presented to WUSC, local body representative 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.

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

The approved ToR will be shared with ADB under the IEE document preparation as per ADB requirements.

CHAPTER 4

4. POLICIES, LAWS, RULES, DIRECTIVES AND GUIDELINES

The Consultant shall describe the pertinent regulations, standards that govern environmental quality, health and safety, protection of sensitive areas and endangered species etc. at international, regional, district, VDC and Ward levels. Nepal is a signatory to many international conventions, including those concerning habitat, biodiversity, cultural heritage protection. These issues shall be considered during IEE and their avoidance/mitigation measures shall be identified. The IEE should also be conducted in compliance with the following Laws, Acts, Rules & Regulation, Standards, Manuals, Strategies and International Conventions:

Laws

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

Acts

- Land Acquisition Act 2034 B.S. (1977 A.D.)
- Solid Waste Management and Resource Mobilization Act 2044 (1987)
- Water Resources Act 2049 B.S. (1992 A.D.)
- Water Tax Act 2023 (1966)
- Soil and Water Conservation Act, (1995)
- Nepal Water Supply Corporation Act. (1989)
- Water Supply Management Board Act. (2006)
- Labor Act 2048 B.S. (1992 A.D.)
- Forest Act 2049 (1993 A.D.)
- Forest Regulations 2050 (1995 A.D.)
- Environment Protection Act 2053 B.S. (1997 A.D.)
- Local Self Governance Act 2055 B.S. (1999 A.D.)
- Drinking Water Regulations 2055 B.S. (1998 A.D.)
- Child Labor Prohibition and Regulation Act 2056 B.S. (2001 A.D.)
- Town Development Act 2045 B.S. (1988 A.D.)

Rules & Regulations

- Solid Waste (Management & Resource Mobilization), Rules, 2047 B.S. (1990 A.D.)
- Water Resources Regulations 2049 B.S. (1993 A.D.)
- Forest Regulation 2052 B.S. (1995 A.D.)
- Environment Protection Rules 2054 B.S. (1997 A.D.) and amendments
- Drinking Water Regulations 2055 B.S. (1998 A.D.)
- Child Labor Prohibition & Regulation Act 2056 B.S. (2001 A.D.)
- Urban Water Supply & Sanitation Policy 2066 B.S. (2009 A.D.)



International Conventions

- World Heritage Convention, in 2036 B.S. (1978 A.D.);
- Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention), in (2045 B.S.) 1987 A.D.;
- Convention on Biodiversity, in 2050 B.S. (1992 A.D.);
- Vienna Convention for the Protection of the Ozone Layer and its Montreal Protocol and subsequent London Amendment, in 2052 B.S. (1994 A.D.);
- Basel Convention on the Control of Trans boundary Movements of Hazardous Wastes and Their Disposal, in (2055 B.S.) 1996 A.D.

Plans and Policies

- Rural Water Supply & Sanitation National Policy, Strategy & Action Plan 2060 B.S. (2004 A.D.)
- Three Year Interim Plan 2063 B.S. (2007 A.D.)
- ADB's "Safeguard Policy Statement (SPS)" 2066 B.S. (2009 A.D.)

Standards, Manuals, Strategies & Guidelines

- National IEE Guideline 2049 B.S. (1993 A.D.)
- National Drinking Water Quality Standards 2062 B.S. (2005 A.D.)
- Water Resources Strategy, 2059 (2002)

Chapter 5

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



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

5.1 Time Schedule

Considering the time limitations, the study has to be completed within about 9 weeks. The work schedule is presented in the Table 5-1.

Table 5-1: Proposed Work Schedule

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

5.2 Estimated Budget

The total estimated cost for the Initial Environmental Examination (IEE) work of Liwang Small Town Water Supply and Sanitation sub-project is approximately NRs. 500,000.00.



5.3 Human Resources Required

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

1. Environmental Specialist
2. Civil Engineer
3. Water Supply and Sanitation Engineer
4. Socio-economist
5. Geo-hydrologist

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



Chapter 6

6. ANTICIPATED IMPACTS OF THE PROPOSED PROJECT ON THE ENVIRONMENT

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

6.1: Beneficial Impacts

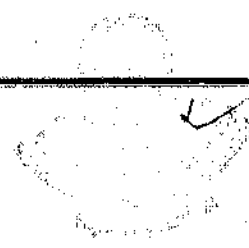
Not only the adverse impacts or issues, there will be various beneficial issues and impacts due to the implementation of the project. These aspects will be evaluated in detail during IEE study. However, some of the anticipated beneficial impacts which will eventually enhance the life style of the residing population as a result of implementation of the project are as follows;

(a) Construction Phase

- i. Employment Generation and Increase in Income
- ii. Skill Enhancement

(b) Operation and Maintenance Phase

- i. Improvement in health and saving of time
- ii. Development of Market center
- iii. Appreciation of Land Value
- iv. Women Empowerment
- v. Quality of Life Values



6.2 Adverse Impacts/Issues

6.2.1 Pre-construction Stage

The pre-construction works involve 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. Some of the issues of 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 Stage

(a) Socio-economic Environment

i. Disturbance to the community activities

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

ii. Social Dispute and Dissatisfaction

There is possibility of influx of outside workforce and with them money from the construction work and unwanted communities can cause some strife with the local community. Use of public land for project infrastructures may also bring some remarks from the locals.

iii. Community health and safety

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

iv. Occupational health and safety (OHS)

Life and health of workers particularly of those involved in concreting, trench cutting, formwork and rebar fixing in overhead tank is of prime concern.



(b) Physical Environment

i. Erosion and land surface disturbance

Top soil during construction 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. Formation of topsoil is very long natural process and is the most fertile portion of the soil.

ii. Damage to the Existing Facilities

During the construction time, while excavating the earth, existing water supply distribution pipe lines and telecommunication cable may get damaged in few places particularly in bazaar area in spite of great care.

iii. Impact on water bodies

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

iv. Air and Noise pollution

The construction activity will comprise of construction, transmission and distribution pipelines, construction of storage reservoirs, transport and installation of pumps.

v. Vibration effects

Construction works are likely to have slight risk of cracks and damages to local infrastructures and private properties due to effects of vibration.

(c) Biological Environment

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

i. Impact on Flora

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

ii. Impact on Fauna

Movement, inhabitation and population dynamics of resident and migratory birds and reptiles at the project site may be affected during construction period due to various construction activities.

iii. Impact on aquatic life

Construction activities are related to the water bodies. These construction activities will physically disturb the water quality for certain period of time and may cause impact on aquatic life.

6.2.3 Post-Construction and Operation Phase

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

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

Table 6-1: 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
		Disturbance to wildlife	Issues of land requirement for project structures
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
	In use roads, 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		Health and safety of the workers, e.g. workers

	use of vehicles and equipment, its associate noise and vibration effects		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



6.4 Mitigation Measure

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

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

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



Chapter 7

7. ALTERNATIVE ANALYSIS

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

- No action option
- Alternative design
- Alternative location
- Alternative schedule and process

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

The mitigation measures for adverse potential impacts due to location, design, construction and post-construction will have to be proposed during the preparation of the IEE report for all the perceived impacts to minimize the environmental impacts of project implementation after the prediction of extent, magnitude and duration of the impacts. Mitigation measures will have to be incorporated from the planning stage onwards. In general the following areas shall be covered while preparing mitigation measures:

- a. Project design/pre-construction phase
- b. Project construction phase
- c. Project operation and maintenance phase

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

Alternative System Analysis

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

Chapter 8

2. MATTERS CONCERNING THE PREVENTION OF THE IMPACTS OF THE IMPLEMENTATION OF THE PROPOSAL ON THE ENVIRONMENT



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 in both the construction and operation phases. The proponent will be responsible for the implementation of environmental mitigation and enhancement program mentioned in IEE report.

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 IEE report. Cost of mitigation and enhancement measures will be categorized in terms of construction and operation phases.

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



Chapter 9

9. MATTERS TO BE MONITORED WHILE IMPLEMENTING THE PROJECT

9.1 Environmental Management Plan

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

9.2 Environmental Monitoring Plan

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



9.3 Information Disclosure, Public Consultation and Participation

Public consultation is the process of exchanging information with those persons and organisations with a legitimate interest in a project and/or who are likely to be affected by the project (stakeholders). It is a two-way process that informs and involves the community in developing a project, and informs the proponent about issues and concerns, which can then be addressed in project design. Information disclosure involves stakeholders in monitoring the development and implementation of a project and fosters openness in decision-making by presenting documents and other project materials for public scrutiny. The consultation and disclosure involves consultation with stakeholders at an early stage of project preparation, and throughout project implementation. As a minimum, stakeholders will be consulted regarding the scope of the environmental study before work has commenced in earnest, and should then be informed about the likely impacts of the project and proposed mitigation once the draft IEE report is under preparation. The report should record the views of stakeholders and indicate how these have been taken into account in project development. Information is disclosed through public consultation and more formally by making documents and other materials available and at a location in which they can be easily accessed by stakeholders. This normally involves making draft reports available (in the local language) at public locations in the community and providing a mechanism for the receipt of comments and making documents available more widely.

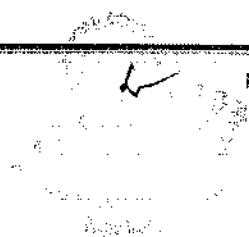
Public consultation and involvement should be given highest priority in the implementation of mitigation measures. Public consultation should take place and on the basis of the decisions of the consultation meeting, implementation of mitigation measures should be prioritized and should be carried out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

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

9.4 Grievance Redress Mechanism

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

A Grievance Redress Committee (GRC) will be formed at the town/VDC/Municipality level, comprising the Chairperson of WASH CC as the chairperson of GRC, and Secretary of concerned WUA or local bodies as the GRC secretary. The GRC members will comprise of (1) RPO social development/environmental (as relevant) officer, (2) representative of affected persons, (3) DSMC's safeguards specialist (social/environment as relevant), (4) a representative of reputable





CBO/SHG/organization working in the project area¹, and (5) contractor's representative. The secretary of the GRC will be responsible for convening timely meetings and maintaining minutes of meetings. The concerned social safeguards expert of DSMC will support the RPMO safeguard's officer and Project Manager of RPMO to ensure that grievances, including those of the poor and vulnerable are addressed. All GRCs shall have at least two women committee members. Along with representatives of APs, civil society and eminent citizens can be invited as observers in GRC meetings. A three tier GRC will be operative as per PAM, TSTWSSSP.

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

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

Chapter 10

10. OTHER NECESSARY MATTERS AND THE REPORT

The IEE report shall be prepared as per this ToR document. The IEE report, whenever applicable, shall contain maps, graphs, photographs, tables and matrix. Letters obtained from the stakeholders in response to public notification, and the newspaper cut piece of public notification and no objection letter from district office will be included in the IEE report. The format of report will be in accordance with the format provided by PMO, STWSSSP. The IEE report should include 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

2.5.1

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

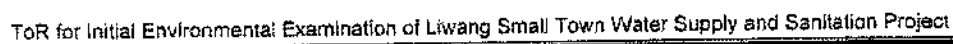
6.5 Information Disclosure, Consultation and Public Participation

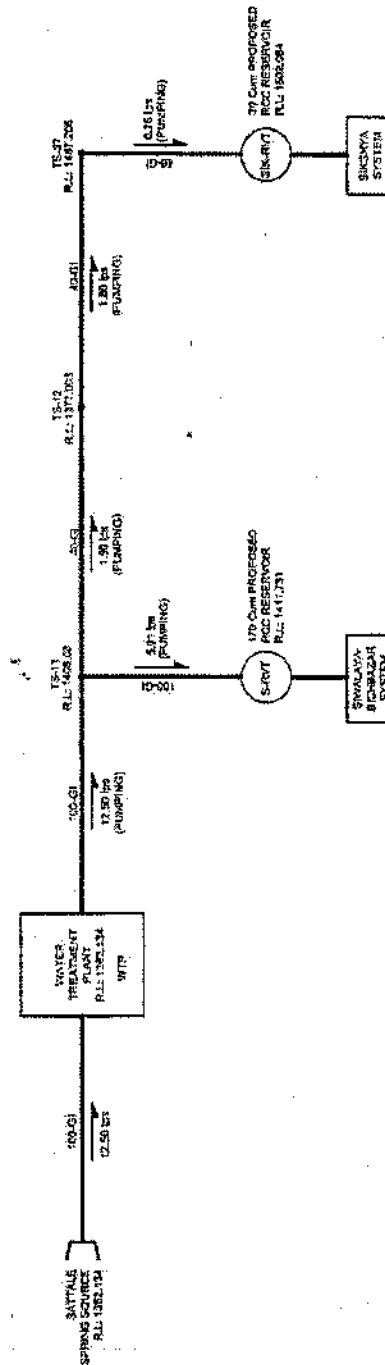
6.6 Grievance Redress Mechanism

10. Conclusions and Recommendations

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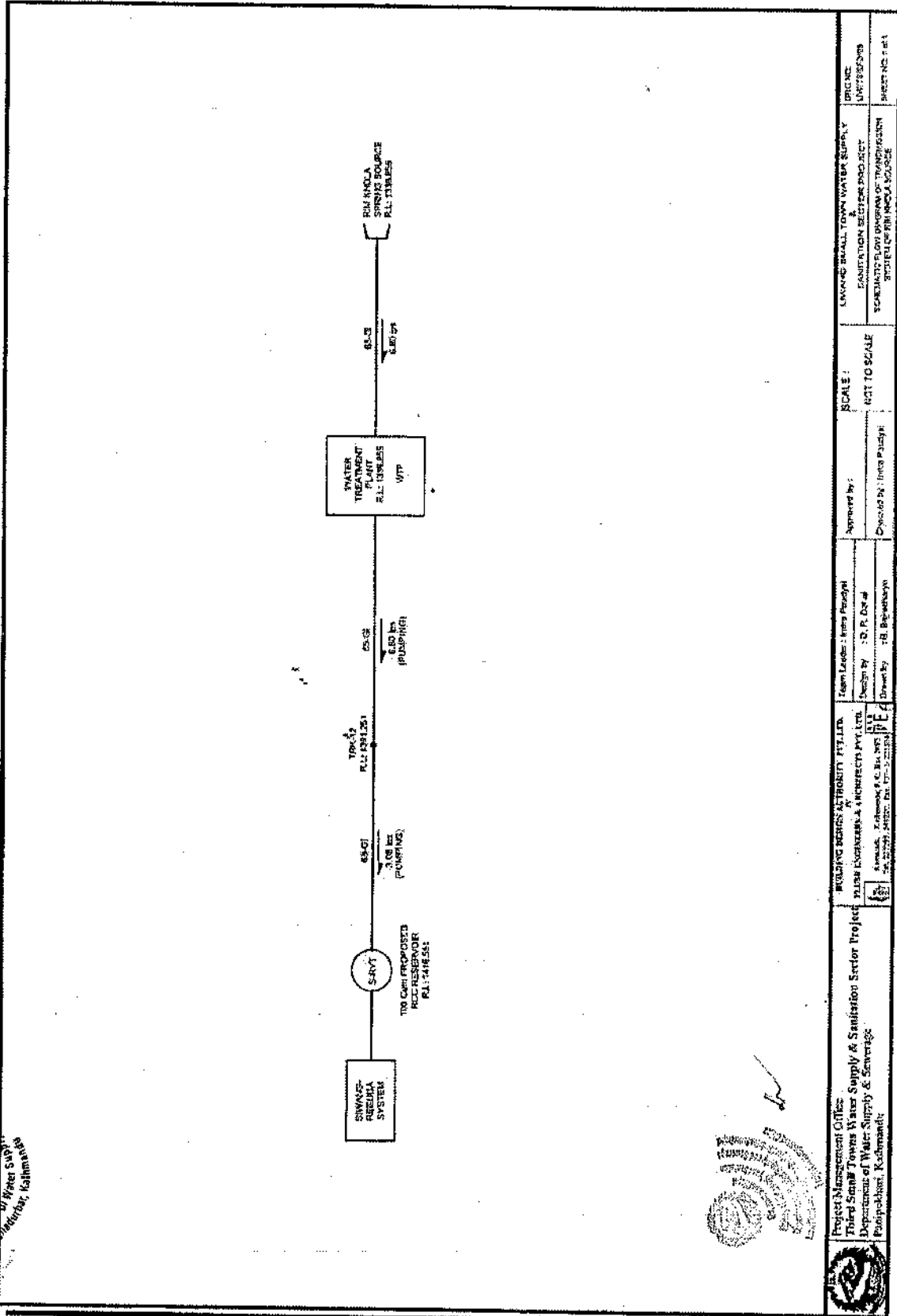


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	Project Management Office Third Small Towns Water Supply & Sanitation Sector Project Department of Water Supply & Sewerage Bangalore, Karnataka		BUILDING DESIGN AUTHORITY EYELA PUNJ ENGINEERS & ARCHITECTS PVT. LTD. Kumbha, Mysuru - 570 002 Tel: 22711, 22712, Fax: 22713, 22714		Team Leader: Inna Pandya Design by : D. R. DPM Drawn by : M. Rajeshwari		Scale : Approved by : NOT TO SCALE Checked by : Inna Pandya		LIVING SMALL TOWN WATER SUPPLY SANITATION SECTOR PROJECT SOMEWHAT FLOW PROGRAM OF TRANSMISSION SYSTEM OF SATTALE CANALS	DRG NO: UNIVERSITY SHEET NO: 1 of 1



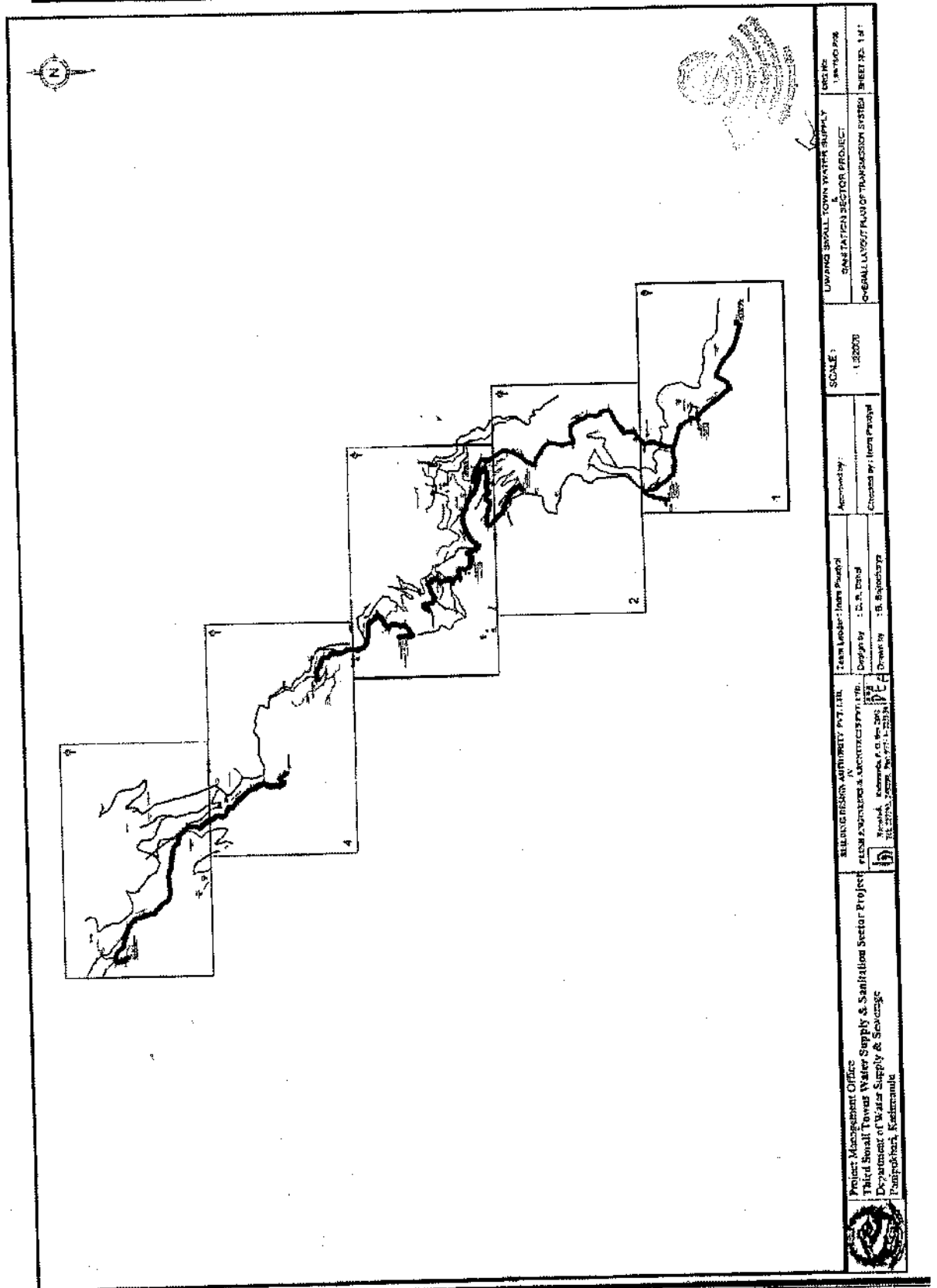
ToR for Initial Environmental Examination of Liwang Small Town Water Supply and Sanitation Project

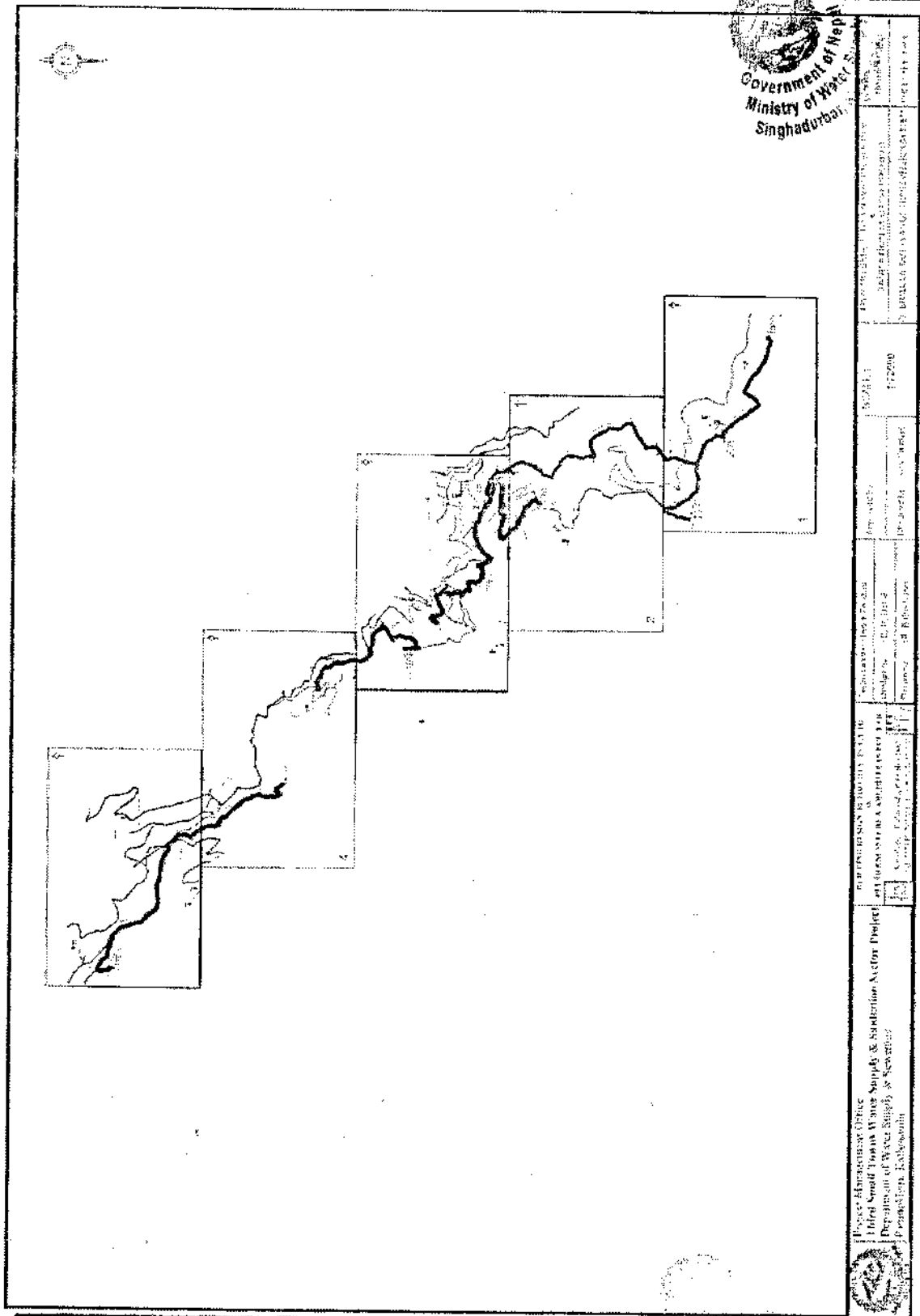


Project Management Office: Third Small Towns Water Supply & Sanitation Sector Project Department of Water Supply & Sewerage Pokhara, Kathmandu	Project: Liwang Small Town Water Supply & Sanitation Sector Project Schematic Diagram of Transmission System of RIN KHOLA SOURCE	Scale: NOT TO SCALE	Approved by: [Signature] Checked by: [Signature]	Project No: 101
Team Leader: [Name] Design by: [Name] Drawn by: [Name]	Team Leader: [Name] Design by: [Name] Drawn by: [Name]	Team Leader: [Name] Design by: [Name] Drawn by: [Name]	Team Leader: [Name] Design by: [Name] Drawn by: [Name]	Team Leader: [Name] Design by: [Name] Drawn by: [Name]



ToR for Initial Environmental Examination of Liwang Small Town Water Supply and Sanitation Project







ANNEX II

ADB's REA Checklist

**ADB's Rapid Environmental Assessment (REA) Checklist for Liwang Sub Projects and preliminary
Climate Risk Screening Checklist for Sample Sub project Towns**

Ministry of Water Supply
Singha Durbar, Kathmandu

Instructions:

- (i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by the Director, RSES and for approval by the Chief Compliance Officer.
- (ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.
- (iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title:

NEP: Third Small Towns Water Supply and Sanitation Sector

Subproject:

Liwang Water Supply and Sanitation Subproject

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

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ToR for Initial Environmental Examination of Lwang Small Town Water Supply and Sanitation Project

Screening Questions	Yes	No	Remarks
• dislocation or involuntary resettlement of people?			
• disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?			
• noise and dust from construction activities?			
• increased road traffic due to interference of construction activities?			
• continuing soil erosion/silt runoff from construction operations?			
• delivery of unsafe water due to poor O & M treatment processes (especially MWSS accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?			
• delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?			
• accidental leakage of chlorine gas?			
• excessive abstraction of water affecting downstream water users?			
• competing uses of water?			
• increased sewage flow due to increased water supply			
• increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant			
• large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?			
• social conflicts if workers from other regions or countries are hired?			
• Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction?			
• Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?			

Ministry of Local Government, Water Supply and Sanitation
Kathmandu



Preliminary Climate Risk Screening Checklist for Sample Sub Project Towns

	Screening Questions	Score	Remarks
Location and design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides		
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g. sea-level, peak river flow, reliable water level, peak wind speed etc.)		
Materials and maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity, and hydro meteorological parameters) affect the selection of project inputs over the life of project outputs (i.e. construction materials)		
Performance of Project Outputs	Would climate/weather conditions and related extreme events likely to affect the performance throughout their design life time?		

Options for answers and corresponding scores are given below.

Response	Score
Not Likely	0
Likely	1
Very Likely	2

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

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

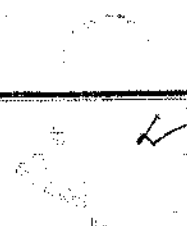
Other comments: None

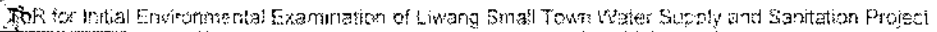




ANNEX III

Environmental Checklists & Socioeconomic Questionnaires for the IEE Study





Date:

Note: _____

Date:

[illegible]

Note:

TOB for initial Environmental Examination of Liweng Small Town Water Supply and Sanitation Project

क.	काग रंगर	ख.	नीकरीवाट भएको आम्दानीवाट
ग.	व्यापारीको आम्दानीवाट	घ.	भारी बोकेर भएको आम्दानीवाट
ड.	दैनिक मजदुरवाट भएको	च.	अन्य



३.९ पशुपालन सम्बन्धी :

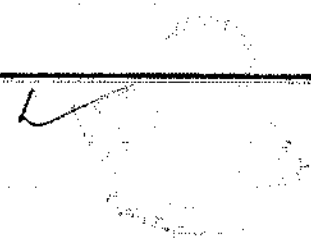
तिपथको घरमा कति / कस्तो पशु पस्तीहन पाल्नु भएको छ/छ ?

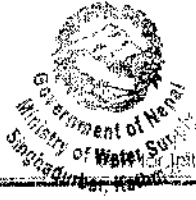
क्र.सं.	पशुपंथी	संख्या
१	गाई	
२	गाव	
३	भैँसी	
४	बाख्रा	
५	बोख्रा	
६	पाडा	
७	पाण्डु	
८	रांगो	
९	छाडा	
१०	बाख्रा	
११	बोका	
१२	खसी	
१३	पाडा/पाटी	
१४	संगर/बंगर	
१५	होस	
१६	कखुरा	
१७	अन्य (खुलाउने)	

४. घर परिवारको वार्षिक औषत आम्दानी :

श्रोत	वार्षिक आम्दानी (रु.)	श्रोत	वार्षिक आम्दानी (रु.)
कृषिवाट		अन्य श्रोतहरु	
खाद्यान्न		नाकरी, सेवा	
नगदेबानी		ज्याला मजदुरी र भरिया	
फलफल		निवृत्तिभरण	
जम्मा (१)		व्यापार	
पशुपालनवाट		घरेलु उद्योग	
दग्ध उत्पादन		पशासत सेवा	
अण्डा कखुरा होस विक्री		माछा विक्री	
वाछा/बाछी/गोर/बिक्रि		अन्य	
भैँस/रांगो बिक्रि		जम्मा (३)	
बोका/खसी/भेडा/बाछा			
बिक्रि			
संगर/बंगर बिक्रि			
कखुरा/होस बिक्रि			
जम्मा (२)			
जम्मा आय (१+२)			

५. घर परिवारको वार्षिक औषत खर्च :





Initial Environmental Examination of Liwang Small Town Water Supply and Sanitation Project

विवरण	जम्मा रकम (रु.)	विवरण	जम्मा रकम (रु.)
प्रामाण्य		चिवा	
खाना		काउच	
नक्का		दिउली	
नक्काको		मोडिफिकेसन	
दुध/दुधो		ओपिड	
साइकल/भाडा		शिफा	
नया/दुध		कपडा	
भुर-मसलना		चाउपत्र	
नया		अन्य	
चिनी			
		जम्मा खर्च	

६. पानीको आपूर्ति

(क) तपाईंले यस खोलाको पानी उपयोग गर्नु हुन्छ, कि हुँदैन र
 गर्नु ☐ हुँदैन ☐

(ख) यदि खोलाको पानी उपयोग गर्नु हुन्छ भने कुन पर्याजनको लागि प्रयोग गर्नुहुन्छ र
 सिचाई ☐ गृहभित्र, बगैचा घुम्ने ☐
 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

कस	नाता	पुरुष	महिला	उमेर	रोग
१					
२					
३					
४					

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

(ग) विरामी पछि सर्वप्रथम कहाँ जानुहुन्छ र

(घ) त्यहाँ निको नभए कहाँ जानुहुन्छ र कसको उल्लेख गर्नुहोस्।

क.स	जाने ठाउँ	रहेको स्थान	दूरी (कि.मी.)
१	अस्पताल		
२	हेल्थपोस्ट		

क. भूगर्भ	ख. नोकरीवाट भएको आम्दानीबाट
ग. व्यावसायिक आम्दानीबाट	घ. भारी बाँकेर भएको आम्दानीबाट
ड. बैँसक मजदुरबाट भएको	च. अन्य



३.९ पशुपालन सम्बन्धी :

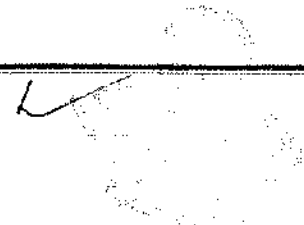
नपाईको घरमा बाँट्न, कस्तो पशु पक्षीहरू पाल्ने भएको छु र

क्र.सं.	पशुपंक्षी	संख्या
१	गाई	
२	गाढ	
३	मेसी	
४	वाछु	
५	वाछि	
६	पाडा	
७	पाँडु	
८	गोसा	
९	घाँडा	
१०	बाछा	
११	बोका	
१२	खसी	
१३	पाटा/पाटी	
१४	सुगर/बुगर	
१५	हंस	
१६	कस्तुरा	
१७	अन्य (खुलाउने)	

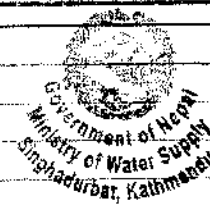
४. घर परिवारको वार्षिक औषत आम्दानी :

श्रोत	वार्षिक आम्दानी (रु.)	श्रोत	वार्षिक आम्दानी (रु.)
कृषिबाट		अन्य श्रोतहरू	
खाद्यान्न		नोकरी, सेवा	
नगदेखानी		ब्यापार मजदुरी र भरीया	
फलफूल		निर्वातनरण	
जम्मा (१)		व्यापार	
पशुपालनबाट		घरेलु उद्योग	
दुध उत्पादन		पेशागत सेवा	
अण्डा/कस्तुरा/हंस विक्री		माछा विक्री	
वाछा/वाछी/गोरु विक्री		अन्य	
मैसि/राँगा विक्री		जम्मा (२)	
बोका/खसी/मेडा/बाछा विक्री			
सुगर/बुगर विक्री			
कस्तुरा/हंस विक्री			
जम्मा (२)			
जम्मा आय (१+२)			

५. घर परिवारको वार्षिक औषत खर्च :



३	इन्धन सप्लाय		
४	बालबोलीका औपचारिक		
५	बिजुल प्रविधिकार शोधार्थी पत्राचार		
६	घासा भाडो		
७	अन्य		



८. महिलाको अवस्था:

(क) धर्मको बर्गिकरण

क.सं	कामको विवरण	हिस्सा प्रतिशतमा	
		पुरुष	महिला
१	खनजोत		
२	सकल श्रम		
३	अभिनव तयारी		
४	सकल		
५	सोदमेत		
६	निर्वाह		
७	क्राउने		
८	क्रोशे र धन्याउने		
९	अन्न प्रयोगन कटार्इ पिमाई		
१०	घास दाउग		
११	गोशाला		
१२	सकल		
१३	सकल		
१४	सकल		
१५	सकल		
१६	सकल		

(ख) सम्पत्तिमा अधिकार

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

(ग) निर्णय प्रक्रियामा अधिकार

क.सं	कामको विवरण	हिस्सा प्रतिशतमा	
		पुरुष	महिला
१	बानी रोज्ने		



Initial Environmental Examination of Liwang Small Town Water Supply and Sanitation Project

क.सं	कामको विवरण	हिस्सा प्रतिशतमा	
		पुरुष	महिला
२	पशु खरीदबिक्री		
३	गरगहना खरीदबिक्री		
५	अन्न खरीदबिक्री		
६	फलफूल खरीदबिक्री		
७	पशुजन्य पदार्थ खरीदबिक्री		
८	काठ काटन खरीदबिक्री		
९	बिघावारी		
१०	परिवार नियोजन		
११	श्रीराष्ट्रिय पढाइ लेखाई		
१२	अन्य		

९. सुश्रव्वा सम्बन्धी:

(क) तपाईंको घर र जग्गाको सुश्रव्वा के भा खान्नु हुन्छ र

नगद ☐ जग्गाको सहा जग्गा ☐ अन्य ☐

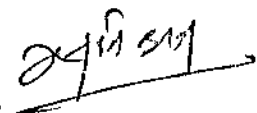
(ख) यदि तपाईंले सुश्रव्वा नगदमा पाउनु भएको भने उक्त सुश्रव्वा रकम के भा प्रयोग गर्नु हुन्छ र

जग्गा किल्ने ☐ घर बनाउने ☐ अरु कतै ☐
 व्यापार गर्ने ☐ अन्य ☐

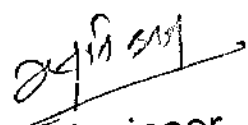
१०. प्रस्ताव कार्यन्वयन गर्दा के कस्तो प्रभाव पर्ने सक्दछ सो सम्बन्धी गद्य शुभाच छ र
 नकारात्मक

ANNEX 2: CHECKLIST, SAMPLE FORMS, FORMATS AND REPORTING
TEMPLATES




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ANNEX 2-A: RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST FOR LIWANG PROJECT AND PRELIMINARY CLIMATE RISK SCREENING

Instructions

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

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

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

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

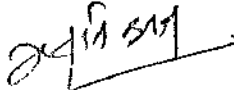
Subproject: **Liwang Urban Water Supply and Sanitation Project**

Screening Questions	Yes	No	Remarks
A. Project Siting Is the project area			
Densely populated?		✓	The population density is 19.57 (per hectare)
Heavy with development activities?		✓	
Adjacent to or within any environmentally sensitive areas?			
Cultural heritage site		✓	
Protected Area		✓	
Wetland		✓	
Mangrove		✓	
Estuarine		✓	
Buffer zone of protected area		✓	
Special area for protecting biodiversity		✓	
Bay		✓	
B. Potential Environmental Impacts Will the Project cause...			

Government of Nepal
Ministry of Water Supply and Sanitation
Department of Urban Water Supply and Sanitation
Urban Water Supply and Sanitation Division
Project Management Office

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pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and soil erosion runoff?		√	
impairment of historical/cultural monuments/areas and loss/damage to these sites?		√	
hazard of land subsidence caused by excessive ground water pumping?			
social conflicts arising from displacement of communities ?		√	
conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		√	
unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?	√		Complete water treatment is proposed. EMP recommends water quality monitoring as prescribed in the NDWQS & its directives.
delivery of unsafe water to distribution system?	√		Design proposes monitoring kits, a lab room. EMP recommends continuing training of WUSC in water quality monitoring, as prescribed in the NDWQS Directives. WSP team will also monitor the system.
inadequate protection of intake works or wells, leading to pollution of water supply?	√		Design proposes protection for intake, as well as perimeter fencing of the entire land area of the intake & associated facilities.
over pumping of ground water, leading to salinization and ground subsidence?		√	
excessive algal growth in storage reservoir?		√	The design incorporates closed reservoirs
increase in production of sewage beyond capabilities of community facilities?		√	Most of the communities have septic tanks leading to soak pits. EMP provides mitigation measures.
inadequate disposal of sludge from water treatment plants?		√	Minimal sludge expected. EMP provides mitigation measures for sedimentation and safe disposal of the effluent.
inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?		√	
Impairments associated with transmission lines and access roads?	√		Loss of shrub cover and damage to standing crops, loss of topsoil are some concerns that are planned for mitigated and compensation
health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.	√		Ca(ClO) ₂ , commonly used in basic water treatment, will be used. Chlorine use guidelines will be followed. Separate storing space will be allocated, and standard operating procedures will be followed.



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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?	√		Operators/workers will be well trained, cautioned and protective equipment will be provided to them Cleaning and disinfection will be scheduled with proper responsibility to specific person/s
dislocation or involuntary resettlement of people?		√	
disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		√	
noise and dust from construction activities?	√		EMP provides mitigation measures.
increased road traffic due to interference of construction activities?	√		EMP provides mitigation measures.
continuing soil erosion/silt runoff from construction operations?		√	Only short term activities are required
delivery of unsafe water due to poor O&M treatment processes (especially MoWS accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?	√		EMP incorporates monitoring of distributed water according to the Directives for the NDWQS. Residual chlorine of 0.5mg/L will be maintained at all times, and this will be regularly monitored
delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?		√	HDPE and DI pipes are proposed
accidental leakage of chlorine gas?		√	
excessive abstraction of water affecting downstream water users?		√	Safe yield has been maintained
competing uses of water?		√	
increased sewage flow due to increased water supply	√		Most of the communities have septic tanks leading to soak pits.
increased volume of sillage (wastewater from cooking and washing) and sludge from wastewater treatment plant		√	Coordination with municipality team for its integrated urban planning and development approach
large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		√	Water supply will be used under permission from local authority and under coordination with the locals. Separate toilets (temporary and permanent, if required) will be constructed for the workforce
social conflicts if workers from other regions or countries are hired?	√		Expected as low concern. Priority will be given to local workers.
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction?	√		Signboards, sharing of working schedules, proper fencing of stockpile areas and campsites will be conducted
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?		√	Small structures are proposed. However, concerns of land instability and structural strengths will be well addressed Signboards will be placed to exclude general public from active construction sites and sensitive areas of the project



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Preliminary Climate Risk Screening Checklist for Sample Sub Project Towns

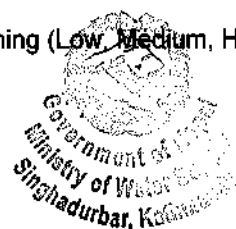
Screening Questions	Score	Remarks
Location and design of project Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides	0	Investments in the sample sub project will not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

Options for answers and corresponding scores are given below.

Response	Score
Not Likely	0
Likely	1
Very Likely	2

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

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



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ANNEX 2-B: RELEVANT ENVIRONMENTAL QUALITY STANDARDS**B.1 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 * 2000
TSP	Annual	-	-	-
	24-hour	230	-	-
PM ₁₀	Annual	-	20	-
	24-hour	120	50	-
PM _{2.5}	1-year	-	10	-
	24-hour	-	25	-
SO ₂	Annual	50	-	-
	24-hour	70	20	-
	10-minute	-	500	-
NO ₂	1-year	40	40	-
	24-hour	80	-	-
	1-hour	-	200	-
CO	8-hour	10,000	-	10,000
	15-minute	100,000	-	100,000
Pb	1-year	0.5	-	0.5
Benzene	1-year	20	-	-

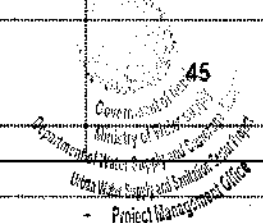
* National Ambient Air Quality Standards for Nepal, 2003. Obtained from Environment Statistics of Nepal 2011, Government of Nepal, National Planning Commission Secretariat, Central Bureau of Statistics, Kathmandu, Nepal.

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

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

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

B.2 Noise Level Standards

Receptor / Source	National Noise Standard Guidelines, 2012 (dB)		WHO Guideline Values for Noise Levels Measured Out of Doors * (One Hour L _{eq} 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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B.3 National Drinking Water Quality Standards, 2006

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

* Health-based guideline values

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

^ These standards indicate the maximum and minimum limits.

^^ From WHO (2003) Chlorine in Drinking-water, which states that this value is conservative.

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

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



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ANNEX C: SAMPLE GRIEVANCE REDRESS FORM

(To be available in Nepalese and English)

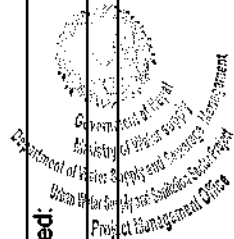
The _____ Project welcomes complaints, suggestions, queries and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enables us to get in touch with you for clarification and feedback. Should you choose to include your personal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

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

FOR OFFICIAL USE ONLY

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

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ANNEX D: SAMPLE TRAFFIC MANAGEMENT PLAN

SAMPLE: TRAFFIC MANAGEMENT PLAN (TMP)

A. Principles

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

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

B. Operating Policies for TMP

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

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

C. Analyze the impact due to street closure

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

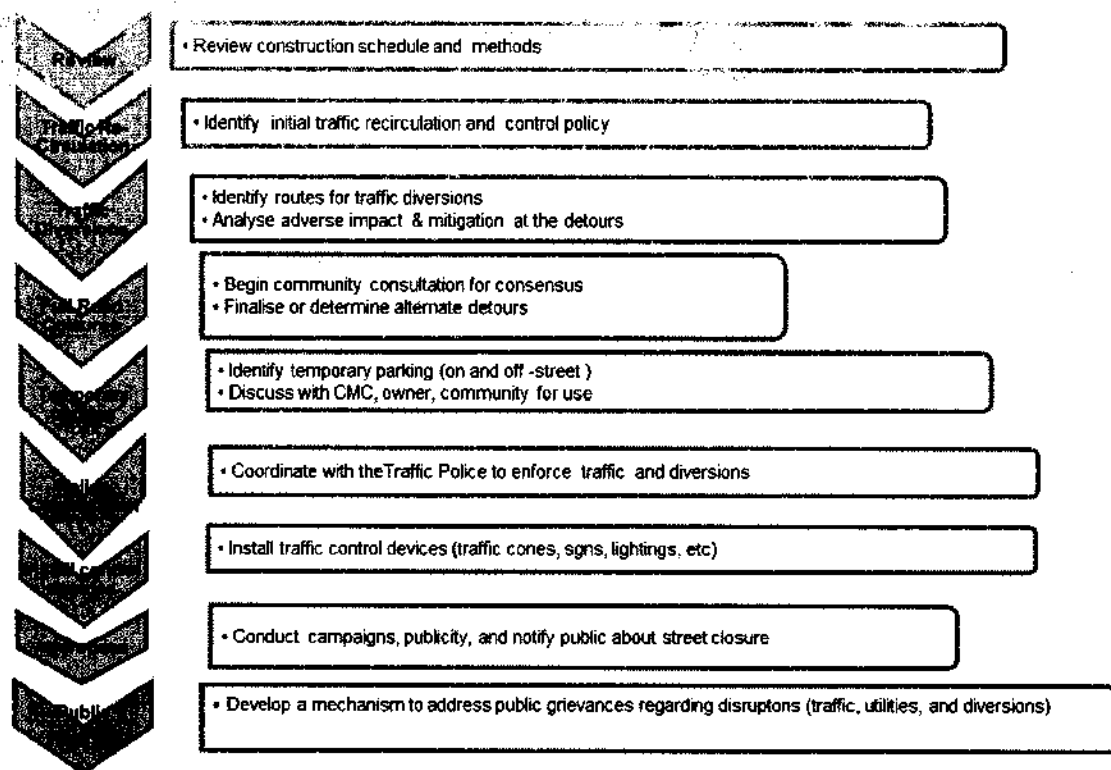
- approval from the ICG, local administration to use the local streets as detours;
- consultation with businesses, community members, traffic police, PWD, etc, regarding the mitigation measures necessary at the detours where the road is diverted during the construction;
- determining of the maximum number of days allowed for road closure, and incorporation of such provisions into the contract documents;
- determining if additional traffic control or temporary improvements are needed along the detour route;
- considering how access will be provided to the worksite;
- contacting emergency service, school officials, and transit authorities to determine if there are impacts to their operations; and
- developing a notification program to the public so that the closure is not a surprise. As part of this program, the public should be advised of alternate routes that commuters can take or will have to take as result of the traffic diversion.

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



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Figure A: Policy Steps for the TMP



D. Public awareness and notifications

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

The awareness campaign and the prior notification for the public will be a continuous activity which the project will carry out to compensate for the above delays and minimize public claims as result of these problems. These activities will take place sufficiently in advance of the time when the roadblocks or traffic diversions take place at the particular streets. The reason for this is to allow sufficient time for the public and residents to understand the changes to their travel plans. The project will notify the public about the roadblocks and traffic diversion through public notices, ward level meetings and city level meeting with the elected representatives.

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

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

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

The campaign will cater to all types of target groups i.e. children, adults, and drivers. Therefore, these campaigns will be conducted in schools and community centers. In addition, the project will publish a brochure for public information. These brochures will be widely circulated around the area and will

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Ministry of
Singaperbangsa, K.

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also be available at the ICG, and the contractor's site office. The text of the brochure should be concise to be effective, with a lot of graphics. It will serve the following purpose:

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

E. Vehicle Maintenance and Safety

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

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

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

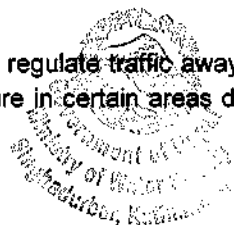
The purpose of installing traffic control devices at the work zones is to delineate these areas to warn, inform, and direct the road users about a hazard ahead, and to protect them as well as the workers. As proper delineation is a key to achieve the above objective, it is important to install good traffic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

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

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

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

Traffic police should regulate traffic away from the work zone and enforce the traffic diversion result from full street closure in certain areas during construction. Flaggers/ personnel should be equipped



29/11/2017
Engineer

Initial Environmental Examination for Liwang Small Town Water Supply and Sanitation Project

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.



24/11/11
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ANNEX E: SPOIL MANAGEMENT PLAN

Spoil Management Plan (SMP)

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

Objectives of SMP: The objectives of SMP are:

- To minimize spoil generation where possible
- Maximize beneficial reuse of spoil from construction works in accordance with spoil management hierarchy
- 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

Aspect	Potential Impact
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

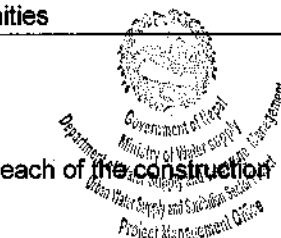
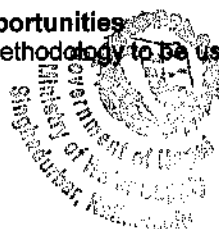
Spoil volumes, Characteristics and Minimization

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, MoWS mix materials, reusable materials)

Adopt Spoil Reduce, Reuse Opportunities

An overview of the assessment methodology to be used is mentioned below.



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

Identification of possible safe disposal sites for spoil: Those spoils which can't be reuse shall be properly disposed in designated areas, such disposal areas should be identified in project locations. Such disposal areas should be safe from environmental aspects and there should be any legal and resettlement related issues. Such areas need to be identified and prior client 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

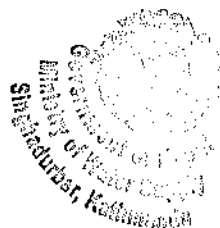
Based on the above, the contractor will prepare a SMP as an integral part of EMP and submit it to the DSMC for their review and approval.

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



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ANNEX F: SAMPLE SEMI-ANNUAL ENVIRONMENTAL MONITORING REPORT TEMPLATE

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

INTRODUCTION

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

N o.	Sub-Project Name	Status of Sub-Project				List of Works	Progress of Works
		Design	Pre- Constructio n	Constructio n	Operational		
		☐	☐	☐	☐		
		☐	☐	☐	☐		
		☐	☐	☐	☐		

COMPLIANCE STATUS WITH NATIONAL/STATE/LOCAL STATUTORY ENVIRONMENTAL REQUIREMENTS

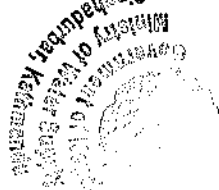
No.	Sub-Project Name	Statutory Environmental Requirements	Status of Compliance	Action Required

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.



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Initial Environmental Examination for Liwang Small Town Water Supply and Sanitation Project

Summary Monitoring Table

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

Overall Compliance with CEMP/EMP

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

APPROACH AND METHODOLOGY FOR ENVIRONMENTAL MONITORING OF THE PROJECT

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

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

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

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

Air Quality Results

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

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24/11/2017
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ANNEX 3: PROJECT LOCATION, SERVICE AREA AND SCHEMATIC LAYOUTS



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Initial Environmental Examination for Liwang Small Town Water Supply and Sanitation Project

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

Water Quality Results

Site No.	Date of Sampling	Site Location	Parameters (Government Standards)					
			pH	Conductivity ($\mu\text{S}/\text{cm}$)	BOD (mg/L)	TSS (mg/L)	TN (mg/L)	TP (mg/L)

Site No.	Date of Sampling	Site Location	Parameters (Government Standards)					
			pH	Conductivity ($\mu\text{S}/\text{cm}$)	BOD (mg/L)	TSS (mg/L)	TN (mg/L)	TP (mg/L)

Noise Level 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



24/11/2017
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ANNEX G: SAMPLE ENVIRONMENTAL SITE INSPECTION REPORT

Project Name
Contract Number

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

WEATHER CONDITION: _____

INITIAL SITE CONDITION: _____

CONCLUDING SITE CONDITION:

Satisfactory _____ Unsatisfactory _____ Incident _____ Resolved _____ Unresolved _____

INCIDENT:
Nature of incident: _____

Intervention Steps: _____

Incident Issues

Resolution

Project Activity Stage	Survey	
	Design	
	Implementation	
	Pre-Commissioning	
	Guarantee Period	

Inspection

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

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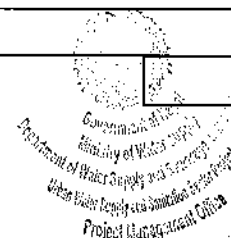
Sign off

Name _____

Position

Name _____

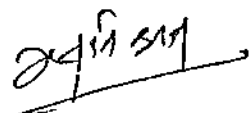
Position



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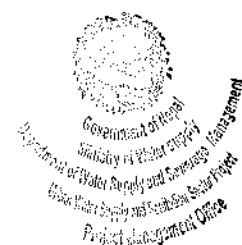
Initial Environmental Examination for Liwang Small Town Water Supply and Sanitation Project




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Initial Environmental Examination for Liwang Small Town Water Supply and Sanitation Project

ANNEX 3: PROJECT LOCATION, SERVICE AREA AND SCHEMATIC LAYOUTS



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Initial Environmental Examination for Liwang Small Town Water Supply and Sanitation Project

As the project is a small town water supply and sanitation project, the initial environmental examination is not required.

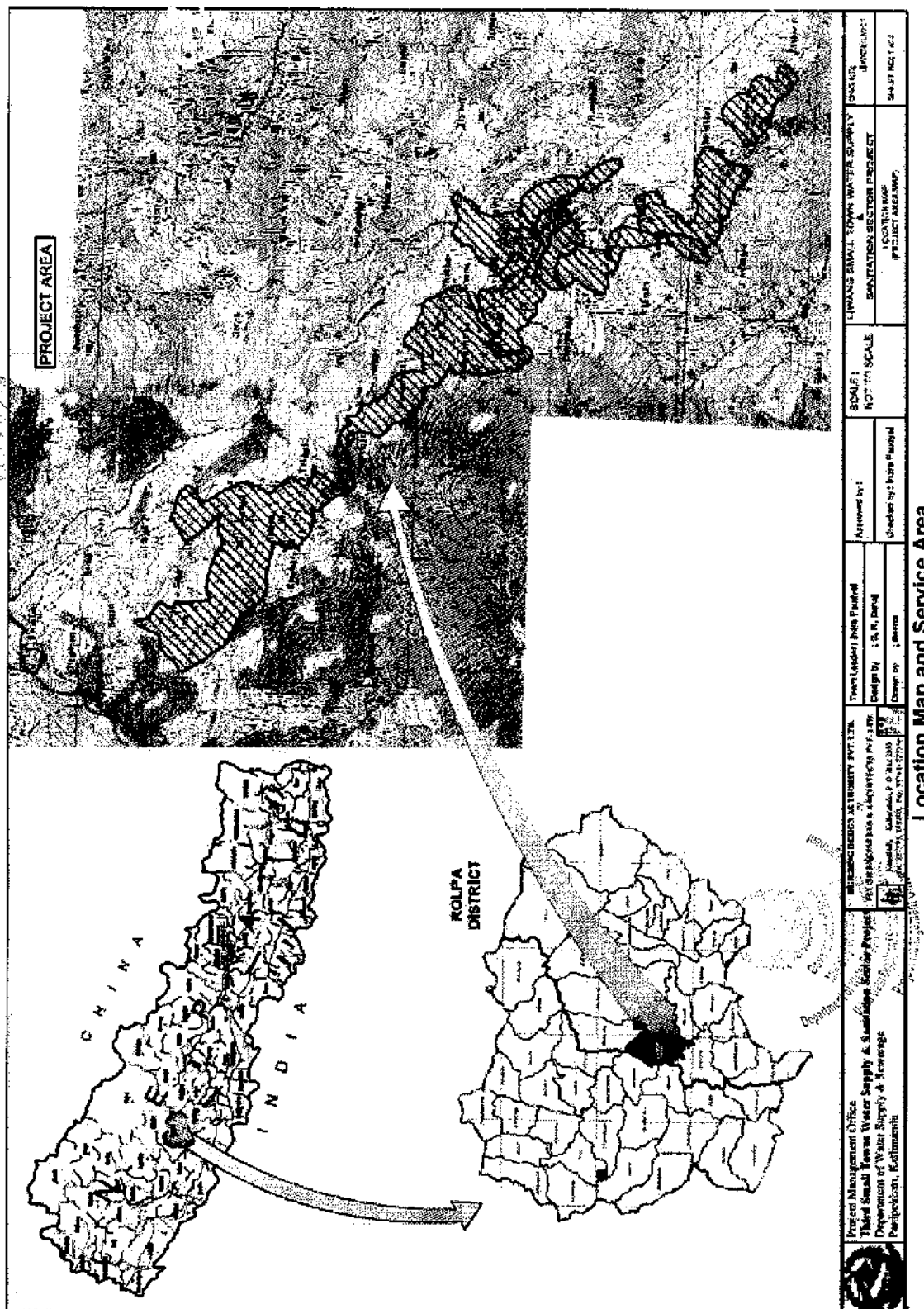


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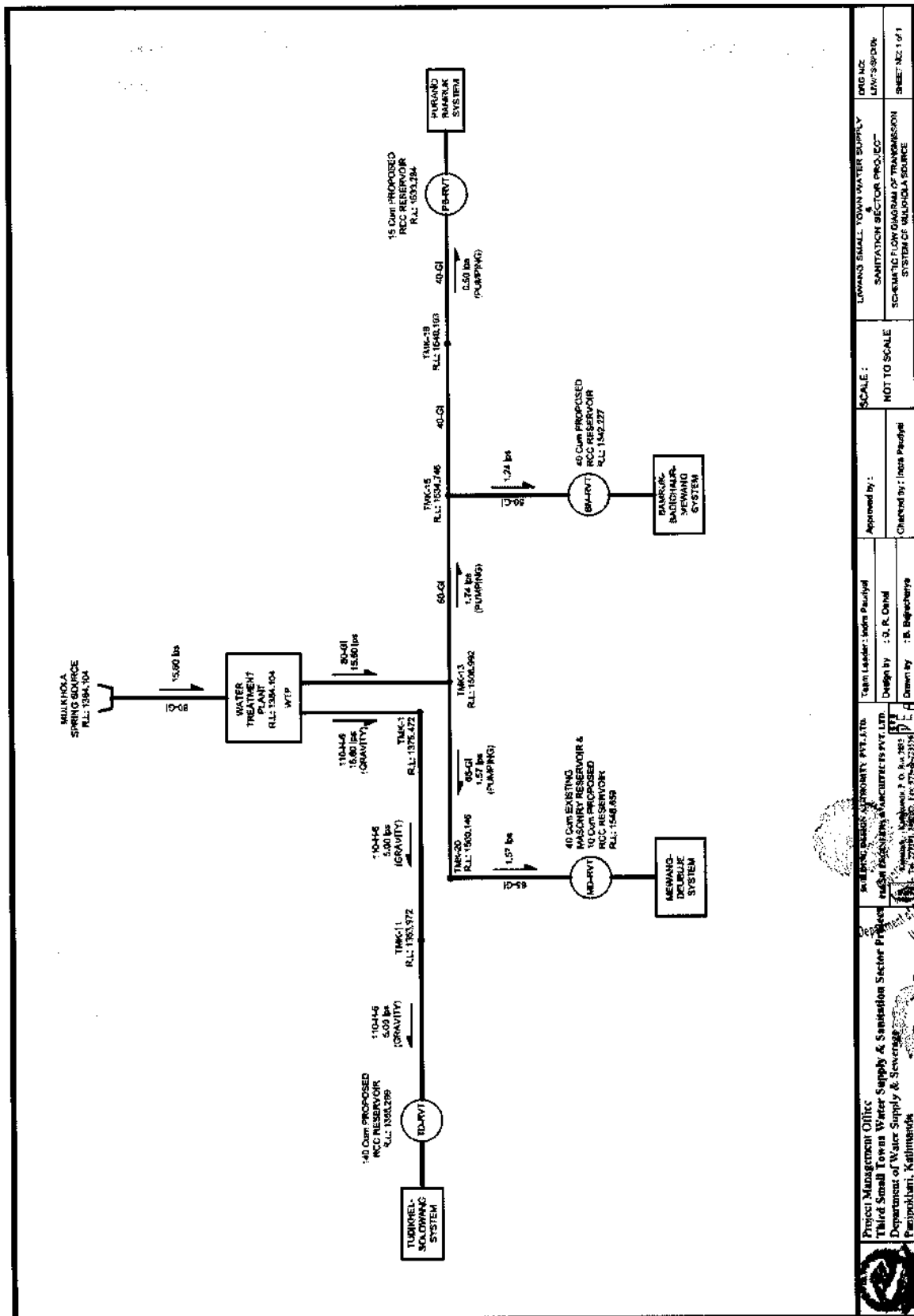


Initial Environmental Examination for Liwang Small Town Water Supply and Sanitation Project

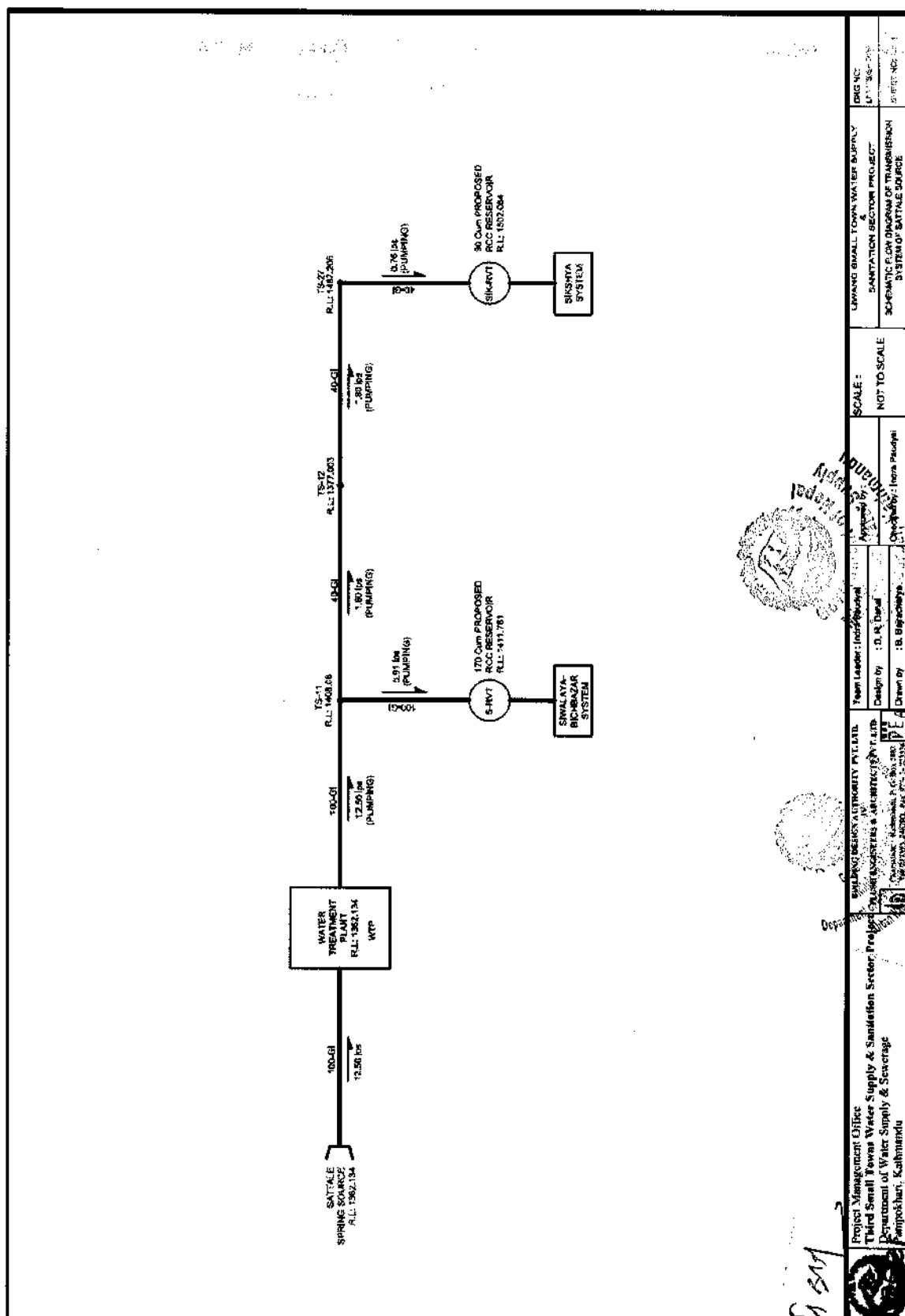
Singadur, Kathmandu
City of Nepal
Water Supply
Department



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S. R. Dangi



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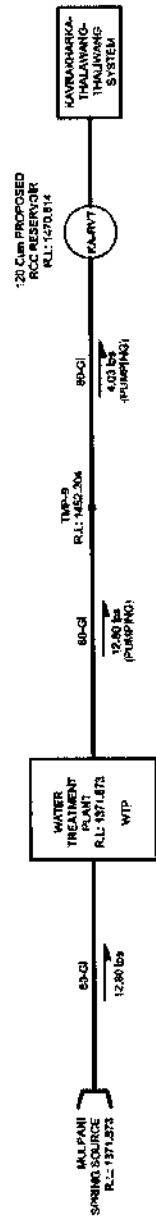
Project Management Office
Third Small Town Water Supply & Sanitation System
Department of Water Supply & Sewerage
Panipat, Haryana

Project Engineer
Engr. [Signature]

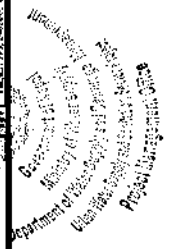
Design by : D. K. Datta
Drawn by : B. Singhania

Scale : NOT TO SCALE

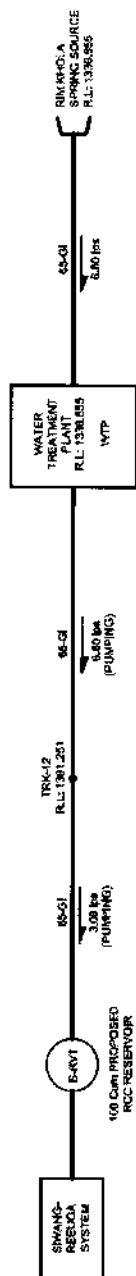
Project No. : 1/2018
Sheet No. : 1



	Project Management Office Third Small Towns Water Supply & Sanitation Sector Project Department of Water Supply & Sewerage Patan, Kathmandu			 BUREAU OF DESIGN AUTHORITY PVT. LTD. PLOT NO. 10, KATHMANDU Bhaktapur, Kathmandu, P.O. Box 195 Tel: 977-01-4455555, Fax: 977-01-4455555		Team Leader: Indra Paudyal Design by: D. R. Dhar Drawn by: B. Bishwakarma		Approved by: _____ Checked by: Indra Paudyal		SCALE: NOT TO SCALE		URBANS SMALL TOWNS WATER SUPPLY & SANITATION SECTOR PROJECT SCHEMATIC FLOW DIAGRAM OF TRANSMISSION SYSTEM OF MALPANI SOURCE		DRG NO: LWS/2019/08 SHEET NO: 1 of 1	




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	Project Management Office Third Small Towns Water Supply & Sanitation Sector Department of Water Supply & Sewerage Pundarikoti, Kathmandu	Project Department	BUILDING DESIGN ALTERNATIVE PVT. LTD. P.O. Box 2802 Kathmandu, Nepal Tel: 977-1-4233561	Team Leader: Hites Pradhan Design by: D.R. Dimal Drawn by: J.R. Bhandari	Approved by: Checked by: Hites Pradhan	SCALE: NOT TO SCALE LIWANG SMALL TOWN WATER SUPPLY SANITATION SECTOR PROJECT SCHEMATIC DIAGRAM OF TRANSMISSION SYSTEM OF RIM KHOLA SOURCE DRC NO: LPP/31/09 SHEET: 322 of 3
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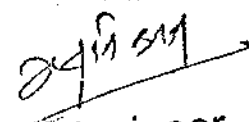
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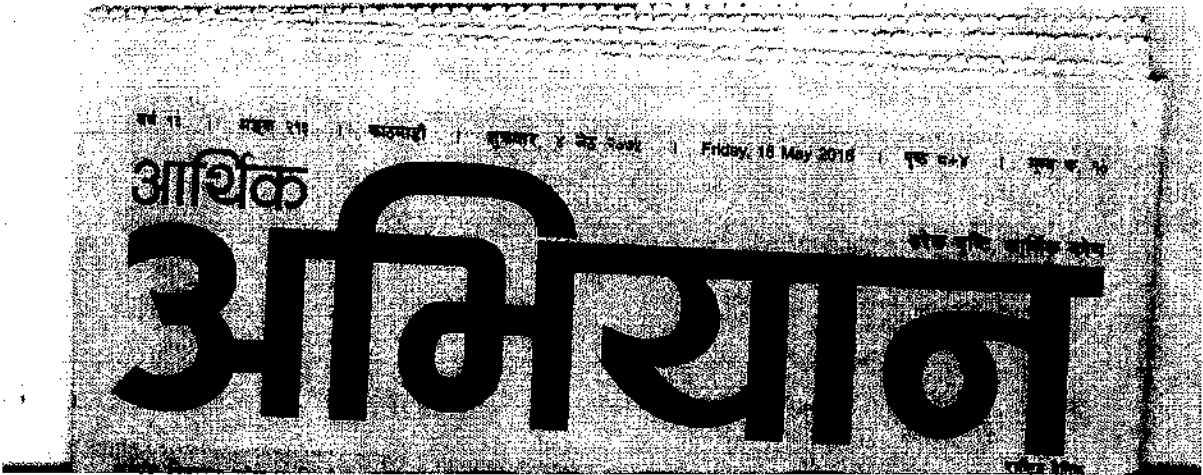
**ANNEX 4: PUBLIC NOTICE, MUCHULKA, CONSENT LETTERS &
RECOMMENDATION LETTER**




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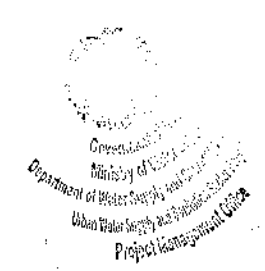
18 May 2018
9018

सर्वोच्च न्यायालय आनेपानी तथा सरसफाई क्षेत्रगत आयोजना
प्रारम्भिक पर्यावरणीय परीक्षणको लागि यस मुद्दाको प्रारम्भिक परीक्षणको
प्रारम्भिक मुद्दा
प्रकाशित मिति: १८/०५/१८

भैरहम, सरकार र स्थानीय विकास बौद्धको आर्थिक सर्वोपरि परियोजना ५ को रोम्बा जिल्ला स्थित रोम्बा नगरपालिकाको विकास - बडा नं. १, २ र ३ को संचालन हुनेछ। यसको विकास आनेपानी तथा सरसफाई आयोजनाको प्रारम्भिक पर्यावरणीय परीक्षण (Initial Environmental Examination) प्रविष्टि गर्न पर्ने भएकोले सो आयोजनाबाट आर्थिक, वैश्विक सामाजिक आर्थिक एवं सांस्कृतिक पक्ष तथा प्रजासत्ताहरूमा के कस्तो असर पार्नेछ, पदचरण वा पर्ने असरहरू, सो भन्ने विषयमा यस मुद्दाको लागि १५ (पन्ध्र) दिवसभित्र जानकारी गरी निम्न तालिकाको पदचरण दिनु हुन आनेपानी तथा सरसफाई विभागको २०५४ को नियम ७ (२) अनुसार सो मुद्दा प्रकाशित गरिएको छ। सो विषयमा यस मुद्दाको प्रविष्टिमा सम्बन्धित मन्त्रालय तथा विभागमा समेत विन सकिनेछ।

यस मुद्दाको पदचरण तालिका

तथा आनेपानी तथा सरसफाई क्षेत्रगत आयोजना	आनेपानी तथा सरसफाई	वि.वि.स-१८/१८ जे.पी.
सरसफाई क्षेत्रगत आयोजना	उपमुक्त कार्यलय	अन्तराष्ट्रिय, आनेपानी
आनेपानी व्यवस्थापन कार्यलय	विभाग, रोम्बा	प.स.स. २०५२
आनेपानी, आनेपानी	फोन: ०८५-४४०२०८	फोन नं. ०१-४२४४२००
फोन: ०१-४४२२३४८	फैसल: ०८५-४४०२०८	फैसल: ०१-४२२३४४१
फैसल: ०१-४४२२३४८		ई-मेल: bdsap@td@gmail.com



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सूचना टाँसको मचल्का

आज मिति २०७१/०२/०६ गतेको दिन यस रोहना गा.पा. वडा नं. ०९, रोल्पा न.पा., रोल्पा जिल्लामा तेस्रो सानाशहरी खानेपानी तथा सरसफाई आयोजना अन्तर्गत यस नगरपालिकासँग संलग्न हुन गईरहेको "लिवाड तेस्रो सानाशहरी खानेपानी तथा सरसफाई आयोजना" को प्रारम्भिक वातावरणीय परिक्षण (IEE) का लागि वातावरण संरक्षण नियन्त्रावली २०१४ अनुसार मिति २०७१/०२/०४ मा प्रकाशित सार्वजनिक सूचना यत्त कडा क्रमालाई अनुगमन गर्दा मा ठाँस भई सो सम्बन्धी संक्षेपमा जानकारी मलक छलफल भएको छ ।

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रोल्पा नगरपालिका
नगर कार्यपालिकाको कार्यालय
लिवाङ, रोल्पा



५ नं. प्रदेश, नेपाल

प.सं.-२०७५/०७६

मिति:- २०७६/०१/१२

च.सं.- १६१५

विषयसिफारिस सम्बन्धमा

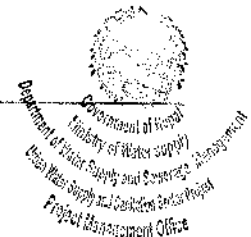
श्री खानेपानी मन्त्रालय,
सिंहदरबार, काठमाडौं।

उपरोक्त सम्बन्धमा त्यस मन्त्रालय अन्तर्गत प्रदेश नं. ५ को रोल्पा जिल्ला स्थित रोल्पा नगरपालिकामा संचालन हुने लिवाङ खानेपानी तथा सरसफाई आयोजना (बडा नं. १, २ र ४) को प्रारम्भिक वातावरणीय परिक्षण (Initial Environmental Examination) प्रतिवेदन तयार गर्ने क्रममा सो आयोजनाबाट भौतिक, जैविक सामाजिक आर्थिक एवं सांस्कृतिक पक्ष तथा प्रणालीहरूमा के कस्ता असरहरू पर्दछन् वा पर्ने सक्दछन् सो बारे लिखित राय सुझाव का लागि मिति २०७५/०२/०४ मा प्रकाशित १५ (पन्ध्र) दिने सूचना यस नगरपालिकामा र सार्वजनिक स्थानहरूमा टाँस गरिएको र सो अवधि भित्र सो कार्यालयमा कुनै विरोध पर्ने नभएको, र स्थानीय स्तरमा प्रारम्भिक वातावरणीय परिक्षण सम्बन्धी छलफलहरू संचालन गरी आवश्यक जानकारी दिइएको कारण, उक्त आयोजना संचालनबाट वातावरणीय क्षेत्रमा कुनै प्रतिकूल प्रभाव नपर्ने देखिएको व्यहोरा समेत सिफारिस गरिन्छ।

महेन्द्र पराजुली
उपसायब



Engineer





मेवाङ सामुदायिक वन उपभोक्ता समूह

लिवाङ-७ रोल्पा

प.सं. :- ०७६१७७६

च.नं. :-

मिति :- २०७६/०९/२०

विषय :- स्तहमति दिइएको स्मृतिपत्र ।

श्रीमान अध्यक्ष ज्यू,

रोल्पा शहरी स्वासेवा समूह उपभोक्ता

तथा सरसफाई समिति रोल्पा नगरपालिका

लिमिटेड, रोल्पा ।

उपरोक्त विषयमा तहको च.नं. २३ मिति २०७६/०९/२०

को पत्रको प्रण वमोजिम भएर सामुदायिक वनको

साविकको वडुका निवास वमोजिम तहको न्यायालयी साक्षी

समितिबाट अलग्गै स्वासेवा समूह संकलन र्खी (RWT) मिलाउने

विषयमा तहको पत्रको प्रण वमोजिम तहको न्यायालयी साक्षी

समितिबाट अलग्गै स्वासेवा समूह संकलन र्खी (RWT) मिलाउने

विषयमा तहको पत्रको प्रण वमोजिम तहको न्यायालयी साक्षी

समितिबाट अलग्गै स्वासेवा समूह संकलन र्खी (RWT) मिलाउने

विषयमा तहको पत्रको प्रण वमोजिम तहको न्यायालयी साक्षी

समितिबाट अलग्गै स्वासेवा समूह संकलन र्खी (RWT) मिलाउने

विषयमा तहको पत्रको प्रण वमोजिम तहको न्यायालयी साक्षी

समितिबाट अलग्गै स्वासेवा समूह संकलन र्खी (RWT) मिलाउने

विषयमा तहको पत्रको प्रण वमोजिम तहको न्यायालयी साक्षी

समितिबाट अलग्गै स्वासेवा समूह संकलन र्खी (RWT) मिलाउने

विषयमा तहको पत्रको प्रण वमोजिम तहको न्यायालयी साक्षी

समितिबाट अलग्गै स्वासेवा समूह संकलन र्खी (RWT) मिलाउने

विषयमा तहको पत्रको प्रण वमोजिम तहको न्यायालयी साक्षी

समितिबाट अलग्गै स्वासेवा समूह संकलन र्खी (RWT) मिलाउने

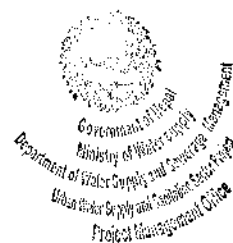
Government of Nepal
Ministry of Water Supply
Kathmandu, Nepal

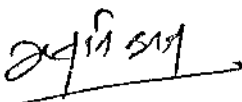
अभिमान
Engineer

Government of Nepal
Ministry of Water Supply
Urban Water Supply and Sanitation Sector Project
Project Management Office



24/11/11
Engineer



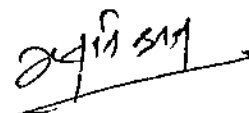

Engineer

ANNEX 5: PUBLIC CONSULTATIONS



[Handwritten signature]
Engineer




Engineer

4th June, 2018

रवर्कवाड, सिताड, स्तारघ्य आमा समूह
Ward - 2

आज मिति २०७५/०६/०१ गतेका दिन सिताड..... साना सहरी खानेपानी तथा सरसफाई आयोजनाको मिति २०७५/२/४ मा प्रारम्भिक वातावरणीय परिक्षण (IEE) का लागि तैस्रो सानासहरी खानेपानी तथा सरसफाई क्षेत्रगत आयोजनाको आयोजना व्यवस्थापन कार्यालयद्वारा प्रकाशित सार्वजनिक सूचनाका आधारमा सरोकारवालाहरु सित निम्न विषयहरुमा जानकारी दिई छलफल तथा अन्तरक्रिया संचालन गरियो:

१. खानेपानी आभोजनाको बारेमा / location को बारेमा
२. प्राश्निक वातावरणीय परिक्षणको बारेमा र यसको आवश्यकता साथै मद्दतको बारेमा
३. खानेपानी लागू हुँदाका फाइदाको विश्लेषण
४. वातावरण व्यवस्थापन योजना; यस अन्तर्गतका कम्पोनेन्टहरू, बजेट विनियोजन र शेड्युलरीको अवसर बारे छलफल



[Signature]
Engineer

क्र.सं.	नाम/संख्या	पेज	वस्तु
१	मिता धर्ति	१	मिता
२	श्याम कुमारी धर्ति	१	श्याम कुमारी
३	अनुता पुन	१	अनुता
४	सिर्जना धर्ति	१	सिर्जना
५	पुर्णमा धर्ति	१	पुर्णमा
६	सुमिता धर्ति	१	सुमिता
७	सुमिता धर्ति पुन	१	सुमिता
८	पारवती धर्ति	१	पारवती
९	विमला धर्ति	१	विमला
१०	मुना पुन	१	मुना
११	मनीषा धर्ति	१	मनीषा
१२	सविता धर्ति	१	सविता
१३	कमला धर्ति मगर	१	कमला
१४	सिता धर्ति मगर	१	सिता
१५	अना धर्ति मगर	१	अना



अपूर्ण
Engineer



क्र.सं.	नाम / विवरण	ठेका	दस्तावेज
१६	बाल कन्या पुत	लिवाइल पा. २ रेखा	बाल कन्या
१७	बेम कन्या पुत	" "	बेम
१८	बेम कन्या पुत	" "	बेम
१९	बेम कन्या पुत	" "	बेम
२०	बेम कन्या पुत	" "	बेम
२१	बेम कन्या पुत	" "	बेम
२२	बेम कन्या पुत	" "	बेम
२३	बेम कन्या पुत	" "	बेम
२४	बेम कन्या पुत	" "	बेम
२५	बेम कन्या पुत	" "	बेम
२६	बेम कन्या पुत	" "	बेम
२७	बेम कन्या पुत	" "	बेम
२८	बेम कन्या पुत	" "	बेम
२९	बेम कन्या पुत	" "	बेम
३०	बेम कन्या पुत	" "	बेम



Engineer

छलफलका विषय तथा सम्बन्धित सुझावहरू

१. यस आयोजनाका विभिन्न कार्यहरू, ती कार्यहरू संचालन हुने स्थानहरू र ती कार्यहरूको प्रकृतीका बारेमा सरोकारवालाहरूलाई जानकारी दिईयो ।
२. आयोजनाबाट प्राप्त हुने फाइदाहरू (सफा सुरक्षित खानेपानी, स्वास्थ्य अवस्थामा सुधार, पानी संकलनमा लाग्ने समय बच्ने, स्थानीय रोजगार, आदी) का बारेमा एवम् आयोजनाको तयारी तथा निर्माण सम्बन्धी कार्यहरू बाट विभिन्न समयमा स्थानीय बातावरणका भौतिक, जैविक तथा आर्थिक-सामाजिक पक्षहरूमा पर्न सक्ने नकारात्मक असरहरूकाबारे पनि जानकारी दिई छलफल गरियो ।
३. निर्माण कार्य संचालनगर्दा हुन सक्ने भूक्षय, हरियालीमा आउन सक्ने ह्रास, खोलानालामा हुन सक्ने प्रदूषण, कामदारको सुरक्षा, सम्भावित बातावरणीय प्रदूषण जस्ता विषयमा जानकारी तथा छलफल भयो ।
४. स्थानीय सरोकारवालाहरू ले उल्लेख गरेका विषयहरू /सरोकारवालाहरू बाट प्राप्त सुझावहरू:

- # खानेपानी लिवाङमा अव्यावश्यक स्ट्रेकोले शुद्ध र सुरक्षित खानेपानीका लागि सबै सहमत रहेको जानकारी;
- # श्रमदान दिन नपर्ने नपने र इन रोजगारीको अवसर मिल्ने हुँदा सरोकारवालाहरू खुशी
- # सकेसम्म यो आयोजना दिई लागू हुन पाए हुन्थ्यो किनभने पानी पुगेको दिन; सुरक्षित दिन
- # यदि सिंचाइको लागि पानीको अभाव हुँदै; शुद्ध र सुरक्षित पानी आउने हो भने यो योजना दिई लागू हुनुपर्द ।



अभिषम
Engineer

2nd June, 2018

Local beneficiaries (Women)

आज मिति २०७५/०३/१९ गतेका दिन लिविङ..... साना सहरी खानेपानी तथा सरसफाई आयोजनाको मिति २०७५/२/४ मा प्रारम्भिक वातावरणीय परिक्षण (IEE) का लागि तेस्रो सानासहरी खानेपानी तथा सरसफाई क्षेत्रगत आयोजनाको आयोजना व्यवस्थापन कार्यालयद्वारा प्रकाशित सार्वजनिक सूचनाका आधारमा सरोकारवालाहरु सित निम्न विषयहरुमा जानकारी दिई छलफल तथा अन्तरक्रिया संचालन गरियो:

Women group

१. वातावरणीय प्रभाव मूल्याङ्कनका बारेमा / IEE बाट
२. पूर्वाधारहरुको निर्माणका बेला हुनसक्ने र भाइपर्ने वातावरणीय हानिका विषयमा
३. आयोजनाको लागू सँगै लिविङमा स्थानीयहरुले प्राप्त गर्न सक्ने सुरक्षित पानी र सर कोटोरमैला ञ्मवस्थापन सम्बन्धि सुविधाहरुका विषयमा
४. वातावरण ञ्मवस्थापन योजना (EMP) का सम्बन्धमा
५. र विस्तृत रुपमा सानासहरी खानेपानी तथा सरसफाई आयोजनाका बारेमा ; स्रोत, sub-system, etc.



[Signature]
Engineer

Women group
2nd June, 2018

क्र.सं.	नाम/संख्या	ठेकावा	दस्तावेज
१.	बालसरी डांगी	रोल्पा न. ४	माल
२.	पार्वती के.सी	" " "	पार्वती
३.	कौसला दांगी	" " २	कौसला
४.	अस्तुरा घर्ती	" " २	अस्तुरा
५.	रिषा पुन मगर	" " २	रिषा
६.	शमिला वली	" " २	शमिला
७.	गौली डांगी	" " २	गौली
८.	रुपा डांगी	" " २	रुपा
९.	जोसु शेर्पा	" " २	जोसु
१०.	पिङमाली शेर्पा	" " २	पिङमाली
११.	गौरी के.सी	" " २	गौरी
१२.	प्रतिष्ठा शेर्पा	" " २	प्रतिष्ठा
१३.	रिता के.सी	" " ४	रिता
१४.	विनिता पुन मगर	" " ४	विनिता
१५.	लिपा घर्ती	" " ४	लिपा



अमरि शर्मा
Engineer



2nd June, 2018
Women group

छलफलका विषय तथा सम्बन्धित सुझावहरू

१. यस आयोजनाका विभिन्न कार्यहरू, ती कार्यहरू संचालन हुने स्थानहरू र ती कार्यहरूको प्रक्रियाका बारेमा सरोकारवालाहरूलाई जानकारी दिइयो ।

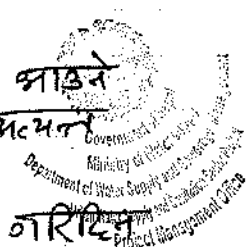
२. आयोजनाबाट प्राप्त हुने फाईदाहरू (सफा सुरक्षित खानेपानी, स्वास्थ्य अवस्थामा सुधार, पानी संकलनमा लाग्ने समय बच्ने, स्थानीय रोजगार, आदी) का बारेमा एयम् आयोजनाको तयारी तथा निर्माण सम्बन्धी कार्यहरू बाट विभिन्न समयमा स्थानीय बातावरणका भौतिक, जैविक तथा आर्थिक-सामाजिक पक्षहरूमा पर्ने सक्ने नकारात्मक असरहरूकाबारे पनि जानकारी दिई छलफल गरियो ।

३. निर्माण कार्य संचालनगर्वा हुन सक्ने भूक्षय, हरियालीमा आउन सक्ने ह्रास, खोलानालामा हुन सक्ने प्रदुषण, कामदारको सुरक्षा, सम्भावित वातावरणीय प्रदुषण जस्ता विषयमा जानकारी तथा छलफल भयो ।

४. स्थानीय सरोकारवालाहरू ले उल्लेख गरेका विषयहरू /सरोकारवालाहरू बाट प्राप्त सुझावहरू:

- स्रोतको सबै पानी भयवा मूल नै सुक्ने गरी यस आयोजनाले स्रोतको पानी प्रयोग नगर्ने हो भने सिचाइमा क्रसर पर्देन भन्ने पाइयो ;
- स्थानीयहरूको मुख्य सरोकारको विषय भनेको सुरक्षित र दीर्घकालिन खानेपानी प्राप्त गर्ने रहेको देखियो ;
- हाल धेरै शुद्ध र सुरक्षित पानीको अभावका साथै अनियमित खानेपानीको उपलब्धताले गर्दा स्थानीयहरूको यस आयोजनाप्रति बढी चासो देखियो
- यस आयोजना लागू हुँदा स्थानीय तहबाट लागेको लागत स्वयंको सहि उपयोग होम भन्ने सुझाव
- यसका लागि guard house दीर्घकालिन रूपमा नै व्यवस्था गर्ने सुझाव
- शुद्ध पानीको अभाव; धाराबाट गडचौला, भ्याकुला आदि आउने हुँदा शुद्धिकरण गर्ने कार्य हुने कुरामा महिला समूह अचम्म खुसी
- जति सक्थो दिटो यस आयोजना लागू गर्न पहल गरिदिने महिला समूहको आग्रह
- पानीको अभाव हुँदा गुवासी /आग्रह गर्न खानेपानी अफिसमा सम्पर्क गर्ने खोज्दा खर्च हुने मोबाइल खर्चबाट बच्न र सस्तो दिटो इटकारा पाउन आग्रह

24/6/18
Engineer



Mewang Forest User Committee
Bamruk, ward 1
Liwang

आज मिति २०७५/०३/२१ गतेका दिन निवाड साना सहरी खानेपानी तथा सरसफाई आयोजनाको मिति २०७५/२/४ मा प्रारम्भिक वातावरणीय परिक्षण (IEE) का लागि तेस्रो सानासहरी खानेपानी तथा सरसफाई क्षेत्रगत आयोजनाको आयोजना व्यवस्थापन कार्यालयद्वारा प्रकाशित सार्वजनिक सूचनाका आधारमा सरोकारवालाहरु सित निम्न विषयहरुमा जानकारी दिई छलफल तथा अन्तरक्रिया संचालन गरियो:

१. खानेपानी आयोजना ; कम्पोनेन्टहरुको बारेमा
२. IEE को विषयमा ; यसको महत्व र आवश्यकताको बारेमा
३. IEE को लागि आवश्यक पर्ने वनस्पतिको जानकारी
४. खानेपानी लागू हुँदा फाइदा र बेफाइदाको विश्लेषण
५. EMP को बारेमा छलफल



अर्पि डल
Engineer



Liwang Forest User Committee
Bamsuk, Ward 1

क्र.सं.	नाम/संस्था	ठेगाना	सहस्रक
१	लाल बहादुर कक्कर	लिवाड रोल्पा नं.पा. १	
२	नोरबुज पोरखेल	लिवाड रोल्पा नं.पा. १	
३	शेख राज पोरखेल	लिवाड रोल्पा नं.पा. १	
४	कमला कवर	लिवाड रोल्पा नं.पा. १	
५	शर्मा व. कवर	लिवाड रोल्पा नं.पा. १	
६	वेदराज कवर	लिवाड रोल्पा नं.पा. १	
७	गणपती कवर	लिवाड रोल्पा नं.पा. १	
८	रुपा महरा	लिवाड रोल्पा नं.पा. १	
९	निर्मला कवर	लिवाड रोल्पा नं.पा. १	
१०	विमला कवर	लिवाड रोल्पा नं.पा. १	
११	सुरदा महरा	लिवाड रोल्पा नं.पा. १	



Engineer

छलफलका विषय तथा सम्बन्धित सुझावहरू:

१. यस आयोजनाका विभिन्न कार्यहरू, ती कार्यहरू संचालन हुने स्थानहरू र ती कार्यहरूको प्रक्रियाका बारेमा सरोकारवालाहरूलाई जानकारी दिइयो।

२. आयोजनाबाट प्राप्त हुने फाइदाहरू (सफा सुरक्षित खानेपानी, स्वास्थ्य अवस्थामा सुधार, पानी संकलनमा लाग्ने समय बच्ने, स्थानीय रोजगार, आदी) का बारेमा एबम् आयोजनाको तयारी तथा निर्माण सम्बन्धी कार्यहरू बाट विभिन्न समयमा स्थानीय बातावरणका भौतिक, जैविक तथा आर्थिक-सामाजिक पक्षहरूमा पर्न सक्ने नकारात्मक असरहरूकाबारे पनि जानकारी दिई छलफल गरियो।

३. निर्माण कार्य संचालनगर्दा हुन सक्ने भूक्षय, हरियालीमा आघात हुन सक्ने ढाँस, खोलानालामा हुन सक्ने प्रदुषण, कामदारको सुरक्षा, सम्भावित बातावरणीय प्रदुषण जस्ता विषयमा जानकारी तथा छलफल भयो।

४. स्थानीय सरोकारवालाहरूले उल्लेख गरेका विषयहरू /सरोकारवालाहरू बाट प्राप्त सुझावहरू:

यस आयोजना दिइएको लागू जग्गाउन पार स्क्दमै राख्ने हुने थियो

पानी दयाकी र गुहान माथि रहेका वस्तीमा पनि पानी पुगोस् । Lifting गर्नुपर्ने छ भने पनि पुगोस्

बातावरणमा प्रस्तो राख्ने आयोजनाले ब्याबी गर्दै नक्छ सबैलाई सुविधा दिन्छ भन्ने सुझाव

यस आयोजनाको नकारात्मक असर दैन वरु दिइने संचालन गर्नु पार राख्ने

यसको राख्ने पक्ष भनेको शान्त-सुरक्षित पानी ल्याउने कूलिक व्यवस्थित (meter) रुपमा रहेको हुनाले यस आयोजनाको अरि लिवाङमा अति आवश्यकता रहेको जिकिर



[Signature]
Engineer

ANNEX 6: SURVEY QUESTIONNAIRE



[Handwritten signature]
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

(ङ) वैवाहिक स्थिति: (च) 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.स.	स्वामित्व	खेत	बारी	बरबारी	वन	प्रयोग
१	आफ्नै					
२	सगोलको					
३	कमाई आएको					

Engineer

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

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

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

३.४ तपाईंको जग्गा आयोजना भित्र पर्छ र ९९भिबकभ नभलतष्यल तजभ अकउयलभलत या उचयवभअत धजभचभ ऊज ार्कि०

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

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

घर ☐ गोठ ☐

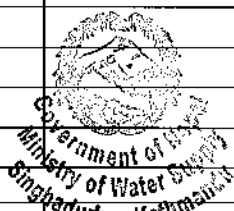
क्र.सं.	किसिम	क्षेत्रफल
घर १		
घर २		
घर ३		

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

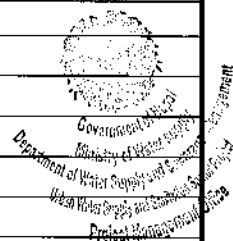
	संख्या	क्षेत्रफल
गोठ		
अन्य (खुलाउने)		

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

क्र.सं.	खाद्यान्न बाली	बाली लगाएका क्षेत्रफल	उत्पादन परिणाम
१. खाद्यान्न बाली			
	धान		
	गहु		
	मकै		
	कोदो		
	दाल गोडागुडी		
	अन्य		
२. नगदे बाली			
	आलु		



Engineer



	तोरी		
	तरकारी		
	अन्य		

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

क्र.सं.	बोटविरुवा	विरुवा संख्या		जम्मा
		फल लागेको	फल नलागेको	
१	फलफूल			
२	कागती			
३	सुन्तला			
४	आप			
५	मेवा			
६	अम्बा			
७	लिच्ची			
८	कटहर			
९	केरा			
१०	आरु			
११	नास्पाती			
१२	आरुबखडा			
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

ख. नोकरीबाट भएको आम्दानीबाट

ग. व्यापारीको आम्दानीबाट

घ. भारी बोकेर भएको आम्दानीबाट

ड. दैनिक मजदुरबाट भएको

च. अन्य

३.९ पशुपालन सम्बन्धी :

तपाईंको घरमा कति / कस्ता पशु पक्षीहरू पाल्नु भएको छ/छ ?

क्र.सं.	पशुपक्षी	संख्या
१	गाई	

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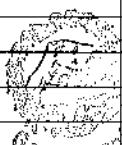
क्र.सं.	पर्यापक्षी	संख्या
२	गोरु	
३	भैसी	
४	बाछा	
५	बाछि	
६	पाडा	
७	पाडि	
८	राँगो	
९	घोडा	
१०	बाखा	
११	बोका	
१२	खसी	
१३	पाठा/पाठी	
१४	सुँगुर/बंगुर	
१५	हाँस	
१६	कुखुरा	
१८	अन्य (खुलाउने)	

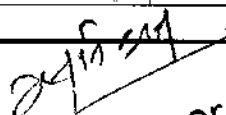
४. घर परिवारको वार्षिक औषत आम्दानी :

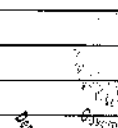
श्रोत	वार्षिक आम्दानी (रु.)	श्रोत	वार्षिक आम्दानी (रु.)
कृषिबाट		अन्य श्रोतहरु	
खाद्यान्न		नोकरी, सेवा	
नगदेवाली		ज्याला मजदुरी र भरीया	
फलफूल		निवृत्तिभरण	
जम्मा (१)		व्यापार	
पशुपालनबाट		घरेलु उद्योग	
दुग्ध उत्पादन		पेशागत सेवा	
अण्डा कुखुरा हाँस बिक्री		माछा बिक्री	
बाछा/बाछी/गोरु/बिक्री		अन्य	
भैसि/राँगो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

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/धु		कपडा	
मर-मसला		चाडपर्व	
नून		अन्य	
चिनी			
जम्मा खर्च			


 Government of Nepal
 Ministry of Water Supply and Sanitation
 Singhadurban Kathmandu


 Engineer


 Government of Nepal
 Ministry of Water Supply and Sanitation
 Liwang Water Supply and Sanitation Project
 Project Management Office

६. पानीको आपूर्ति

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

(ख) यदि खोलाको पानी प्रयोग गर्नु हुन्छ भने कुन प्रयोजनको लागि प्रयोग गर्नुहुन्छ रु
सिचाई ☐ 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

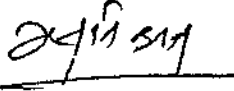
क्र.सं.	नाता	पुरुष	महिला	उमेर	रोग
१					
२					
३					
४					

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

(ग) विरामी पर्दा सर्वप्रथम कहाँ जानुहुन्छ

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

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


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द. 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	सिचाई		
८	काट्ने		
९	बोक्ने र थन्काउने		
१०	अन्न प्रसोधन (कुटाई पिसाई)		
११	घाँस दाउरा		
१२	गोठालो		
१३	मेलापात		
१४	खाना पकाउने		
१५	पानी पधेरो		
१६	बच्चाबच्ची र बुढाबुढी हेरविचार		

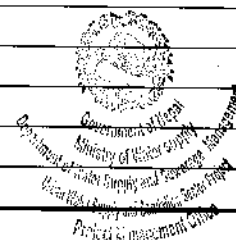
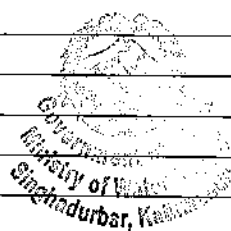
(ख) सम्पत्तिमा अधिकार

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 रोज्ने		
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) तपाईंको घर र जग्गाको मुआब्जा के मा चाहनु हुन्छ

नगद ☐

जग्गाको सट्टा जग्गा ☐

अन्य ☐

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

जग्गा किल्ले ☐

घर बनाउने ☐

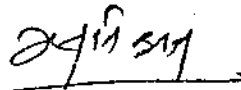
ऋण तिर्ने ☐

व्यापार गर्ने ☐

अन्य ☐

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

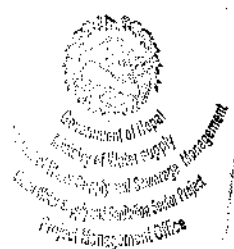



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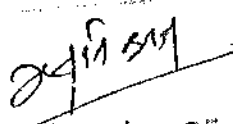
ANNEX 7: CHLORINE USE GUIDELINES



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CHLORINE GUIDELINE VALUE

In humans and animals exposed to chlorine in drinking-water, specific adverse treatment related effects have not been observed.

Chlorine in drinking water is safe for consumption. The small amount of chlorine typically used to disinfect water does not pose risks to human health. The World Health Organization (WHO) has established a guideline value of 5 mg/L for chlorine in drinking water, meaning that such concentrations are considered acceptable for lifelong human consumption. Furthermore, WHO concludes that this value is "conservative," as no adverse effects from chlorine in drinking water were observed in studies reviewed by WHO.

Guideline values for chlorine WHO Guidelines for drinking water quality (2004)

Chlorine	below 5 milligrams per liter (mg/L)*
----------	--------------------------------------

*For effective disinfection, there should be a residual concentration of free chlorine of 0.5 mg/L after at least 30 min contact time at pH<8.0

Chlorination does not harm aquatic environments

Chlorinated drinking water is unlikely to be harmful when discharged into aquatic environments. An extensive risk assessment conducted under European Union guidelines examined potential harm from various processes to make drinking water using sodium hypochlorite. This assessment found no significant environmental risks from chlorine or byproducts formed during drinking water chlorination. The DBPs formed in drinking water depend on the nature and quantity of organic matter present as well as on the disinfectant and other treatments used. In drinking water the principal byproducts are trihalomethanes (THMs; mainly chloroform) and halo-acetic acids (HAAs), with smaller amounts of other byproducts. Direct 'whole effluent' experiments representing various uses, including drinking water, have shown that no significant amounts of persistent and potentially bio-accumulative substances are formed. Toxicity tests on these mixtures demonstrated that the presence of DBPs did not increase the toxicity.

A major concern from the past was the formation of some highly-chlorinated, high-hazard molecules, such as dioxins, resulting from chlorine used in paper pulp bleaching. However, dioxins were only formed from 'active chlorine' under specific conditions: acid pH and in the presence of certain phenols such as those abundant in the lignin component of wood. There is no significant formation of dioxins or other high-hazard molecules at neutral or alkaline pH. All current uses of 'active chlorine' for microbial control and cleaning take place at alkaline or neutral pH.

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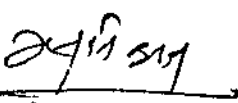




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ANNEX 8: WATER QUALITY TEST REPORTS


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NESS

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Page 1 of 4

NESS/Lab, M-03/R1.1

QS Test Report / Certificate

NS Accreditation No. Pra. 01/053-54

Entry No. : NCL - 358(W) (4) - 02 - 2018

Date Received : 26 - 02 - 2018

Sample : Water (Mul Khola Spring Source)

Date Completed : 15 - 03 - 2018

Client : BDA PEA JV

Location : Rolpa

Sampled By : WUSC Liwang, Rolpa

Project : Third Small Town Water Supply and Sanitation Project

S. N.	Parameters	Test Methods	Observed Values
1	pH at 20°C	Electrometric, 4500 - H ⁺ B, APHA	7.8
2	Electrical Conductivity (µS/cm)	Conductivity Meter, 2510 B, APHA	297
3	Turbidity (NTU)	Nephelometric, 2130 B, APHA	1
4	Color (Chromaticity Unit)	Spectrophotometric, 2120 C, APHA	<0.05
5	Taste	Physical, 2180 B/C, APHA	Unobjectionable
6	Odor	Warm up, JIS - K 010210-1	Unobjectionable
7	Total Dissolved Solids (mg/L)	Oven Drying Method, 180°C, 2540 C, APHA	192
8	Total Hardness as CaCO ₃ (mg/L)	EDTA Titrimetric, 2340 C, APHA	190
9	Carbonate Hardness (mg/L)	Calculation	190
10	Total Alkalinity as CaCO ₃ (mg/L)	Titrimetric, 2320 B, APHA	220
11	Bicarbonate Alkalinity (mg/L)	Calculation	220
12	Chloride (mg/L)	Argentometric Titration, 4500 - Cl ⁻ B, APHA	<0.5
13	Ammonia (mg/L)	Direct Nesslerization, 4500 - NH ₄ ⁺ C, APHA	N.D. (<0.05)
14	Nitrate (mg/L)	UV Spectrophotometric Screening, 4500 - NO ₃ ⁻ B, APHA	1.48
15	Aluminum (mg/L)	Erichrome Cyanine R, 3500 - Al A, APHA	<0.01
16	Fluoride (mg/L)	SPANDS, 4500 - F D, APHA	<0.05
17	Sulphate (mg/L)	Gravimetric Method with Ignition of Residue, 4500 - SO ₄ ²⁻ C, APHA	<1
18	Calcium (mg/L)	EDTA Titrimetric, 3500 - Ca B & 3500 - Mg B, APHA	39.23
19	Arsenic (mg/L)	SDDC, 3500 - As, C, APHA	N.D. (<0.01)
20	Mercury (mg/L)	Cold Vapor AAS, 3112 B, APHA	N.D. (<0.005)
21	Iron (mg/L)	Direct Air - Acetylene AAS, 3111 B, APHA	N.D. (<0.05)
22	Manganese (mg/L)		N.D. (<0.02)
23	Cadmium (mg/L)		N.D. (<0.003)
24	Lead (mg/L)		N.D. (<0.01)
25	Copper (mg/L)		<0.01
26	Chromium (mg/L)		N.D. (<0.01)
27	Zinc (mg/L)	Multiple Tube Fermentation, 9221 E, APHA	0.02
28	E. coli Count (MPN Index /100 mL)		Ni

N. D. : Not Detected

Note:

AAS: Atomic Absorption Spectrophotometer; UV: Ultraviolet; EDTA: Ethylenediaminetetraacetic acid; MPN: Most Probable Number; NCL: Nepal Council for Laboratory Accreditation; NED: Nepal Environmental & Scientific Services (P) Ltd.; NTU: Nephelometric turbidity unit; NEDA: N-1-Naphthylethylenediamine dihydrochloride; APHA: American Public Health Association.

(Analyzed By)

(Checked By)

(Authorized Signature)

Note:

- This report/certificate is in reference to Laboratory Quality Control Manual, QS (01).
- The result of parameters refers only to the tested samples. Endorsement of products is neither inferred nor implied.
- Liability of our institute is limited to the invoiced test parameters & amount only.
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- The clients are requested to take back their test samples along with the report/certificate.

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Page 2 of 4

NESS/Lab, M-03/R1.1

QS Test Report / Certificate**NS Accreditation No. Pra. 01/053-54**

Entry No. : NCL - 358(W) (4) - 02 - 2018 Date Received : 26 - 02 - 2018
 Sample : Water (Sattle Spring Source) Date Completed : 15 - 03 - 2018
 Client : BDA PEA JV Location : Rolpa
 Sampled By : WUSC Liwang, Rolpa
 Project : Third Small Town Water Supply and Sanitation Project

S. N.	Parameters	Test Methods	Observed Values
1.	pH at 20°C	Electromens, 4500 - H ⁺ B, APHA	8.1
2.	Electrical Conductivity (µS/cm)	Conductivity Meter, 2510 B, APHA	303
3.	Turbidity (NTU)	Nephelometric, 2130 B, APHA	6
4.	Color (Chromaticity Unit)	Spectrophotometric, 2120 C, APHA	N.D. (<0.05)
5.	Taste	Physical, 2180 B/C, APHA	Unobjectionable
6.	Odor	Warm up, JIS - K 010210.1	Unobjectionable
7.	Total Dissolved Solids (mg/L)	Oven Drying Method, 180°C, 2540 C, APHA	138
8.	Total Hardness as CaCO ₃ (mg/L)	EDTA Titrimetric, 2340 C, APHA	200
9.	Carbonate Hardness (mg/L)	Calculation	200
10.	Total Alkalinity as CaCO ₃ (mg/L)	Titrimetric, 2320 B, APHA	230
11.	Bicarbonate Alkalinity (mg/L)		230
12.	Chloride (mg/L)	Argentometric Titration, 4500 - Cl B, APHA	<0.5
13.	Ammonia (mg/L)	Direct Nesslerization, 4500 - NH ₃ C, APHA	0.06
14.	Nitrate (mg/L)	UV Spectrophotometric Screening, 4500 - NO ₃ B, APHA	0.96
15.	Aluminium (mg/L)	Erichrome Cyanine R, 3500 - Al A, APHA	<0.01
16.	Fluoride (mg/L)	SPANDS, 4500 - F D, APHA	<0.05
17.	Sulphate (mg/L)	Gravimetric Method with Ignition of Residue, 4500 - SO ₄ C, APHA	<1
18.	Calcium (mg/L)	EDTA Titrimetric, 3500 - Ca B & 3500 - Mg B, APHA	41.68
19.	Arsenic (mg/L)	SDDC, 3500 - As, C, APHA	N.D. (<0.01)
20.	Mercury (mg/L)	Cold Vapor AAS, 3112 B, APHA	N.D. (<0.0005)
21.	Iron (mg/L)		0.27
22.	Manganese (mg/L)		N.D. (<0.02)
23.	Cadmium (mg/L)		N.D. (<0.003)
24.	Lead (mg/L)	Direct Air - Acetylene AAS, 3111 B, APHA	N.D. (<0.01)
25.	Copper (mg/L)		<0.01
26.	Chromium (mg/L)		N.D. (<0.01)
27.	Zinc (mg/L)		0.02
28.	E. coli Count (MPN Index/100 mL)	Multiple Tube Fermentation, 9221 E, APHA	Ni

N.D.: Not Detected

Note:

AAS: Atomic Absorption Spectrophotometer; UV: Ultraviolet; EDTA: Ethylenediaminetetraacetic acid; MPN: Most Probable Number; NTU: Nephelometric turbidity unit; NEDA: N-Ethylmaleimide dihydrochloride; APHA: American Public Health Association.

Health Association.

(Analyzed By)

(Checked By)

(Authorized Signature)

Note:

1. This report/certificate is in reference to Laboratory Quality Control Manual, QS 1017.
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24/11/2017
 Engineer



Nepal Environmental & Scientific Services (P) Ltd.

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Page 3 of 4

NESS/Lab, M-Q3/R1.1

QS Test Report / Certificate**NS Accreditation No. Pra. 01/053-54**

Entry No. : NCL - 358(W) (4) - 02 - 2018 Date Received : 26 - 02 - 2018
 Sample : Water (Mulponi Spring Source) Date Completed : 15 - 03 - 2018
 Client : BDA PEA JV Location : Rolpa
 Sampled By : WUSC Liwang, Rolpa
 Project : Third Small Town Water Supply and Sanitation Project

S. N.	Parameters	Test Methods	Observed Values
1	pH at 20°C	Electrometric, 4500 - H ⁺ B, APHA	7.8
2	Electrical Conductivity, (µS/cm)	Conductivity Meter, 2510 B, APHA	288
3	Turbidity (NTU)	Nephelometric, 2130 B, APHA	5
4	Color (Chromatic Unit)	Spectrophotometric, 2120 C, APHA	0.03
5	Taste	Physical, 2160 B/C, APHA	Unobjectionable
6	Odor	Warm up, JIS - K 010210.1	Unobjectionable
7	Total Dissolved Solids, (mg/L)	Oven Drying Method, 180°C, 2540 C, APHA	188
8	Total Hardness as CaCO ₃ , (mg/L)	EDTA Titrimetric, 2340 C, APHA	184
9	Carbonate Hardness, (mg/L)	Calculation	184
10	Total Alkalinity as CaCO ₃ , (mg/L)	Titrimetric, 2320 B, APHA	215
11	Bicarbonate Alkalinity, (mg/L)		215
12	Chloride, (mg/L)	Argentometric Titration, 4500 - Cl B, APHA	<0.5
13	Ammonia, (mg/L)	Direct Nesslerization, 4500 - NH ₃ C, APHA	<0.05
14	Nitrate, (mg/L)	UV Spectrophotometric Screening, 4500 - NO ₃ B, APHA	0.37
15	Aluminum, (mg/L)	Enchrochrome Cyanine R, 3500 - Al A, APHA	<0.01
16	Fluoride, (mg/L)	SPANDS, 4500 - F D, APHA	<0.05
17	Sulphate, (mg/L)	Gravimetric Method with Ignition of Residue, 4500 - SO ₄ C, APHA	<1
18	Calcium, (mg/L)	EDTA Titrimetric, 3500 - Ca B & 3500 - Mg B, APHA	39.28
19	Arsenic, (mg/L)	SDOC, 3500 - As C, APHA	N.D. (<0.01)
20	Mercury, (mg/L)	Cold Vapor AAS, 3112 B, APHA	N.D. (<0.0005)
21	Iron, (mg/L)		0.21
22	Manganese, (mg/L)		N.D. (<0.02)
23	Cadmium, (mg/L)		N.D. (<0.003)
24	Lead, (mg/L)	Direct Air - Acetylene AAS, 3111 B, APHA	N.D. (<0.01)
25	Copper, (mg/L)		<0.01
26	Chromium, (mg/L)		N.D. (<0.01)
27	Zinc, (mg/L)		0.02
28	E. coli Count, (MPN Index / 100 ml)	Multiple Tube Fermentation, 9221 E, APHA	>1100

N.D.: Not Detected

Note:

AAS: Atomic Absorption Spectrophotometer; UV: Ultraviolet; EDTA: Ethylenediaminetetraacetic acid; MPN: Most Probable Number; NTU: Nephelometric turbidity unit; NEDA: N-(1-Naphthyl)ethylenediamine dihydrochloride; APHA: American Public Health Association.

(Analyzed By)

(Checked By)

(Authorized Signature)

Note:

1. This report/certificate is in reference to Laboratory Quality Control Manual, QS (001).
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Page 4 of 4

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QS Test Report / Certificate

NS Accreditation No. Pra. 01/053-54

Entry No. : NCL - 358(W) (4) - 02 - 2018 Date Received : 26 - 02 - 2018
 Sample : Water (Rim Khola Spring Source) Date Completed : 15 - 03 - 2018
 Client : BDA PEA JV Location : Rolpa
 Sampled By : WUSC Liwang, Rolpa
 Project : Third Small Town Water Supply and Sanitation Project

S. N.	Parameters	Test Methods	Observed Values
1.	pH at 20°C	Electrometric, 4500 - H ⁺ B, APHA	7.8
2.	Electrical Conductivity, (µS/cm)	Conductivity Meter, 2510 B, APHA	273
3.	Turbidity (NTU)	Nephelometric, 2130 B, APHA	<1
4.	Color (Chromaticity Unit)	Spectrophotometric, 2120 C, APHA	N.D. (<0.05)
5.	Taste	Physical, 2160 B/C, APHA	Unobjectionable
6.	Odor	Warm up, JIS - K.010210.1	Unobjectionable
7.	Total Dissolved Solids, (mg/L)	Oven Drying Method, 180°C, 2540 C, APHA	186
8.	Total Hardness as CaCO ₃ , (mg/L)	EDTA Titrimetric, 2340 C, APHA	176
9.	Carbonate Hardness, (mg/L)	Calculation	176
10.	Total Alkalinity as CaCO ₃ , (mg/L)	Titrimetric, 2320 B, APHA	205
11.	Bicarbonate Alkalinity, (mg/L)		205
12.	Chloride, (mg/L)	Argentometric Titration, 4500 - Cl ⁻ B, APHA	<0.5
13.	Ammonia, (mg/L)	Direct Nesslerization, 4500 - NH ₃ C, APHA	0.17
14.	Nitrate, (mg/L)	UV Spectrophotometric Screening, 4500 - NO ₃ B, APHA	0.74
15.	Aluminum, (mg/L)	Enochrome Cyanine R, 3500 - Al A, APHA	<0.01
16.	Fluoride, (mg/L)	SPANDS, 4500 - F D, APHA	<0.05
17.	Sulphate, (mg/L)	Gravimetric Method with Ignition of Residue, 4500 - SO ₄ ²⁻ C, APHA	<1
18.	Calcium, (mg/L)	EDTA Titrimetric, 3500 - Ca B & 3500 - Mg B, APHA	37.67
19.	Arsenic, (mg/L)	SDOC, 3500 - As, C, APHA	N.D. (<0.01)
20.	Mercury, (mg/L)	Cold Vapor AAS, 3112 B, APHA	N.D. (<0.0005)
21.	Iron, (mg/L)		N.D. (<0.05)
22.	Manganese, (mg/L)		N.D. (<0.02)
23.	Cadmium, (mg/L)		N.D. (<0.003)
24.	Lead, (mg/L)	Direct Air - Acetylene AAS, 3111 B, APHA	N.D. (<0.01)
25.	Copper, (mg/L)		<0.01
26.	Chromium, (mg/L)		N.D. (<0.01)
27.	Zinc, (mg/L)		0.03
28.	F. col Count, (MPN Index / 100 mL)	Multiple Tube Fermentation, B221 E, APHA	NI

N.D.: Not Detected

Note:

AAS: Atomic Absorption Spectrophotometer; UV: Ultraviolet; EDTA: Ethylenediaminetetraacetic acid; MPN: Most Probable Number; NTU: Nephelometric turbidity unit; NEDA: N-1-Naphthylethylenediamine dihydrochloride; APHA: American Public Health Association.

(Analyzed By)

(Checked By)

Authorized Signature

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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.



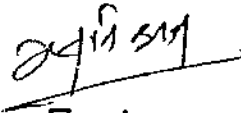
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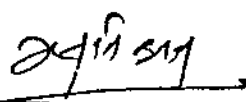
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ANNEX 9: CHECKLISTS




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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 road 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



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CHECKLIST OF PLANT RESOURCES

Date:

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Note:.....



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CHECKLIST OF WILDLIFE ANIMALS

Date:

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Note:



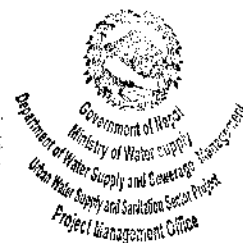
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CHECKLIST OF (Birds)

Date:

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Note:.....



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Checklist for Socio-economic Environment

A. Consultative Meeting in Project Area

Key Informant interview, Focus Group Discussion and Walk Through survey shall be applied to gather the community concern regarding the development of the Project

Process:

1. The IEE team will present the development of the project focussing on:
 - a. Location of the project to the communities
 - b. Explain the subsidiary facilities required for the construction of the project
 - c. Explain how the local people will be affected during construction and in operation period
 - Land and property acquisition of permanent project occupied areas
 - Obstruction of irrigation canals, foot trails, suspension bridge etc. during construction
 - Construction related risks
 - Vehicular movement and related risks
 - Job and employment opportunities
 - Influx of outside people and social and cultural risks
 - Improvement of access and related benefits to education, health, and economy
2. Seek following information from the locals

About People

- a. Demographic Feature of the project area along with male and female population
- b. The major ethnic groups in the close proximity of the project sites and their demography along with male and female population
- c. Relationship between the ethnic groups
- d. Any cultural difference between the ethnic groups
- e. Economic status of people (In general, by ethnicity)
- f. Major Health problems of the area (Frequently observed disease, among child, old, young, women)
- g. Education status of people (In general, by ethnicity)
- h. Health status of people (In general and by ethnicity)
- i. Occupational status of people (in general, by ethnicity)
- j. Any in migration and out migration in the last five years and reasons for migration

About Infrastructures

Any infrastructure (foot trail, suspension bridge, existing water supply line, water springs, irrigation they think will be affected by the project

About culture and historical places

Name the temples in the municipality and what is their religious significance

Is any of the temple lies close to the project sites

What are key festivals of the local people and the observation day of festival (how many people visit the site)

Is there a site of historical and touristic significance in the area

About development

Name the schools in the project area and their status

Name the health posts in the proeic area - number of health workers

Name the industries in the project area - number of workers

Water supply system and coverage (mode of water fetching for household use)

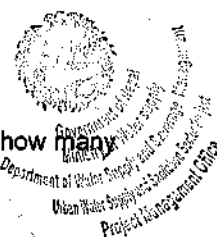
Energy Use and types of energy use

- for cooking (average consumption per household)
- for lighting (average consumption per household)

About Gender and Social Inclusion

Educational and Social status of women

Social backward communities and their status



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ANNEX 10: PHOTOGRAPHS



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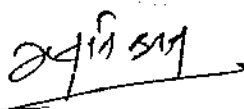

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Photo 1: Stakeholder consultation



Photo 2: Consultative meeting in a beneficiary community

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Government of Nepal
Ministry of Water Supply
Kathmandu

Government of Nepal
Ministry of Water Supply
Urban Water Supply and Sanitation Project
Project Management Office



Photo 3: Key Respondant interview



Photo 4: Meeting with WUSG on socio-economic aspects

Government of Nepal
Ministry of Water Supply
Singhadurbar, Kathmandu

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

ANNEX 11:

COMMENTS FROM MoWS, AND COMEMNTS INCORPORATION MATARIX



24/11/2017
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Annex 11: Comments from MoWS, and Comments Incorporation Matrix



24/11/2017
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नेपाल सरकार

खानेपानी मन्त्रालय

पत्र संख्या:- ०६६/०६६
चलानी नं:- ९९६



फाँस नं.: ४२९९६९३
फाँस नं.: ९७७-९-४२९९६९३
सिंहदरबार,
काठमाडौं, नेपाल।

मिति: २०७६।०८।०६

श्री खानेपानी तथा ढल व्यवस्थापन विभाग,
पानीपोखरी, काठमाडौं।

विषय : IEE प्रतिवेदन Revise गरी पुनः पेश गर्ने सम्बन्धमा।

प्रस्तुत विषयमा तहको पत्र साथ पेश भएको सहरी खानेपानी तथा सरसफाइ (क्षेत्रगत) आयोजना, प्रस्तावक रहेको रोल्पा जिल्लामा संचालन हुने लिवाङ्ग, 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 सुझावहरू अनुरूप प्रतिवेदन परिमार्जन गरी ती सबै Comments को Comments Incorporation Matrix सहित पुनः पेश गर्नुहुन निर्देशानुसार अनुरोध छ।



अञ्जना महर्जन
(इन्जिनियर)

बोधार्थ :

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

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

1. Chapter 2 seems unnecessary.
2. Linkage of core area and surrounding area with direct impact and indirect impact respectively is technically wrong and hence the concerned section i. e. section 3.4 (a) & (b) needs to be revised accordingly.
3. Besides service area, core area should include all construction hotspots as well.
4. Designated sites for disposal of sludge/extra spoil/solid waste/demolition waste need to be indicated as well in Figure 1-b or Figure 1-c.
5. Sub-chapter 3.8 on IEE Methodology needs to be presented in a separate chapter.
6. In-situ measurements and sampling seem to have been overlooked as methods of field assessment of physical environment. Besides, methods used for quantification of adverse impacts on physical environment, if any, need to be mentioned as well under Methodology.
7. Sub-chapter 3.9 on Existing Environmental Condition should be presented as a separate chapter.
8. Information on altitudinal variations of the project implementation area are missing in sub-section 3.9.1.1.
9. In sub-section 3.9.1.2, it'd be highly advisable to give numerical data in terms of percentage distribution of various land-uses existing within the core area.
10. In sub-section 3.9.1.5, it'd have been better to mention the time of the day/night when the instantaneous noise levels were measured.
11. The following could be considered as some additional construction activities.
 - a) Stockpiling of construction materials/fuel
 - b) Rock blasting (as mentioned in sub-section 4.2.2.1 (ii))
 - c) Storage/disposal of extra spoil/solid waste
 - d) Operation of DG sets during construction/operation phases
12. 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.
13. Proposed proper disposal of the inorganic fraction of solid waste generated from workers' camps and construction waste needs to be further elaborated to ensure that the disposal is environmentally safe.
14. It needs to be ensured that 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.
15. Mitigation measures for addressing impacts of operation of pumps and DG sets during operation phase seem to be missing.
16. 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

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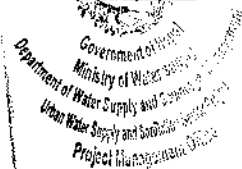


Annex 11: Comments Incorporation Matrix

(Based on comments on IEE Report provided during presentation in MoWS and received on 24th November 2019)

SN	Comments by MoFE (Jwala Shrestha, Head - EA Section)	Response/Updates
1	In both executive summary in background section, mention the name of the project's district	This has been incorporated (Page v - paragraph 1; and Page ix - paragraph 1)
2	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 vi, vii: Nepali Executive Summary; & Page x: English Executive Summary)
3	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
4	Mention about the depth of trench, volume of muck generation	The information have been added respectively in sub-section 3.16 page 33; and sub-section 4.2.1.1, page 37 of the report.
5	Mention clearly about crossing of river, road etc (if there is any)	The information on road crossing has been provided in sub-section 4.2.2.1 (ii), page 36 The information on river crossing has been provided in sub-section 4.2.2.1 (vi), page 37
6	Mention about duration of water supply whether it is for 24 hours?	This has been mentioned under 7 th heading of the table of salient features (Table 2, Page 6)
7	Better to mention clearly about survey year household, base year household and design year household	This has been mentioned in 8 th point of salient features (Page 6)
8	Mention clearly about date, place of public consultation and field works as well.	Date and place of public consultation is mentioned in sub-section 3.8.5 (Page 13); the date of field works has been given in sub-section 3.8.2 (Page 12)
9	Add impact identification in topic 3.8.6 and clearly define the methodology of impact identification and prediction	Impact identification and the methods have been added in sub-section 3.8.4; Page 13
10	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)
11	Include a table of land requirement for the proposed project showing clearly about area, type and ownership	This has been tabulated in table number 12 (page 32)
12	Mention clearly about the public, private, community infrastructures that lies in the alignment of proposed project	This detail for the whole alignment is not required for laying of water supply pipelines
13	Include religion and culture section in socio-economic environment	The information has been added under sub-section 3.9.3.8, in Page 18

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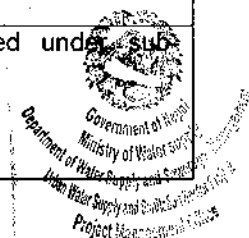
14	As in-migration plays a vital role in increasing population, mention about it in detail	This has been clarified under sub-heading 'Household and Population' in sub-section 3.9.3.1; Page 16
15	Remove date from Constitution of Nepal, review National Land Policy 2075, consumer protection act 2075, Forest Act 2076. Add environment protection act 2075, correct the date of EPA as 2053. Review working procedure with standard for using national 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)	The date has been removed from title of the Constitution of Nepal, and the date of EPA 2053 has been mentioned in sub-section 3.10.1; page 19 The suggested policies and acts have been reviewed (Page 21, 22, 23)
16	Clearly mention about how many guard houses will be constructed in reservoir sites, treatment plant site and intake sites?	This has been clarified in sub-heading 3.14.2 (vii), Page 31
17	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 11 Number/location of campsite facilities are mentioned in sub-section 3.16, page 33 There is no municipal drainage system
18	Mention in detail about water treatment process and frequency of backwashing process	This has been discussed in sub-section 3.14.2; page 29
19	Add about campsite waste disposal	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 (vi), Page 48
20	Mention about existing provision of 1:10 compensatory plantation and looking after for 5 years	This has been mentioned in sub-section 6.2.2 (i), Page 48
21	As landslide has been mentioned in impact but land type hasn't been mentioned in detail in the report.	This has been discussed in sub-section 4.2.2.1 (ii), Page 36
22	Add existing road damage in movement of vehicle section.	This has been added under sub-section 'Construction' of table 16; Page 59
23	Better to include monitoring cost in lumpsum rather than specifying individuals amount	The cost has been revised as lumpsum cost of NRs 335,000 in table 18; page 67



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SN	Comments by Expert (Environmental Engineer, BhaiRaja 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	The comment is not valid as there has been no mentioning of direct/indirect impact areas
3	Besides service area, core area should include all construction hotspots/pipe laying works as well	In this project, core area and service area are the same as per the design report
4	Designated sites for disposal of sludge/extra spoil/solid waste/demolition waste need to be indicated as well in Figure 1-b or Figure 1-c.	These sites has been mentioned in the Figure 1-b & Figure 1-c Demolition waste will be disposed either at municipality's disposal site (not yet finalized) or at the spoil disposal site (shown in Figure 1-b & 1-c)
5	Sub-chapter 3.8 on IEE methodology needs to be presented in a separate chapter	The report is prepared based on Schedule 5 of EPR 2054
6	In-situ measurements and sampling seem to have been overlooked as methods of field assessment of physical environment Besides, methods used for quantification of adverse impacts on physical environment, if any, need to be mentioned as well under Methodology.	In-situ measurements and sampling have been added under sub-section 3.8.2; page 12 The methods have been added under sub-section 3.8.4; page 12
7	Sub-chapter 3.9 on Existing Environmental Condition should be presented as a separate chapter	The report is prepared based on Schedule 5 of EPR 2054
8	Information on altitudinal variations of the project implementation area are missing in sub-section 3.9.1.1.	This information has been added in sub-section 3.9.1.1; page 14
9	In sub-section 3.9.1.2, it'd be highly advisable to give numerical data in terms of percentage distribution of various land-uses existing within the core area.	The approximate proportions of land use pattern of the core area has been added in sub-section 3.9.1.2; page 14
10	In sub-section 3.9.1.5, it'd have been better to mention the time of the day/night when the instantaneous noise levels were measured.	This has been clarified; sub-section 3.9.1.5, page 14
11	The following could be considered as some additional construction activities; a) Stockpiling of construction materials/fuel b) Rock blasting (as mentioned in sub-section 4.2.2.1 (ii)) c) Storage/disposal of extra spoil/solid waste d) Operation of DG sets during construction/operation phases	These activities have been added in sub-section 3.16, page 33
12	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	This has been discussed under sub-section 6.2.1 - iii; Page 46

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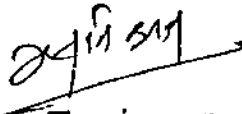
13	Proposed proper disposal of the inorganic fraction of solid waste generated from workers' camps need to be further elaborated to ensure that the disposal is environmentally safe.	The elaborations have been provided in sub-section 6.2.1 - vi; Page 47
14	The proposed sanitary toilets for the workers 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 6 th bullet of sub-section 6.2.3 - iv; Page 48
15	Mitigation measures for addressing impacts of operation of pumps and DG sets during operation phase seem to be missing.	This has been added in sub-section 6.3 (iii); page 49
16	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 7.2; Page 65



29/11/2019
Engineer



SN	Comments from others representatives in the meeting of MoWS	Response/Updates
1	Update the status of toilets in executive summary in Nepali language	This has been updated, page ii
2	To remove the word 'suggest' from objectives sub-section 2.5	This has been changed; page 4
3	Re-structure the text under Core Area and Surrounding Area for more clarity in sub-section 3.4	This has been updated; page 7
4	Under the sub-section 'desk study', name the documents that you have reviewed Also mention which information were collected using the mentioned tools	These have been explained in sub-section 3.8.1; page 11
5	What are the specific tools used for collection of primary socio-economic data	These have been explained in heading 'Socio-economic Assessment' under sub-section 3.8.2; page 12
6	Provide the source of 'caste and ethnicity' data	The source has been mentioned, sub-section 3.9.3.3; page 16
7	There is mistake in description of treatment process	This has been corrected in sub-section 3.14.2; page 29
8	To make consistent project name as in some parts the project name contains 'sector'	The project name has been made consistent as 'Liwang Urban Water Supply and Sanitation Project' throughout the report


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