Initial Environmental Examination

Document Stage: Draft
Project No. 35173-015
March 2020

NEP: Urban Water Supply and Sanitation (Sector) Project – Katahariya Storm Drainage Project, Rautahat District

Package No: W-22

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

ABBREVIATIONS

A.D.	Anno Domini
ADB	Asian Development Bank
AM	Accountability Mechanism
BoQ	Bill of Quantities
B.S.	Bikram Sambat
CA	Catchment Area
CBS	Central Bureau of Statistics
CITES	Convention on International Trade in Endangered Species of Wild Fauna & Flora
CO	Carbon Monooxide
CRO	Complaint Receiving Officer
CSA	Concerned Sector Agency
DDR	Due Diligence Report
DEDR	Detailed Engineering Design Report
DMC	Developing Member Countries
DoR	Department of Roads
DRTAC	Design Review and Technical Audit Consultant
DSMC	Design, Supervision and Management Consultant
DWSSM	Department of Water Supply and Sewerage Management
EARF	Environmental Assessment and Review Framework
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMR	Environmental Monitoring Report
EO	Environmental Officer
EPA	Environment Protection Act
EPR	Environment Protection Rules
ERDSMC	Eastern Regional Design Supervision and Management Consultant
ES	Environmental Specialist
ESA	Environmental Safeguard Assistant
ESE	Environmental Safeguard Expert
E-W	East-West
GoN	Government of Nepal
GRM	Grievance Redress Mechanism
HHs	Households
IBAT	Integrated Biodiversity Assessment Tool
ICG	Implementation Core Group
IEC	Information, Education and Communication
IUCN	International Union for Conservation of Nature
IEE	Initial Environmental Examination
LC	Least Concern
MoFE	Ministry of Forest and Environment
MoWS	Ministry of Water Supply
MWSS	Manufacturer Waste Scrap Shingles

NEPAP	National Environment Policy & Action Plan
no.	Number
NO_2	Nitrogen Dioxide
NGO	Non-Governmental Organization
NRs	Nepalese Rupees
NTFP	Non-Timber Forest Products
NVMES	Nepal Vehicles Mass Emission Standards
NWSC	Nepal Water Supply & Sewerage Corporation
O&M	Operation and Maintenance
PID	Project Information Datasheet
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter 2.5 micrometers
PM_{10}	Particulate Matter 10 micrometers
PMO	Project Management Office
PMQAC	Project Management and Quality Assurance Consultants
RDSMCs	Regional Design Supervision and Management Consultant
REA	Rapid Environmental Assessment
ROW	Right of Way
RPMO	Regional Project Management Office
SDG	Sustainable Development Goal
SO_2	Sulfur Dioxide
SPS	Safeguard Policy Statement
SS	Site Specific
STWSSSP	Small Towns' Water Supply and Sanitation Sector Project
TDF	Town Development Fund
ToR	Terms of Reference
TSTWSSSP	Third Small Town Water Supply & Sanitation Sector Project
VDC	Village Development Committee
WHO	World Health Organization
WN	Ward Number
WSP	Water Safety Plan
WSSDO	Water Supply and Sanitation Divisional Office
WUA	Water Users' Association
WUSC	Water Users' and Sanitation Committee

WEIGHTS AND MEASURES

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

TABLE OF CONTENTS

LIST OF APPENDIXES

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

Introduction

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

251. During field study, it has been identified that the existing drainage condition of the project town is unplanned and covers only a small portion of the project area. The existing drains are not functioning properly due to improper design, size and its improper implementation process. Similarly, our study also shows that during monsoons, the project town has been facing street flooding and pondage problems. This has been badly affecting people of the project town yearly during every monsoon. They are losing their property as well as access during rains. This has urged the urgent need to implement properly planned drainage system within the proposed project town.

252. The study also shows that the proposed project area lies in Katahariya Municipality, Rautahat District, a terai district in the Province 2 of Nepal. Out of 9 wards of the project town, the proposed project covers partial areas of wards 4 & 5 that includes Katahariya Bazaar, Katahariya Gaun, Tolapur, Bahadurpur and few stretches of Balirampur, along which the proposed drain structures will be constructed and the outfall areas.

Policy, Legal & Administrative Framework

253. The IEE study requires study of the concerned Policy, Legal & Administrative Framework to analyze their compliance with the project construction activities. The major environmental act, rules, plan, policies, guidelines that are relevant for IEE study of this project includes;

a) Major Law, Acts & Rules: i)Constitution of Nepal; ii) Environmental Protection Act (EPA), 2053 B.S. (1997 A.D) and; iii) Environmental Protection Rules (EPR), 1997 AD, and its amendments in 2017 A.D.

b) Plans, Policies & Strategies: i) National Environmental Policy & Action Plan (NEPAP), 2050B.S. (1993 A.D.); ii) Water Resources Strategy, 2059 B.S. (2002 A.D.); iii) National Water Plan, 2062 B.S. (2005 A.D.); iv) National Urban Policy, 2063 B.S. (2007 A.D.); v) National Urban Water Supply & Sanitation Sector Policy, 2065 B.S. (2009 A.D.); vi) Urban Water Supply & Sanitation Policy 2066 B.S. (2009 A.D.); vii) Updated 15-yr Development Plan for Small Towns Water Supply and Sanitation Sector, 2066 B.S. (2009) A.D.; viii) National Water Supply & Sanitation Policy, 2071 B.S. (2014 A.D.); ix) Land Acquisition, Rehabilitation and Resettlement Policy, 2015 A.D.; x) Land Use Policy, 2072 B.S. (2015 A.D.); xi) National Urban Development Strategy, 2074 B.S. (2017 A.D.); xii) National Forest Policy,2075 B.S. (2019 A.D.); xiii) Fourteen Three Years Plan 2073/74-2075/76; xiv) Fifteenth Plan Approach Paper (2076/77-2080/81); xv) Climate Change Policy, 2076 B.S. (2019 A.D.) and xvi) National Environmental Policy, 2076 B.S. (2019 A.D.)

c) Laws & Acts: i) Aquatic Animal Protection Act, 2017 B.S. (1961 A.D.) with Amendments (2055 B.S. (1997 A.D.)); ii) Town Development Act , 2045 B.S. (1988 A.D.); iii) Forest Act, 2049 B.S. (1993 A.D.) with amendments 2055 B.S. (1999 AD.); iv) Land Acquisition Act,2049 B.S. (1993 A.D.); v) Child Labor Prohibition and Regulation Act, 2056 B.S. (2001 A.D.); vi) Solid Waste Management Act, 2068 B.S. (2011 A.D.); vii) Labour Act, 2074 B.S. (2017 A.D.); viii) Local Government Operation Act, 2074 B.S. (2017 A.D.) and ix) Land Use Act, 2076 B.S. (2019 A.D.)

d) Rules & Regulations: i) Solid Waste (Management & Resource Mobilization) Rules, 2044 B.S. (1987 A.D.) & Amendments 2049 B.S. (1992 A.D.); ii) Solid Waste Management Rules, 2070 B.S. (2013 A.D.); iii) Labor Rules, 2075 B.S. (2018 A.D.)

e) Directives, Guidelines & Manuals: i) National EIA Guidelines, 2049 B.S. (1993 A.D.); ii) WHO Air Quality Guidelines, Global Update, 2061 B.S. (2005 A.D.); iii) WHO Guidelines for Drinking-water Quality, Fourth Edition, 2073 B.S. (2017 A.D.); iv) National Noise Standard Guidelines, 2068 B.S. (2012 A.D.); and v) Guidelines for Community Noise by WHO, 2055 B.S. (1999 A.D.)

5. All projects funded by the ADB must comply with the Safeguard Policy Statement (SPS) 2009 to ensure that projects funded under ADB loan are environmentally sound, legally compliant, and safe. On the environment, the ADB Operations Manual, Bank Policy (OM Section F1/OP, 2010), underpins the SPS 2009. The policy promotes international good practice as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health, and Safety Guidelines.

Approach and Methodologies

254. The IEE study has been carried out in accordance with the requirements of the ADB's Safeguard Policy Statement (SPS 2009) and environmental requirements of GoN i.e., EPA (1997) and EPR (1997 with amendments 1999, 2007 & 2017). The methodology adopted to carry out this IEE study involves;

a) Literature Review/ Desk Study: Relevant Maps & Reports including Feasibility Report, DEDR & DDR and other rrelated published articles were reviewed to collect secondary information regarding the proposed project.

b) Impact Area Delineation: On the basis of literature review and field study, the Impact Area Delineation is carried out to determine the area of the project area affected by the proposed project activities.

c) Field Study: The field study was conducted to collect baseline information on physico-chemical, biological, and socio-economic conditions of the core and surroundings areas of the project town.

d) Stakeholder & Public Consultation: This has been carried out to acknowledge any kind of suggestions and to acquire the required information regarding the proposed project from the interested stakeholders. The information acquired was integrated in the identification of anticipated environmental impacts..

e) Impact Identification, Prediction & Evaluation Method: is carried out through simple checklist & questionnaire method and through professional judgement to determine adversity of the anticipated impacts. The study has followed the

procedures outlined in the approved ToR and has covered the issues delineated therein.

Description of the Project

255. The project town covers wards 4 & 5 of Katahariya Municipality. The catchment area for the proposed project has been divided into number of areas with respect to the flow consideration. Separate drainage sub system has been proposed for this project. Each sub drainage has the catchment area less than 40 ha. The proposed project comprises the following components:

a) Drains: The proposed drain is laid within the right of way of the road. Two types of drains that include Circular Drain & Rectangular Drain are proposed for this project based on the shape of the drain. The drain is laid parallel and joining to the footpath.

b) Manholes: The spacing of manhole is kept (30-50) m apart. Along with this, there is provision of manholes at each road junction and drop. The top surface corresponds to the road ground level. Circular brick masonry manholes with CI cover/ MS grating has inner plastered surface to prevent the leakage and provide smooth flow.

c) Outfall: There are several possible outfalls available for the drainage of the storm. In total, 23 outfalls are identified and proposed for this drainage project. For Phase 1, 15 outfalls have been proposed while for Phase 2, the remaining 8 outfalls have been proposed.

d) Rain Water Inlet: Brick masonry rain water inlets are proposed which has inside plaster to prevent the leakage.

e) Head Wall: Eleven brick masonry headwalls with RCC coping has been designed at the entry/start of drain. RCC has been provisioned at the bottom.

f) Blacktopped Road Cutting: Altogether, 2 road cuttings are required along the Harsaha near OHT site and bazaar highway at across 5 locations to lay the drainage pipe. The permission from the DoR is mandatory for this. It is envisaged that the municipality will be responsible to achieve the approval from DoR to construct the drain and associated structures on road.

Description of the Environment

256. This IEE study requires information on the existing environment of the project town to identify the susceptibility of the environmental aspects of the project town towards the anticipated environmental impacts of the proposed project. Regarding this, the secondary information of the existing environment was collected through literature review during desk study. However, the secondary information is not sufficient for IEE study. Hence, the field study was carried out to collect primary information on the existing environmental aspects.

257. Regarding this, details on various physical environmental aspects like Landforms & Topography, Geology & Soil, Water Resources, Climate, Air Quality, Acoustic Environment and biological features like Flora, Fauna, Aquatic Life, Protected Areas & Community Forest Areas were collected through simple checklist, REA checklist, professional judgment and interaction with the locals & the concerned bodies during field study. No existence of

protected areas as well as community forest areas within the project area was observed during the field study.

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

Anticipated Environmental Impacts and Mitigation Measures

259. The analysis on the information collected during field study helps to identify and predict the likely environmental impacts that may result from the proposed project. These predicted impacts are then evaluated using Scoring matrix as per National EIA Guidelines, 1993 to determine the nature, extent and magnitude. This evaluation will further help to propose the appropriate mitigation measure for each impact.

260. The anticipated environmental impacts have been mainly categorized into two viz., Beneficial Impacts and Adverse Impacts on the basis of its negative and positive significance. This has been further categorized into four impacts that includes i) Impact on Physical Environment, ii) Impact on Biological Environment, iii) Impact on Chemical Environment and iv) Impact on Socio-economic Environment, based upon the effects on the existing environment. These impacts has been sub divided into three categories based upon the project phase that includes i) Design Phase, ii) Construction Phase and iii) Operation Phase.

261. Here, Beneficial Impacts includes Employment Generation, Skill Enhancement, Local Trade & Business Opportunities, Improved Health & Hygiene, Improvement on Surface Water Flooding & Ponding, Increased Urban Aesthetic Value and Increased Land Value. Similarly, Adverse Impacts includes Soil Erosion & Land Surface Disturbances, Spoil Disposal & Gully Erosion, Noise Pollution, Impacts on Air Quality, Surface Water Quality, Generation of Solid Waste & Waste water from the construction site & worker's camp, Accidental Leakage or Spillage of Stored Fuel/Chemicals, Land Use Pattern, Haphazard Disposal of Dismantled Debris, Impacts on Water Bodies, Impacts on Flora & Fauna, Impact on Aquatic Life, Impact on Water Quality of nearby rivers, Workers & Community Health & Safety Hazards, and Damage to the existing Utilities, Traffic Congestion, Public Protests, Disruption to Local Vendor's Business, Mobilization of Child Labour, Occupational Health & Safety Hazards, Delivery of Unsafe Water, Pollution in Newly Constructed Storm Drains, Blocking/Choking of Drains, Impact on Recipient Water Bodies and Impact of Sustainability of Works.

262. The mitigation & augmentation measures for each & every adverse as well as beneficial impacts mentioned above have been proposed. If these proposed mitigation measures are effectively implemented, no such significant environmental problems have to be encountered during the construction & operation period of the proposed project. Likewise, various suitable augmentation measures have also been proposed to to maximize the anticipated beneficial impacts.

Analysis of Alternatives

263. Analysis on the alternatives of the proposed project is another important process of IEE study that will help to assess the feasibility of the project in regard to technical, environmental & social aspects. Primarily, this involves two alternatives that includes

"Without Project" or "Do-nothing" Alternative and "With Project" Alternative. The limitation of "Without Project" Alternatives regarding the risks of flooding problems, leads to select the "With Project" Alternative. With Project Alternative has been analyzed by envisaging the likely benefits of the proposed project. The analysis shows that the proposed project is designed to provide sanitation services through effective drainage system to 10,481 populations as per base year 2016 A.D. This alternative analysis also shows that proposed project is a unique system and there are no alternatives proposed in the proposed project. However, considering the availability of the budget and necessity of the drain in the town, the drainage area has been prioritized by Katahariya Municipality and WUSC on 29 August, 2019. The priorities area are as follows:

Priority 1: From OHT to bazaar to Tolapur

Priority 2: From OHT to Katahariya Gaun

Priority 3: Some part of Bazaar area and Bahadurpur

Priority 4: Balirampur

Priority 5: Harsaha and remaining areas

264. Based upon the priority and availability of the budget, the drains are categorized into main drain (M) and branch drain (B). Discussion has been made with Katahariya Municipality and PMO to split the area to construct the drain in phase 1 and 2. The main drain of priority 1, 2, 3 and some length of priority 4 are kept in phase 1. Depending upon the overland flow and risk factor, the major drains have been identified and kept in phase 1 and the remaining has been kept in phase 2.

Environmental Management Plan

265. Preparation and Implementation of the environmental management plan (EMP) is another essential process of the IEE study.The main purpose of EMP is to ensure that the activities are undertaken in a responsible and non-detrimental manner. Similarly, the other objectives of EMP are as follows:

- providing a proactive, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on-site;
- guiding and controlling the implementation of findings and recommendations of the environmental assignment conducted for the project;
- detailing specific actions deemed necessary to assist in mitigating the environmental impacts of the project and in enhancing beneficial impacts; and
- ensuring that safety recommendations are complied with.

266. The total estimated local level monitoring and mitigation cost for the project is NRs. 1,500,000.00.

Information Disclosure, Consultation & Participation

267. Stakeholder Consultation and Community Participation is an essential process in project preparation. It is the process of engaging stakeholders and affected people. This process involves Key Informant interviews, On-site discussions with WUSC, and Random Field Interviews of stakeholders. Prior to the stakeholder's consultation, stakeholder analysis and mapping of stakeholders were carried out to identify the potential stakeholders and their

roles towards the implementation of the project. The potential stakeholders were then involved in consultation to disseminate information related to the project, to collect their views & suggestions and to prioritize their concerns regarding the project. This will continue throughout the implementation of the projects and operation period. To facilitate the stakeholder consultation, PMO & ICG will maintain good communication and collaboration with WUSC and the Municipality.

Grievance Redress Mechanism

268. The Project-specific grievance redress mechanism (GRM) is also an essential process of the IEE study which is meant for persons seeking satisfactory resolution to their complaints on the social and environmental performance of the projects under STWSSSP. The mechanism, developed in consultation with key stakeholders, will ensure the following mentioned points;

(i) the basic rights and interests of every person adversely affected by the social and environmental performance of a Project are protected; and
(ii) their concerns are effectively and timely addressed

269. This GRM involves setting up the Grievance Redress Committee (GRC) at the municipality level. The GRC will comprise of the following mentioned members:

(1) WUSC Secretary;

(2) RPMO Engineer;

(3) RPMO social /environmental (as relevant) officer,

(4) Representative of affected persons,

(5) RDSMC's safeguards specialist (social/environment as relevant),

(6) Representative of reputable and relevant CBO/SHG/organization working in the project area as invitee[1] , and

(7) Contractor's representative

Monitoring & Reporting

270. PMO & RPMO will be responsible for environmental monitoring & reporting. RPMO will monitor and measure the progress of EMP implementation. RPMO will submit a monthly monitoring and implementation reports to PMO, who will take follow-up actions, if necessary. PMO will submit semi-annual monitoring reports to ADB. ADB will review project performance against the MoWS's commitments as agreed in the legal documents. ADB will monitor projects on an ongoing basis until a project completion report is issued. Along with this, Ministry of Water Supply (MoWS) as well as Ministry of Forests & Environment (MoFS) under Government of Nepal will also undertake monitoring process through random field visits to review the project performance.

Conclusion

271. In conclusion, the IEE study shows that the proposed project is not an environmentally critical undertaking. The proposed project, its components, are not within or

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

adjacent to environmentally sensitive areas. The few adverse impacts of high magnitude during construction will be temporary and short-term (i.e., most likely to occur only during peak construction periods). The proposed project will bring about the following mentioned benefits:

i) the benefits of easy access to rivers for storm runoff reducing risks of flooding and loss of lives & private property;
ii) promotion of good hygiene and sanitation practices and reduced health and safety risks as positive impacts; and
iii) enhanced community health, improved quality of life and safe communities as outcomes.

272. Hence, there are no significant negative impacts of the proposed project, and the classification of the project as Category "B" is confirmed as per ADB and as Schedule -1 is confirmed as per Environment Protection Rules, 2054 (1997) and 2017 (Latest Amendments). No further special study or detailed environmental impact assessment (EIA) needs to be undertaken to comply with ADB SPS (2009) and Environment Protection Rules, 2054 (1997) of Nepal.

I. INTRODUCTION

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

i. Name of the Proposal

1. The Name of the Proposal is Katahariya Storm Drainage Project

ii. Name and Address of the Proponent

2. The Project proponent, the Urban Water Supply and Sanitation (Sector) Project (UWSSP) of the Department of Water Supply and Sewerage Management (DWSSM) is the proponent (Implementing Agency). The Ministry of Water Supply (MoWS), Government of Nepal, is the executive agency.

Name of Proponent

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

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B. Background

3. Prior to three projects (STWSSSP), (SSTWSSSP) & TSTWSSSP, currently, ADB and GoN are working together to provide water supply and sanitation services to selected urban municipalities of Nepal through Urban Water Supply Sanitation (Sector) Project (UWSSP) in accordance with the updated 15-year Development Plan for Small Towns and the National Urban Development Strategy. The Project will support Nepal in expanding access to community managed water supply & sanitationin 20 project municipalities by drawing on experiences and lessons from three earlier projects funded by ADB. UWSSP will be implemented over a five-year period (indicative implementation period is 2018 to 2023) and will be supported through ADB financing using a sector lending approach. This project has the following outputs: i) Improved Water Supply and Sanitation Infrastructure in Project Municipalities and ii) Strengthened Insttitutional and Community Capacities.

4. Department of Water Supply and Sewerage Management (DWSSM) is the implementing agency whereas the Ministry of Water Supply is the executing agency. The project will assist in implementing a part of the 15-year Development Plan for Small Towns Water Supply and Sanitation Development in the country and about 20 Small Towns will be covered by this project.

5. In this context, the Eastern Regional Design Supervision and Management Consultants (ERDSMC), joint venture of TAEC Consultants P. Ltd. and Integrated Consultants Nepal (P.) Ltd. has been assigned to provide services on detailed design of seven towns namely; Birendranagar (Chitwan), Katahariya (Rautahat), Lalbandi (Sarlahi), Katari (Udaipur), Diktel (Khotang), Bhojpur Bazaar (Bhojpur) and Charikot (Dolakha) Town Projects. In addition, Ilam (Ilam), Brihat Bhanu (Tanahun), Panchkhal (Kavre), Kanchanrup (Saptari), Rampurtar (Okhaldhunga) and Deurali Hupsekot (Nawalpur) are assigned for the preparation of DEDR report.

6. The project has many stakeholders such as the WUSC, Project Management Office/ DWSSM, DRTAC, Town Development Fund (TDF), and Regional Design Supervision and Management Consultants (RDSMCs), RPMO. There is a need for effective co-ordination among the various stakeholders. In this context, the consulting team especially the major members of the Consultants' Team including the Team Leader, socio-economist and design engineer responsible for detailed design has been responsible for maintaining co-ordination with all the stakeholders involved in the project.

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

C. Sub Project Selection Criteria Based on Environmental Assessment and Review Framework

8. This EARF has been prepared in accordance with ADB SPS and Government of Nepal Environment Protection Act (EPA) 1997 and Environment Protection Rules (EPR) 1997, as amended in 1999 and 2007. This EARF will provide guidance on subproject selection, screening and categorization, information disclosure and consultation, assessment, planning, institutional arrangement, and processes to be followed in the formulation and implementation of subprojects during project implementation. The proposed project has strictly followed the criteria mentioned in

EARF. The ***Table I-I*** given below depicts the complaince matrix of the subproject selection criteria as per EARF.

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

S. No.	Sub Project Selection Criteria	Compliance Status (Yes/No)	Remarks
A.	**General Criteria**		
1	The subproject has been identified and designed in a participatory manner during the prefeasibility and feasibility stages and appropriate physical and socioeconomic surveys have been carried out to allow effective designs. The water user's association (WUA) or local body has agreed with the design and cost of the subproject, and the responsibility for the O & M of the same. WUA or local body has also committed (in management agreement with DWSSM) to provide minimum operational staff to operate the particular facilities sustainably.	Yes	The Katahariya municipality is responsible for O & M of the proposed system.
3	The design of each of the subproject ensures the least-cost of the combined capital and of O & M expenditures in achieving its objectives. The subproject has an economic internal rate of return of 12% or higher.	Yes	The proposed system considers this issue.
4	The subproject complies with all requirements of relevant national laws and regulations, including, among others, the Government's Environmental Protection Rules (1997) and their amendment in 2017, and of ADB's policies, including Safeguard Policy Statement (SPS) 2009	Yes	The proposed system considers this issue.
5	The subproject has been assessed and screened in accordance with the environmental assessment and review framework (EARF), the resettlement framework (RF) and the indigenous people-planning framework (IPPF) agreed for the project. Subprojects that will cause significant involuntary resettlement impacts and/or cause adverse negative impact to the indigenous people communities will not be selected. Subprojects that will cause significant impacts to the environment, protected areas and sensitive receptors as a result of the project design will not be selected.	Yes	No involuntary resettlement issues are encountered.
6	The design of the facilities has been made in accordance with DWSSM's design guidelines for small towns, and all other relevant Government guidelines and design standards.	Yes	As per design report, this aspect is ;considered during design.
9	O&M responsibilities and costs have been developed and agreed. O&M manuals of each of the subproject will be prepared, and WUA or local body has committed to implementing the same.	Yes	As per technical specification of this project, the Contractor will submit O & M manual providing details of all the plant /mechanical facilities he supplies and give details of recommended

S. No.	Sub Project Selection Criteria	Compliance Status (Yes/No)	Remarks
			maintenance intervals and procedures.
B.	**Specific Criteria**		
1	The town center experiences severe disabilities during heavy rainstorms, such as flooding of roads and buildings, severe water logging, disruption of traffic and general unsanitary conditions.	Yes	During field study, it was found that the project town has been facing flood problems. This has been badly affecting people of the project town yearly during every monsoon. They have lost their properties as well as access during monsoons.
2	Prior to design - a storm master plan has been prepared and approved for the town that shows a feasible drainage solution and prioritizes the first phase/segments for investment	Yes	The master plan has already been prepared and approved.
3	The local body is able to develop the means and resources to maintain the proposed drains in a serviceable manner.	Yes	It is the responsibility of the local body for O & M of the proposed system.
4	The local body has agreed to contribute 15% of the capital cost and cover 100% of the O & M cost.	Yes	The cost estimate project involves local authority contribution of 15% of the total project cost, which is as per UWSSP guidelines.
5	The local body will use the existing road and drainage right-of-way (RoW) with no or minimum involuntary resettlement impacts. Drainage construction using or crossing private lands should be avoided. If involuntary resettlement impacts are identified for the street vendors/ shops/stalls, regardless of their legal status, located in the proposed subproject an appropriate resettlement plan (RP) will be prepared in accordance to the agreed Resettlement Framework.	Yes	The proposed system considers this issue.
7	No drainage should be established in protected areas, near sensitive receptors and within the setback distance of a historical or cultural heritage site.	Yes	There is no existence of such features observed. REA Checklist as attached in Appendix 1 mentions this issue.

Source: EARF, 2018 and IEE Study 2018/019

D. Project Area Description

9. The Project area of Katahariya Storm Drainage Sub Project lies in Katahariya Municipality, Rautahat District, a terai district in the Province 2 of Nepal. Geographically, the project area lies in the terai region lies between 26°58' 03" N to 26°59'59" latitude N to 85°13' 30" E to 85°14' 52" E longitude with altitudes ranging between 89 m to 92 m above mean sea level (amsl).

10. This ***figure I-I*** below shows that The proposed project area belongs to Katahariya municipality which is bounded by Garuda Municipality, Brindaban Rural Municipality and Gujra Rural Municipality in the east, Fatuwavijaypur and Maulapur Rural Municipalities in the west, Gujra Rural Municipality in the north and Devahi Gonahi Rural Municipality in the south.

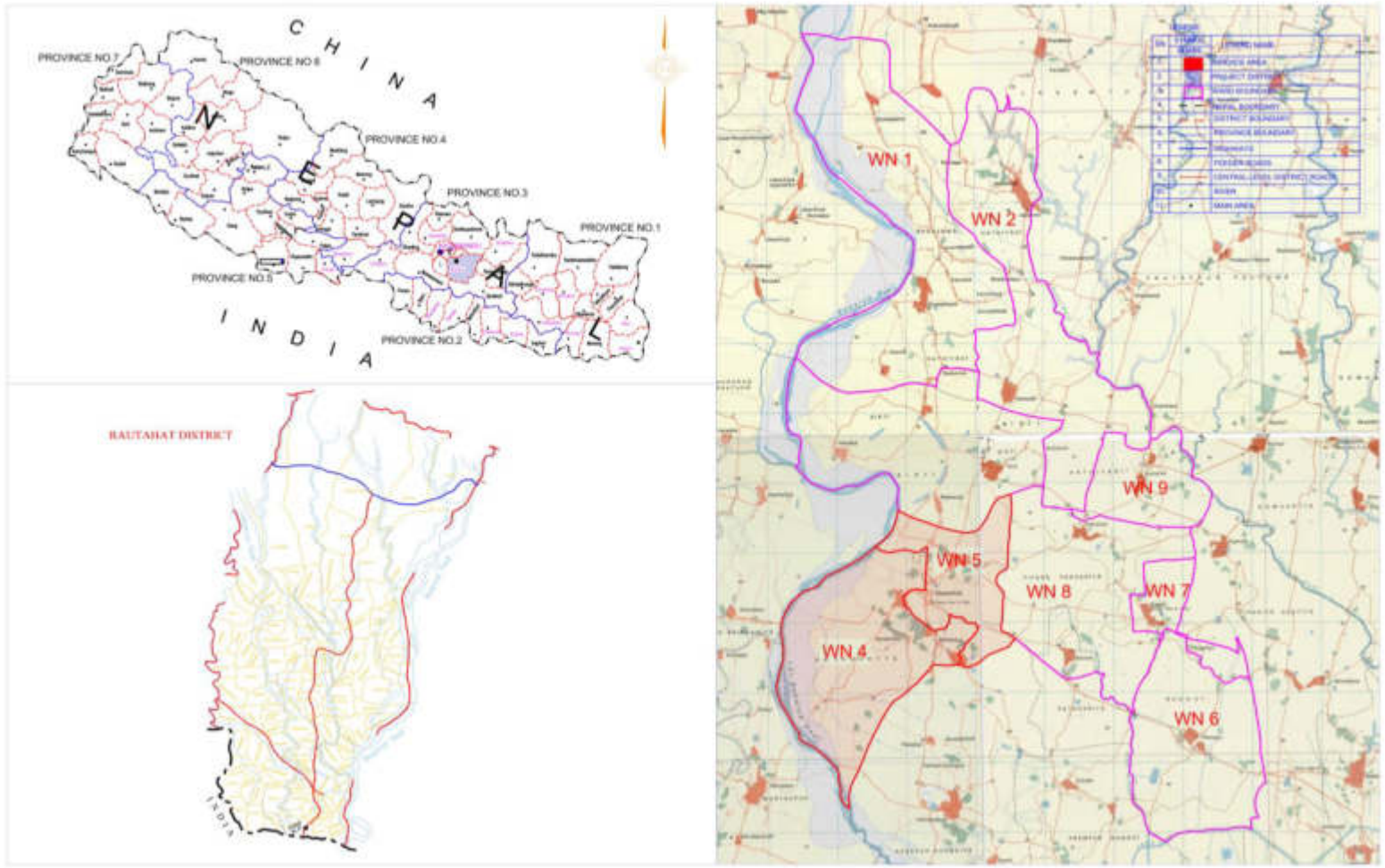


Figure I-I:Location Map of the Project Area

11. The ***Table I-II*** given below gives the brief details on the reformed Katahariya municipality;

Table I-II: Katahariya Municipality Ward Profile

PresentWard Municipality	Former VDC/Municipality	Former Ward No.
1	Bhasedawa VDC	WN 1 to 9
2	Hathiyahi VDC	WN 1 to 9
3	Birtiprastoka VDC	WN 1 to 9
4	Katahariya VDC	WN 1,2,3 & 7
5	Katahariya VDC	WN 4,5,6,8 & 9
6	Bagahi VDC	WN 1-5
7	Bagahi VDC	WN 6-9
8	Pipara Pokhariya VDC	WN 1 -5
9	Pipara Pokhariya VDC	WN 6-9

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

273. The above given table also shows that the reformed Katahariya Municipality has been divided into 9 wards.The current wards 1 belongs to ward 1 to 9 of former Bhasedawa VDC, ward 2 belongs to ward 1 to 9 of former Hathiyahi VDC, ward 3 belongs to ward 1 to 9 of former Birtiprastoka VDC, ward 4 & 5 belongs to ward 1,2,3 & 7 and ward 4,5,6, 8 & 9 of former Katahariya VDC respectively, ward 6 & 7 belongs to ward 1 to 5 and ward 6 to 9 of former Bagahi VDC respectively and ward 8 & 9 belong to wards 1 to 5 and ward 6 to 9 of former Pipariya Pokhariya VDC respectively.

274. The project area is along Sapaimai Road- a road stretching between Gaur to Kalaiya via Garuda of Hulaki Road. The project area is linked with the East-West highway at Chandra Nigahpur via Garuda. The Garuda is about 20 km from Chandra Nigahpur and 8 km east of the project location. Gaur Municipality, the headquarter of the district, is situated at a distance of about 28 km. The nearest airport is Simara in Bara district about 98 km, where daily flights from Kathmandu operate. Day and night bus services are easily available from Kathmandu and other major towns. Therefore, the project area has easy access to all parts of the country.

E. Purpose of the IEE

275. The main purpose of IEE is to ensure the environmental sustainability of the project, to integrate environmental considerations into the project preparation process, and to manage environment during project implementation. All projects funded by ADB must comply with the Safeguard Policy Statement (SPS) 2009 to ensure that projects are environmentally sound, designed to operate in compliance with applicable regulatory requirements, and are not likely to cause significant environmental, health, or safety hazards. The rapid environmental assessment using ADB's REA Checklist and Scoping Checklist has indicated that the Subproject is a Category B undertaking, requiring an IEE. On the GoN side, the statutory requirement that has to be adhered is the Environment Protection Act (1997), and Environment Protection Rules (1997 with Latest Amendments 2017). Based on EPR Schedule 1, the Subproject is within the threshold of activities under the water supply and sanitation sector that will require an IEE. This IEE fulfills the policy requirements of both ADB and GoN.

276.

277. The IEE Report primarily:

i. Provides information on the Subproject and its environmental requirements;
ii. Provides the baseline physical, ecological, cultural and socioeconomic environments and resources in and surrounding the Subproject's area of influence;
iii. Identifies and assesses potential environmental impacts arising from the implementation of the Subproject;
iv. Recommends measures to avoid, mitigate, and compensate the adverse impacts;
v. Presents information on stakeholder consultations and participation during Subproject preparation
vi. Recommends a mechanism to address grievances
vii. Includes an environmental management plan.

F. Need for the Subproject

278. Proper and effective management of storm drainage has become the utmost necessity of the Katahariya town because of the flat topography of the area and the uncontrolled urban growth in the town. As the urbanization increases, frequency of pondage during the monsoon in several areas of the town increases. The town experiences extensive pondage and considerable urban area is inundated because the town does not have proper road network for the construction of storm drainage. These problems need to be addressed in a holistic manner and correct remedial measures need to be proposed. The proposed drainage line (priority lines) streamlines the area and generally enhances the management of storm. Implementation of the priority sectors, as determined by the present study, enhances the infrastructure amenities of the town and attracts business ventures in the area as well.

G. Rationale of the Project and IEE

279. Rationale of the Project

280. The rationale of the project is based on the increasing demand of effective drainage system, increased risk of loss of property and lives due to flooding problems during monsoons, public health impacts, policy commitments and various other aspects.

281. Rationale of the IEE

282. The IEE study for the proposed project is needed to be carried out from the environmental point of view as per EPA 1997 AD and EPR 1997 AD, 2054 BS (Amendments1999 AD, 2007 AD and 2017 AD) and as per ADB Safeguard Policy Statement (SPS), 2009. The regulation stated in Schedule 1 (Clause H) of EPR, 1997 with amendments in 2017 shall only be applicable for this project which states that "Operation of a drinking water supply system with inclusion of sewerage drainage system with treatment system".

283. As per EPR 1997(Amendments 1999, 2007 & 2017 AD), IEE for any project shall be done if the project meets the criteria mentioned in the Schedule 1 (Pertaining to Rule 3) (Clause H) for drinking water projects of EPR 1997(Amendments 1999, 2007 & 2017 AD), only an IEE should be done. The regulation stated in Schedule 1 (H) shall only be applicable if the proposal does not fall under the category "A" through (Clause H) of Schedule 2. Our study shows that the proposed project does not meet the criteria mentioned in Schedule 2 (Clause H) of EPR while the proposed project features meet the criteria mentioned in

Schedule 1 (Clause H) of Environmental Protection Regulations 1997 with amendments 2017.

284. The Project does not involve the relocation and resettlement of people or households. The proposed project is intended to provide drainage facilities in wards 4 & 5 of Katahariya municipality. The project is expected to benefit a base year population of about 26,736 populations (2016) & design year populations of 43,161 (2035) by providing a properly planned drainage facilties and promotion of good hygiene and sanitation practices.

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

285. The IEE study has followed the necessary policy, legal and adminstrative framework outlined in the approved ToR. However, some of them mentioned in ToR are updated in this IEE study.

A. Nepal's Environmental Policy, Legal & Administrative Framework

Constitution of Nepal

286. The Constitution of Nepal is the fundamental law of Nepal.

- Article 30 (1) of the Constitution of Nepal guarantees a ''clean environment'' as a fundamental right, and elaborates that ''every citizen shall have the right to live in a clean and healthy environment".

- Article 30 (3) of the constitution also encourages the state to formulate necessary legal frameworks to balance environment and development.

287. Beside this, the Government of Nepal has passed a series of environmental laws, policies and implementing regulations and standards. Among these, the basic legislations that provide the framework within which environmental assessment is carried out in Nepal are the:

Environmental Protection Act, 2053 (1997)

288. Environmental Protection Act (EPA), 1997, which requires a proponent to undertake IEE or EIA of the proposed project and have the IEE or EIA Report approved by the concerned sector agency, respectively, prior to implementation. This EPA:

(i) Sets out the review and approval process of IEE and EIA Reports, that involve informing and consulting stakeholders;

(ii) Stipulates that no one is to create pollution that would cause significant adverse impacts on the environment or harm to public life and health, or to generate pollution beyond the prescribed standards;

(iii) Specifies for the Ministry in charge of environment (currently the MoFE) to conduct inspection of approved projects to ensure that pollution prevention, control or mitigation is carried out according to the approved IEE or EIA Report;

(iv) Provides for the protection of objects and places of national heritage and places with rare plants, wildlife and biological diversity; and

(v) States that any person/party affected by pollution adverse environmental impact caused by anybody may apply to the prescribed authority for compensation to be recovered from the polluter/pollution generator.

Environmental Protection Rules, 2054(1997) with Latest Amendments 2017

289. Environmental Protection Rules (EPR), 1997, and its amendments in 1999, 2007 & 2017 defines the implementing rules and regulations of the IEE/EIA process, elaborating the provisions in the EPA. The preparation, review and approval of IEE and EIA Reports are

dealt with in Rules 3 to 7 and 10 to 14. Schedules 1 and 2 list down the projects of activities that are required IEE and EIA, respectively, as amended in 2017.

290. Other environmental policies, laws, rules, conventions & standards that provide general context in the environmental assessment of water supply & sanitation works are presented in ***Table II-I***.

Table II-I:Other Relevant Environmental Act, Rules, Plan, Policies, and Guidelines of Nepal

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
a) Plans, Policies & Strategies			
		•	
National Environmental Policy & Action Plan (NEPAP)	2050B.S. (1993 A.D.)	Of its five objectives, most relevant to the Project are to (i) mitigate adverse environmental impacts; and (ii) safeguard national & cultural heritage & preserve biodiversity, within & outside protected areas.	**I.** The subproject will not encroach any physical & cultural heritage areas and will not affect biodiversity. **II.** EMP provides measures to mitigate anticipated adverse impacts.
Water Resources Strategy	2059 B.S. (2002 A.D.)	Among the ten strategic outputs of this strategy, third output focuses on Adequate Supply of and access to potable water and sanitation & hygiene awareness provided.	This provision will strengthen implementation capacity for the proposed project.
National Water Plan	2062 B.S. (2005 A.D.)	• This includes subsector-wise action programmes in water induced disasters, environmental action plan on management of watershed and aquatic ecosystem, water supply, sanitation and hygiene, irrigation for agriculture, hydropower development, industries, tourism, fisheries, and navigational uses, water-related information systems (Decision Support System for River Basin Planning and Management), legal frameworks, and institutional mechanisms • This also includes Environment Management Plan, a strategic document for the implementation of environmental protection measures (including downstream water pollution and groundwater quality, erosion/landslide and sedimentation, water pollution and sanitation, effect on aquatic life and wetland ecosystem), monitoring (baseline, impacts, and compliance), environmental auditing and institutional and procedural arrangements.	This has been considered in IEE study.
National Urban Policy	2063 B.S. (2007 A.D.)	The policy gives importance to environment conservation while carrying out urban development works and natural resource use; thus, supporting the required environmental conservation and protection in donor-assisted development projects.	The IEE study will meet the provisions of this policy.
National Urban Water Supply & Sanitation Sector Policy,	2065 B.S. (2009 A.D.)	The Policy requires the IEE or EIA of proposed WSS projects by the EPA/EPR to (i) incorporate consultations with key	The IEE study will meet the provisions of this policy.

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
		stakeholders, including endpoint users; & (ii) specify measures to mitigate environmental impacts before, during construction & operation, as well as corrective measures.	
Updated 15-yr Development Plan for Small Towns Water Supply and Sanitation Sector	2066 B.S. (2009 A.D. and Amendments in 2015A.D.)	The Plan emphasizes monitoring and evaluation as an important component of a project to determine the overall impact of a project.	EMP prescribes performance monitoring & evaluation to minimize the anticipated environmental impacts.
National Water Supply & Sanitation Policy	2071 B.S. (2014 A.D.)	The Policy addresses the need in the protection of property and human health by providing storm drains in densely populated urban centers.	The proposed project is also committed to provide drainage facilities for storm in emerging towns like Katahariya.
Land Acquisition, Rehabilitation and Resettlement Policy	2015 A.D.	• Contribute to overall development of the nation and its citizens by creating a conducive environment for implementation of infrastructure development projects • Facilitate timely execution (completion) of development projects by minimizing adverse impacts on economic, social and cultural aspects of affected families/people and the project area • Improve social and economic status of project-affected families by providing fair and adequate compensation, appropriate resettlement and rehabilitation assistances/ allowances.	There is no issue of any kind of Land Acquisition, Rehabilitation and Resettlement in this project.
Land Use Policy	2072 B.S. (2015 A.D.)	• The strategy 3 of Policy 2 has taken into account to maintain a balance between physical infrastructure development and environment. • The strategy 3 of Policy 10 focuses on adoption of principle of sustainable development in view of the impact of climate change during any construction and/or development works in order to keep balance between land, environment and development.	The proposed project will maintain balance between construction activities and environmental aspects of the project town.
National Urban Development Strategy	2074 B.S. (2017 A.D.)	• This strategy assesses the existing conditions of infrastructures, environment, economy and governance establishes benchmarks and desirable standards. • It identifies prioritized strategic initiatives for investment in infrastructure and environment to realize the comparative advantages of urban areas.	The IEE study has duly followed this.

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
National Forest Policy	2075 B.S. (2019 A.D.)	It guides sub sectorial programmes relating to forests, plant resources, wildlife, biodiversity, medicinal plants, and soil and watershed conservation. It also covers periodic assessment and updating of information on forest resources of the country.	The proposed project does not have to deal with forest related adverse issues.
Fourteenth Three Years Plan (FY 2073/74-2075/76)	2073/74-2075/76	This plan has separate provision for water supply & sanitation sector. Regarding this, this plan intends to provide water supply & sanitation service to whole population, for which it has its own strategy, working policy and expected positive outcomes through various development works in the field of water supply & sanitation service.	This proposed project falls under the major programmes of this plan. (Chapter 4, Section 3, Sub Section 3.6, Ka-2)
Fifteenth Plan Approach Paper (2076/77-2080/81)	2076/77-2080/81	This plan also has separate provision for water supply & sanitation sector. Regarding this sector, this plan aims to ensure access to safe water supply & sanitation service and to enhance quality service. This plan has also its own strategy, working policy and expected positive outcomes through various development works in the field of water supply & sanitation service.	The successful implementation of the proposed project shall be the expected outcome of this plan.
Climate Change Policy	2076 B.S. (2019 A.D.)	This has various objectives that includes i) advancing capacity on CCA, ii) developing ecosystem resilience, iii) promoting green economy by adopting low carbon economic development concept, iv) mobilizing national and international financial resources, v) making effective the information service, vi) mainstreaming climate change into relevant policy, strategy, plan and programmes, and vii) also mainstreaming gender and social inclusion, including in climate change mitigation and adaptation programmes	This will be followed during project implementation as per requirement.
National Environmental Policy	2076 B.S. (2019 A.D.)	• This encourages the state to control pollution, manage wastes and promote greenery so as to ensure citizens' right to live in a fair and healthy environment. This was framed to guide the implementation of environment related laws and other thematic laws, realize international commitment and enable collaboration between all concerned government agencies and non-government organizations on environmental management actions. • The policy has entrusted the federal government with the responsibility for looking after national-level policy, law and	This will be followed during the proposed project implementation phase.

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
		standards related works for environmental protection and management.	
b)Laws & Acts			
Aquatic Animal Protection Act	2017 B.S. (1961 A.D.) with Amendments (2055 B.S. (1997 A.D.))	This act renders punishment to any party introducing poisonous, noxious or explosive materials into a water source or destroying any dam, bridge or water system with the intent of catching or killing aquatic life. It also emphasizes that GoN empowers to prohibit catching, killing and harming of certain kinds of aquatic animals by notification in Nepal Gazette.	Information of this act will be delivered to the construction workers, as they may get involved in fishing during construction period.
Town Development Act	2045 B.S. (1988 A.D.)	This act has provision of services and facilities like road, transport, electricity, drainage, sanitation and open space based on density of such area.	The proposed project is solely for provision of storm drainage system.
Forest Act	2049 B.S. (1993 A.D.) with Amendments -2055 B.S. (1999 A.D.)	The Act prohibits the extraction of boulders, rocks, pebbles, sand or soil from national forests, defined as all forests, excluding private forests, whether marked or unmarked with forest boundary, to include waste or uncultivated lands, or unregistered lands surrounded by the forest or situated near adjacent forests as well as paths, streams rivers, lakes, riverine lands within the forest.	No trees will be cut. EMP stipulates no quarrying of natural aggregate materials.
Land Acquisition Act	2049 B.S. (1993 A.D.)	It guides the compulsory acquisition of land. It also describes that GoN can acquire land at any place and in any quantity by giving compensation pursuant to the act for the land acquired for any public purposes or for operation of any development project initiated by GoN.	There is no requirement of land acquisition of private land. All the land required are under the ownership of GoN.
Child Labor Prohibition and Regulation Act	2056 B.S. (2001 A.D.)	The section 3 of the Act prohibits a child from engaging in work, sub-clause 1 of the clause 3 states “Nobody shall engage in work a child who has not completed fourteen years of age as a labor and subclause 2 states “Nobody shall engage a child in a risk full occupation or work set forth in the Schedule”. The section 4 states “Child not to be engaged in work against his will by temptation or fear or pressure or by any other means.	This provision has been stated in EMP.
Solid Waste Management Act	2068 B.S. (2011 A.D.)	Article 4 provides that the management of hazardous, medical, chemical or industrial waste rests upon the generators of such wastes. Management should be as prescribed in the Act. Article 5 provides that individuals and entities must reduce the amount of solid waste generated while carrying out work or business.	EMP prescribes eco-friendly management of solid and hazardous wastes.

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
Labor Act	2074 B.S. (2017 A.D.)	• The has provisions for the rights, interest, facilities and safety of workers and employees working in enterprises of various sectors. • The Act emphasizes on occupational health and safety of workers and stipulates provision of necessary safety gears and adopting appropriate precautionary measures against potentially hazardous machine/equipment in the workplace. • It also specifies to arrange such as removal of waste accumulated during production process and prevention of dust, fume, vapor and other waste materials, which adversely affect the health of workers. • It specifies the provision of controlling the communicable diseases at the construction site. It also prohibits mobilization of child as a labor. It emphasizes on the provision of temporary camp, safe drinking water and necessary food supplies to the workers.	These provisions are stated in EMP.
Local Government Operation Act	2074 B.S. (2017 A.D.)	The Act gives Province Government the functions, duties & powers to: (i) entrust municipalities with responsibility of WSS services, (ii) conserve & protect their local environment & natural resources; (iii) plan, implement &/or operate & maintain WS projects at local level; (iv) implement or arrange for implementation local sanitation/sewerage & drainage projects; (v) protect cultural heritage & religious sites; &/or (vi) monitor project activities within their respective jurisdictions.	Provides a basis for Local Government to monitor the environmental performance of the projects. EMP provides the responsibilities of LGs in EMP implementation.
Land Use Act	2076 B.S. (2019 A.D.)	The main aim of the act is to ensure that land is properly used and managed and that land set aside for one purpose is not used for other. The act has assigned the responsibility for implementing the act to not only the federal government but also to the provincial and local governments.	Information on this act is necessary for this project to avoid misuse of land for the construction of project components. However, as this project requires RoW of the public road for the proposed components, land misuse May not be a serious issue.
c)Rules & Regulations			
Solid Waste (Management & Resource Mobilization), Rules	2044 B.S. (1987 A.D.) & Amendments 2049 B.S. (1992A.D.)	• This act focuses on the management of solid waste and mobilization of resources related. • These also ensure the health convenience of the common people by controlling the adverse impact on pollution from solid waste.	• This act needs to be reviewed during construction phase. • EMP covers the requirement of this rule for the proposed project.

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
Solid Waste Management Rules	2070 B.S. (2013 A.D.)	• GoN has issued these rules by exercising the power conferred by the section 50 of the Solid Waste Management Act, 2068. • Section 3 of this rule focuses on Segregation & management of solid wastes.	EMP for this proposed project covers this matter focused by this rule.
Labor Rules	2075 B.S. (2018 A.D.)	• GoN has issued these rules by exercising the power conferred to it under the section 184 of the Labor Act, 2074. • Section 7 of these rules deals with Occupational Safety & Health Policy.	EMP for this proposed project covers this matter focused by this rule.
d)Directives, Guidelines & Manuals			
National EIA Guideline	2049 B.S. (1993 A.D.)	This guidelines aims to assess the environmental impacts likely to be caused by a project, and promote its positive impacts and mitigate or eliminate adverse impacts by undertaking preventive and other effective measures after integrating the environmental impacts in the planning cycle of all the projects to be initiated in Nepal, prior to their initiation, so as to make the economic benefits from development projects sustainable.	This has been followed for evaluation of the anticipated environmental impacts.
WHO Air Quality Guidelines, Global Update	2061 B.S. (2005 A.D.)	It provides basis for global standards in air quality that are designed to offer guidance in reducing the health impacts of air pollution.	During air quality monitoring, this guideline will be followed.
WHO Guidelines for Drinking-water Quality, Fourth Edition	2073 B.S. (2017 A.D.	It provides the recommendation of WHO for managing the risk from hazards that may compromise the safety of drinking water.	During water quality monitoring, this guideline will be considered and followed
National Noise Standard Guidelines	2068 B.S. (2012 A.D.)	It provides basis for national standards in noise quality that are designed to offer guidance in reducing the health impacts of noise pollution.	During noise quality monitoring, this guideline will be followed.
Guidelines for Community Noise by WHO	2055 B.S. (1999 A.D.)	It provides basis for global standards in noise quality at community level that are designed to offer guidance in reducing the health impacts of noise pollution.	During noise quality monitoring, this guideline will be followed.

Source: IEE Study, 2018/019

B. Environmental Agreements

International Environmental Agreements

291. Nepal is a signatory to many international agreements and conventions related to environmental conservation. However, all of those conventions are not interrelated to the proposed project. The conventions related to the proposed project are as follows:

(i) The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973

(ii) International Covenant on Economic, Social and Cultural Rights (ICESCR), 1976

(iii) Worst Forms of Child Labour Convention, 1999

292. The relevance of the aforementioned environmental agreements to the Subproject are with their emphasis on human activities to (i) take measures to protect local, as well as global, natural resources and environment; (ii) prevent or reduce the causes of climate change; and (iii) anticipate and mitigate the adverse impacts of climate change. The country is also committed to the Millennium Development Goals, the seventh goal of which is to "ensure environmental sustainability" targeting the reverse of loss of forest and environmental resources, reduction of biodiversity loss, and increase in the proportion of the population with sustainable access to safe drinking water and basic sanitation.

293. The Katahariya Storm Drainage Project does not and will not break or go against Nepal's commitment to these international agreements.

C. Environmental Standards

294. The key environmental quality standards applied in the GoN IEE (as well as in the ADB IEE) are listed below and their details featured as ***Appendix 2A***:

- National Ambient Air Quality Standards, for Nepal (NAAQS), 2003 A.D. & Updated in 2012 A.D.
- National Diesel Generator Emission Standard,2012
- Nepal Vehicle Mass Emission Standard, (NVMES), 2069 B.S. (2012 A.D.)
- The key environmental quality standards applied in the GoN IEE (as well as in the ADB IEE) are listed in ***Table II-II*** and their details on the acceptable level criteria of these standards are featured in ***Appendix 2A***.

Table II-II: Relevant Environmental Quality Standards

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

Source: IEE Study, 2018/019

295. As shown in the above table, *National Ambient Air Quality Standards, for Nepal, 2003* is enforced by GoN that has set quality standards for seven parameters TSP, PM_{10},

Sulphur Dioxide(SO_2), Nitrogen Oxide(NO_2), Carbon Mono-oxide (CO), Lead (Pb) and Benzene at national level. Similarly, *WHO Air Quality Guidelines, Global Update, 2005* enforced by WHO has set quality standards for four parameters PM_{10}, $PM_{2.5}$, SO_2 and NO_2 at international level. Both standards provide guidelines to follow and comply the set standards for the ambient air quality during construction period. The acceptable level criteria for ambient air quality as per both standards are given below:

Table II-III: Standards for Ambient Air Quality

Parameter	Averaging Period	Nepal's Ambient Air Quality Standard (µg/m³) *	WHO Air Quality Guidelines (µg/m³) **	
			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	-	-

296.

297. Source:

* National Ambient Air Quality Standards for Nepal, 2003. Obtained from Environment Statistics of Nepal 2011, Government of Nepal, National Planning Commission Secretariat, Central Bureau of Statistics, Kathmandu, Nepal.
** Environmental, Health and Safety General Guidelines, 2007. International Finance Corporation, World Bank Group.
^ Air Quality Guidelines for Europe, Second Edition, 2000. WHO Regional Office for Europe, Copenhagen.
Parameter that either has no national standard value for 24-hour observation or with WHO guideline value for 24-hour observation as more stringent than that specified in the national standards.

298.

299. Similarly, *National Noise Standard Guidelines, 2012* has set the standard noise levels measured in dBA for Inustrial area, Commercial Area, Rural Residential Area, Urban Residential Area, Mixed Residential Area and Quiet Area. This also has provision of standard values for the noise level generated by Water Pumps and Diesel Generator also. This is limited within the country only. For international level, *WHO Noise Level Guidelines* has set the standard noise levels measured in dBA for two areas that includes residential and commercial areas. The standard values for ambient noise quality are given in the table given below:

Table II-IV: Standards for Ambient Noise Quality

Receptor / Source	National Noise Standard Guidelines, 2012 (dB)		WHO Guideline Values for Noise Levels Measured Out of Doors * (One Hour L_{Aeq} in dBA)	
	Day	Night	07:00 - 22:00	22:00 - 07:00
Industrial area	75	70	70	70
Commercial area	65	55		
Rural residential area	45	40	55	45
Urban residential area	55	50		
Mixed residential area	63	55		
Quiet area	50	40	-	-
Water pump	65		-	
Diesel generator	90		-	

300. * Guidelines for Community Noise, WHO, 1999.

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

301. *National Diesel Generator Emission Standard,2012* has been introduced by the Government of Nepal in 2012 for new and in use diesel generators with a capacity of 8 kW-560kW (under the 1997 Environment Protection Act). The emissions standards set for new diesel generator imports is equivalent to Bharat Stage III standards and, for in-use diesel generators, is equivalent to Bharat Stage II. The Diesel Power Generation: Inventories and Black Carbon Emissions in Kathmandu Valley, Nepal 60 emissions limits are set for four major pollutants: CO, HC, NOx, and PM. This is given in detail below:

Table II-V: National Diesel Generators Emission Standards, 2012

1. Emissions Limits (g/kWh) for Imports of New Diesel Generators

Category (kW)	CO	HC+NO_x	PM
kW< 8	8.00	7.50	0.80
8 = kW <19	6.60	7.50	0.80
19 = kW <37	5.50	7.50	0.60
37 = kW <75	5.00	4.70	0.40
75 = kW <130	5.00	4.00	0.30
130 = kW <560	3.50	4.00	0.20

Note: This standard is equivalent to Bharat III standards.

2. Emissions Limits (g/kWh) for In-use DG Sets

Category (kW)	**CO**	**HC**	**NO_x**	**PM**
kW< 8	8.00	1.30	9.20	1.00
8 = kW <19	6.60	1.30	9.20	0.85
19 = kW <37	6.50	1.30	9.20	0.85
37 = kW <75	6.50	1.30	9.20	0.85
75 = kW <130	5.00	1.30	9.20	0.70
130 = kW <560	5.00	1.30	9.20	0.54

Note: This standard is equivalent to Bharat II standards.

a) Sampling collection point should be located at one-third of the DG set stack height.

*b) kW= Power Factor * kW*

c) Testing Methodology: Should be according to ISO 8178 or equivalent to ISO 8178 standard set by the manufacturing country.

302.

Source: Diesel Power Generation, 2014 by The World Bank

D. Environmental Assessment Requirements

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

304.

(iii) Environmental Assessment Requirements of ADB

305. All projects funded by the ADB must comply with the Safeguard Policy Statement (SPS) 2009 to ensure that projects funded under ADB loan are environmentally sound, legally compliant, and safe. On the environment, the ADB Operations Manual, Bank Policy (OM Section F1/OP, 2010), underpins the SPS 2009. The policy promotes international good practice as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health, and Safety Guidelines.[2]

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

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

Table II-VI:SPS 2009 Safeguard Requirements

SPS 2009 - Safeguard Requirements	Remarks
Use a screening process for each proposed project, as early as possible, to determine the extent and type of environmental assessment (EA) so that the studies are undertaken commensurate with the significance of potential impacts and risks.	REA has been undertaken, indicating that the Subproject is **NOT**: (i) environmentally critical; and (ii) adjacent to or within environmentally sensitive/critical area. The extent of adverse impacts is expected to be local, site-specific, confined within main and secondary influence areas. Significant adverse impacts during construction & operation will be temporary & short-term, can be mitigated properly. Hence, IEE is sufficient.
Conduct EA to identify potential direct, indirect, cumulative, & induced impacts and risks to physical, biological, socio-economic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), and physical, cultural resources in the context of the project's area of influence. Assess potential trans boundary global impacts, including climate change.	IEE has been undertaken to meet this requirement. (Section VI).
Examine alternatives to the project's location, design, technology, and components and their potential environmental and social impacts and document the rationale for selecting the particular alternative proposed. Also, consider the no project alternative.	No project alternatives
Avoid, and where avoidance is not possible, minimize, mitigate, &/or offset adverse impacts and enhance positive impacts using environmental planning & management. Prepare an EMP that includes the proposed mitigation measures, environmental monitoring and reporting requirements, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators.	An EMP has been prepared to address this requirement. Section VIII
Carry out meaningful consultation with affected people &facilitate their informed participation. Ensure women's participation. Involve stakeholders, including affected people & concerned NGOs, early in the project preparation process & ensure that their views & concerns are made known to & understood by decision makers and taken into account. Continue consultations with stakeholders throughout project implementation as necessary to address issues related to EA. Establish a GRM to receive & facilitate resolution of affected people's concerns & grievances on project's environmental performance.	Key informant and random interviews have been conducted. The information regarding Grievance Redress Mechanism (GRM) for the resolution of valid Project-related social and environmental issues/concerns is presented in Section VI.
Disclose a draft EA (including the EMP) promptly, before project appraisal, in an accessible place & a form & language(s) understandable to affected people & other stakeholders. Disclose the final EA, & its updates if any, to affected people & other stakeholders.	This is the final IEE based on the detailed engineering design report. Copies of both SPS-compliant IEE and GoN-approved IEE will be made available at the offices of the PMO, ICG, and WUSC for public consultation.
Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclose monitoring reports.	EMP implementation, reporting, and disclosure of monitoring reports are in this IEE.
Do not implement project activities in areas of critical habitats, unless (i) there are no measurable adverse impacts on the critical habitat that could impair its ability to function, (ii) there is no reduction in the population of any recognized endangered or critically	The subproject does not encroach into areas of critical habitats. No trees will be cut.

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

Source: ADB, SPS, 2009

(ii) Environmental Impact Assessment Requirements of Nepal

307. The Environmental Protection Rules (EPR, 1997) defines the process that should be followed in the preparation, review, and approval of environmental assessment reports. The process applicable to the Subproject is summarized in ***Table II-VII***. The key environmental quality standards applied in the GoN IEE (as well as in the ADB IEE) are listed in the table given below and their details featured as ***Appendix 2A***.

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

Steps in the Process	Remarks
Proponent refers to EPR Schedules 1 & 2 for the required environmental assessment (IEE or EIA) to carry out.	The project requires an IEE.
If a proposed project requires an IEE, Proponent prepares an IEE schedule of work/ToR using the format prescribed in Schedule 3 of the EPR and submit this to the CSA for approval.	ToR has already been prepared and submitted to MoWS accordingly.
Proponent carries out IEE according to the approved work schedule/ToR and prepares an IEE Report following the format prescribed in EPR Schedule 5 and incorporating stakeholders' feedback applying the consultation procedure specified in the EPR.	The project carried out the IEE and prepared the IEE Report accordingly.
Proponent submits 15 copies of the IEE Report along with the project proposal and recommendation of the concerned town or town to the CSA.	The project submits documents accordingly for review and approval.
CSA conducts review and grants approval of IEE Report.	The approval of IEE Report will be taken from the concerned ministry
If the review reveals project implementation to have no substantial adverse impact on the environment, CSA grants approval within 21 days of receipt of the report.	
If the review reveals the necessity to carry out an EIA, Proponent conducts an EIA following the prescribed EIA process.	The IEE study shows that there is no requirement of EIA. IEE is sufficient for the project.
Proponent implements approved IEE Report and any terms and conditions given the approval.	The project has not started implementation.
CSA monitors and evaluates the impact of project implementation. When necessary, issue directives to the Proponent to institute environmental protection measures.	The project has not started implementation.
MoFE conducts the environmental audit after two years of project commissioning/operation.	The project has not started implementation.

Source: EPR, 1997 with Latest Amendments 2017

III. APPROACH AND METHODOLOGIES

39. The IEE study was carried out in accordance with the requirements of the ADB's Safeguard Policy Statement (SPS 2009) and environmental legal requirements of GoN i.e., EPA (1997) and EPR (1997 with amendments 1999, 2007 & 2017). The IEE study was conducted through preliminary exercise to solicit information from the planners, policy makers, concerned authorities, WUSC and the relevant stakeholders. This involves walkthrough survey, desk study, field visits and impact identification & evaluation. For this, the stepwise process to undertake these activities are as follows:

A. Literature Review/Desk Study

308. Available secondary information in the form of reports and maps; topographic maps, land use maps, aerial photographs, cadastral survey maps, etc. were collected and reviewed. Feasibility Study Report, Detailed Engineering Design Report and Social Safeguard Due Diligence Report of the proposed project were the key documents to determine the nature and scope of activities of the project that influences the environmental conditions of the proposal area. Rainfall & Other Meteorological data of the project town were also collected from the Department of Hydrology & Meteorology. Similarly, published and unpublished reports about environmental policies, laws, rules, standards, Acts, Regulation and other legal provisions were also collected and reviewed. Published and unpublished literature of the project area about biological, social, chemical, physical, and cultural environments in the form of maps, and reports, etc. were collected from various sources and reviewed to get information on the coverage of the studies and fulfill the data gaps.

B. Impact Area Delineation

309. To carry out IEE study, the possible areas where the anticipated impacts have either significant or insignificant effects, need to be delineated. To specify the area that would be covered by the assessment, the geographical boundary of the influence area is delineated on the topographical map. This delineating methodology is called Impact Area Delineation The impact areas have been delineated on the basis of proximity of the construction site to the nearby surrounding areas. The impact areas has been delineated as “Core Project Area”, and “Surrounding Project Area” on the basis of proximity and magnitude of the impacts due to the proposed project activities.

310. Core Area: Here, the Core Area indicates the area required permanently as well as temporarily for the proposed project. This area refers to the service area as well the area where the construction of the project components will be carried out.

311. Surrounding Area: Here, the Surrounding Area indicates the area within the immediate surroundings of the core area of proposed project and has spill over effects of the core area. It includes the area of the project town which is closely associated with the core area of the project

C. Field Study

312. Field studies were carried out within the project site areas in an extensive manner by a multidisciplinary team comprising a) an Environmental Specialist; b) Water Supply & Sanitation Engineer; c) Sociologist; d) Geo-hydrologist and e) Botanist. During the visit, baseline information on physico-chemical, biological, and socio-economic & cultural conditions of the core area and surrounding areas of the project area were collected through simple checklist

method and Survey Questionnaire method. During field study, Rapid Environmental Assessment (REA) Checklist (***Refer Appendix 1***) as recommended by ADB as per SPS, 2009 were duly followed and filled up. This checklist primarily includes the data regarding physico-chemical, biological, socio-economic & cultural environment. Various approaches and methodological tools that were used for the data collection of various environmental aspects during this field study are described below:

a) Physico-Chemical Environment

313. An extensive physical & chemical environment survey were carried out by delineating the project impact area to collect the baseline information. Topographic and geomorphological features that include Landforms, Geology & Soil, Land use pattern, Landslide susceptibility etc. were observed and documented. The data regarding Climate & Rainfall of the project town were collected from the concerned authority. Similarly, information on air quality and noise quality condition were collected through field observation and expert's judgment. Information on rivers and aquatic ecology were also collected to assess the existing condition. Various consultations programs with the local communities and Interviews with few government officials, schools & representatives of the local bodies were also conducted.

b) Biological Environment

314. The baseline information regarding biological environment were collected through walkthrough survey throughout the core & surrounding areas of the project area by adopting simple checklist method (***Refer Appendix 5***), through professional judgment and local interaction. Under this baseline information in regard to the biological environment, types of vegetation and forests were identified based on the species composition. The protected vegetation (rare, endangered, indigenous, etc.) of the project area as per IUCN Red Book, CITES Appendices, Proximity Report Generated by IBAT and GoN list species were enumerated based on consultation with the local people and the expert judgment.

315. Information on rivers of the project area and aquatic ecology were also collected through the interaction with the locals, the expert judgment and field observation.

316. The data on the existing wildlife/mammals, birds, herpetofauna (Reptiles/Amphibians) were collected through field observation and interaction with the locals. The checklists as given in ***Appendix 5*** were filled up accordingly. The status of each of these species were identified as either threatened or near threatened or endangered species or least concern as per IUCN Red Book, IBAT Report of ADB, CITES Appendices and GoN list species. This were affirmed by the expert review.

c) Socio-Economic & Cultural Environment

317. Household surveys were conducted through interviews by simple questionnaire method to obtain information on the socio-economic & cultural environment that primarily includes demography, ethnicity, education, health & sanitation, drinking water condition of the project area, irrigation facility, local traditions, religions, land use patterns, incomes & expenditures and to acquire their perception towards the proposed project, etc. Information on Migratory patterns of the local people and the Impact of river on settlements & agriculture were collected. Information on the people residing within the core area of the proposed project town were collected through socio-economic survey. The sample of Household Survey Questionnaire that were filled up during household survey has been included in ***Appendix 5.***

318. Focused Group discussions (FGD) were conducted to obtain suggestions and comments from all the potential stakeholders. Direct Observation was conducted to ascertain the existence of the cultural sites, and public institutions such as temples, cremation grounds, historical & archaeological sites, schools, and health posts within the project core areas and to determine the effect on their existence due to project construction activities. The Consultations with the village elites, Meetings and Group discussions were done to assess the current situation of the project area community.

D. Stakeholder & Public Consultation

51. Various consultations with key stakeholders were held during design phase of this proposed project. Here, the key stakeholders include government agencies, local bodies, road users, local beneficiaries etc. These consultation programs disclose information regarding the proposed project to the relevant stakeholders. Along with this, other required information for the project were collected from the concerned stakeholders, which were integrated in the identification of anticipated environmental impacts.

E. Impact Identification, Prediction & Evaluation Methods

319. The information regarding Physico-chemical, Biological and Socio-economic & Cultural aspects as mentioned above were collected to identify the susceptibility of these aspects to be affected by the proposed project activities. This helped to identify the anticipated environmental impacts of the proposed project. For this, Simple Checklist method were adopted for the impact identification. This was carried out by using Rapid Environmental Assessment (REA) Checklist prepared by ADB and by using simple household survey questionnaire (***Refer Appendix 5***) prepared during the desk study. These checklists explained about the environmental features or factors that need to be addressed while identifying the impacts of projects and activities.

320. Once all the important impacts were identified, their potential characteristic were predicted. The baseline data on physico-chemical, biological, socio-economic and cultural aspects were used to estimate the likely characteristics and parameters of impacts that includes Nature, Magnitude, Extent and Duration.

321. The nature of each predicted impact has been classified into Direct (D) and Indirect (ID). The magnitude of the impact is classified into High (H), Medium (M) and Low (L). The extent is classified into Site-Specific (SS), Local (L), and Regional (R). Similarly, the duration of impact is classified into Short Term (ST), Medium term (MT), and Long term (LT).

322. Impact predictions is generally made against a baseline established by the existing environment. Hence, during our field study, the baseline data were used as reference point against which the characteristics and parameters of impact related changes were analyzed. Impact predictions were made by considering the future state of the environment. This also requires professional judgment for accuracy.

323. After the impact identification and prediction method, the impacts will be evaluated regarding the significance of the predicted impacts to assess the adversity of adverse impacts and efficiency of beneficial impacts within the project core & surrounding areas. This was done by following the *National EIA Guidelines 1993* according to which scoring for each likely parameter of the impacts was carried out and the level of significance has been assessed as recommended by these guidelines.The scoring of Impacts as per *National EIA Guidelines 1993* is tabulated below*:*

Table III-I: Scoring of Impacts

S. No.	Likely Parameters of Impacts	Type	Scoring as per National EIA Guidelines,1993
1.	Nature	Direct	No Scoring Required
		Indirect	
2.	Magnitude	High (H)	60
		Medium/Moderate (M)	20
		Low (L)	10
3.	Extent	Regional (R)	60
		Local (L)	20
		Site Specisifc (SS)	10
4.	Duration	Long Term (LT)	20
		Medium Term (MT)	10
		Short Term (ST)	5

Source: National EIA Guidelines 1993

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

Table III-II: Significance of Impacts

S. No.	Scoring as per National EIA Guidelines,1993	Level of Significance as per National EIA Guidelines,1993
1.	Less than 50	Insignificant
2.	50 to 75	Significant
3.	More than 75	Very Significant

Source: National EIA Guidelines 1993

324. This evaluation has been carried out as per the professional judgment by the key expert team involved in the IEE study.

IV. DESCRIPTION OF THE PROJECT

A. Project Area

(i) Proposed Area

325. According to the detailed engineering design report, Discussion has been made with Katahariya Municipality and PMO to split the area to construct the drain in phase 1 and 2. Depending upon the overland flow and risk factor, the major drain has been identified and kept in phase 1 and the remaining has been kept in phase 2. The design of both phase 1 and 2 have been carried out. The project municipality may precede for the phase 2 construction activities through the utilization of their own resources based on the design or any other possible funding sources. All designed flow of upstream of settlement can be carried by phase 1 main drain. Hence, the flow is diverted into another side of the road and designed the drain. Hence, the municipality needs to give top priority to construct this drain first to overcome the problem. However, there may be some overland flow during heavy rain, if the flood comes from the upstream catchment is more than the designed flow.

326. Considering the availability of the budget and necessity of the drain in the town, the drainage area prioritized by Katahariya Municipality and WUSC on 29 Aug, 2019.The priorities area are as follows:

327. Priority 1: From OHT to bazaar to Tolapur

328. Priority 2: From OHT to Katahariya Gaun

329. Priority 3: Some part of Bazaar area and Bahadurpur

330. Priority 4: Balirampur

331. Priority 5: Harsaha and remaining areas

332. Based upon the priority and availability of the budget, the drains are categorized into main drain (M) and branch drain (B). Accordingly, main drains are kept in priority basis upto the available budget. The main drain of priority 1, 2, 3and some length of priority 4 are kept at this stage. But the design has been carried out in the whole service area. The settlement has small and narrow roads, where both side surface drains are not possible to construct. These drains are mainly kept in phase 2. Also the recently laid water supply pipe may encounter during construction of drains. To overcome from the difficulties and some newly laid pipes, the drain of narrow roads has been kept in phase 2. Some drain of the settlement that has been constructed by other stakeholder is not included in present scope. If overlapped, the drain can be shifted based on the design during implementation though it is not kept in present scope.

333. Discussion has been made with Katahariya Municipality and PMO to split the area to construct the drain in phase 1 and 2. Depending upon the overland flow and risk factor, the major drain has been identified and kept in phase 1 and the remaining has been kept in phase 2.

334. The design of drain of both phases 1 and 2 have been carried out. Municipality can construct the drain under phase 2 from its own resources based on the design or find funding sources from themselves. All designed flow of upstream of settlement can be carried by phase 1 main drain.

335. Hence, municipality needs to give top priority to construct this drain first to overcome the problem. However, there may be some overland flow during heavy rain, if the flood comes

from the upstream catchment is more than the designed flow. The figure given below gives the overall sewer network plan for overall drainage system and phase 1 drainage system

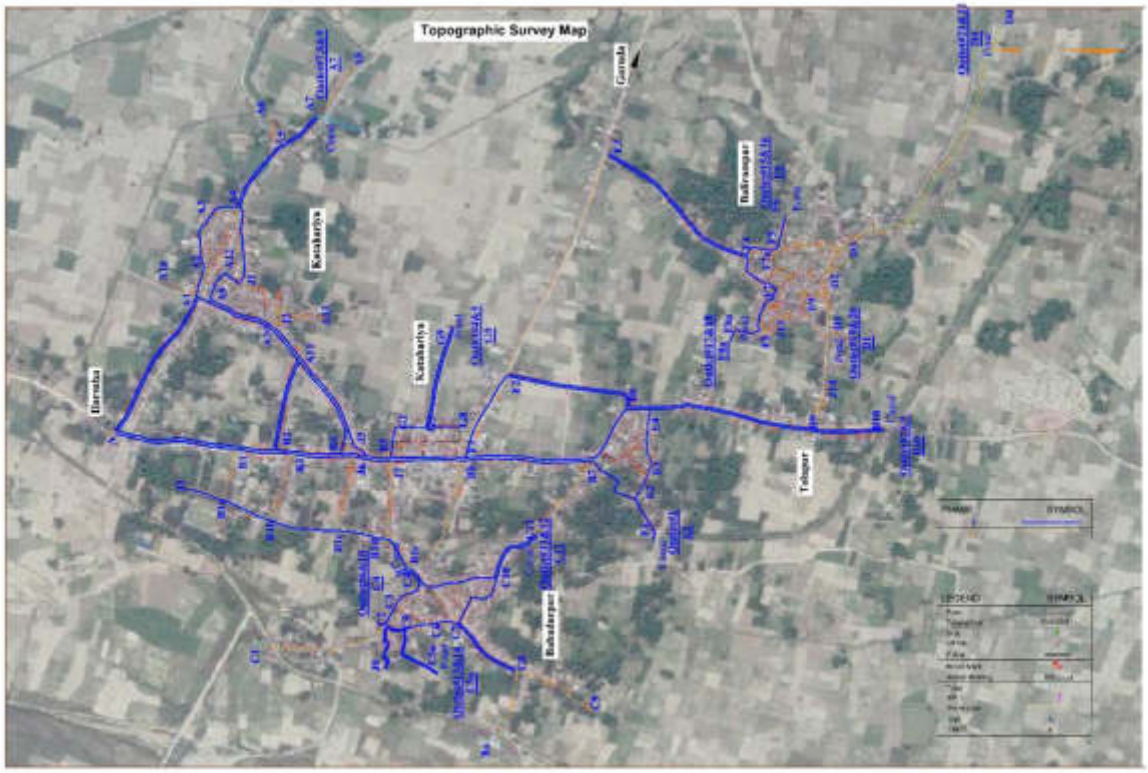


Figure IV-I: Overall Storm Sewer Network Plan under Phase 1

(ii) Catchment Area

336. The catchment area refers to the maximum area of land from which rainfall will passes into the point of consideration to determine the runoff. In this concept, the catchment has been divided into number pasture land and number of built up area with respect to the flow consideration. Accordingly, the flow at each point has been determined to finalize the size of drain in respective stretch. Separate drainage sub system has been proposed for this project. Each sub – drainage has the catchment area less than 400 ha. The catchment area for the proposed project is depicted in the figure given below:

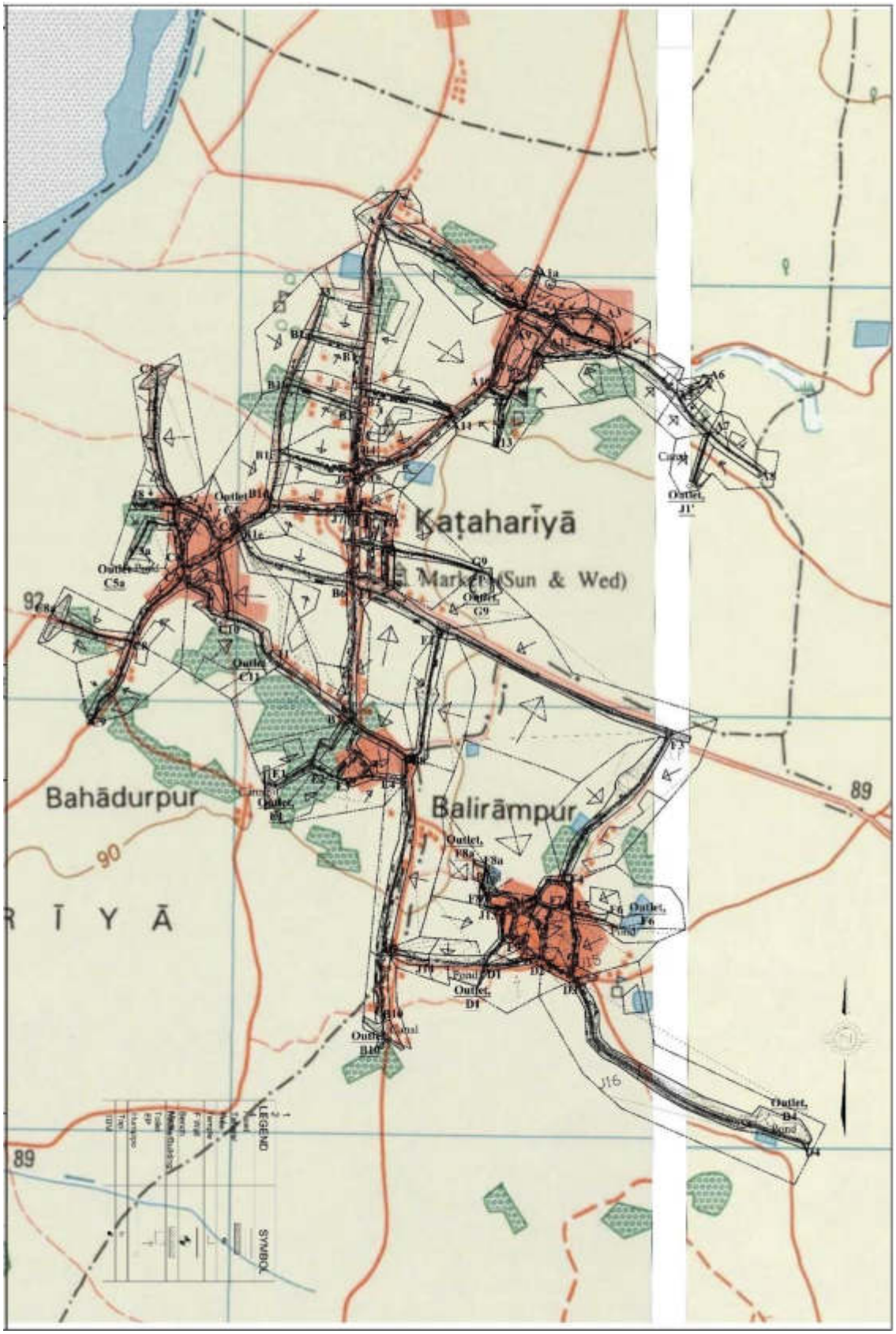


Figure IV-II: Catchment Area

337. The table given below gives brief details on the catchment areas of the proposed project.

Table IV-I: Catchment Area Details

S.N	Node Revised	Maximum Length Travelled by Water from Farthest Point of Catchment and Converted Length, L	Catchment area of pasture at each side (Right/ Left)	Catchment area of built up at each side (Right/ Left)
		m	Sq. Km	Sq. Km
1	A-J1'			
	A1a-A1,R	46.94	0	0.0026
		10.98	0.0005	0.0039
	A1a-A2,L	25.59	0.0004	0.0034
		57.9	0	0.0015
		83.78	0	0.0026
	A-A1,R	293.32	0.0047	0.015
	A-A1,L	86.23	0.0011	0.0043
		319.21	0	0.0083
	A2-A3	61.12	0	0.0076
	A6-A5,R	72.85	0	0.0021
	A6-A5,L	72.85	0	0.0045
	A3-A7,L	111.97	0	0.009
		87.95	0	0.0042
		81.32	0	0.002
		50.12	0	0.001
		47.96	0	0.0021
	A8-A7,R	58.65	0	0.0018
		84.95	0.0007	0.0092
	A8-J1',L	168.67	0.0006	0.0114
2	A9-J1',R			
	A9-J1,R	82.34	0.0007	0.0030
	J1-J1'	177.89	0.0003	0.0026
			0.0018	0.0138
			0.0087	0.0656
		154.47	0.0014	0.0097
		112.74	0.0010	0.0056
		109.35	0.0014	0.0076
3	A9-G9,L			
	A9-A10,R	146.39	0.0007	0.0049
	J1-A10,R	118.94	0.0006	0.0034
3	J1-A13,L	235.43	0.0016	0.0151
	A13-J2	111.80	0.0003	0.0015
	J2-A11	98.81	0.0017	0.0084
	A1-A11,R	290.89	0.0042	0.0452
	A-A11,L	235.59	0.0027	0.0247
		218.57	0.0007	0.0060
	A11-J5,L	203.84	0.0011	0.0090
	B2-B4,R	205.95	0.0011	0.0090
		195.61	0.0011	0.0087
	B2-B4,L	100.73	0.0010	0.0052
	J5-G9,L	114.36	0.0015	0.0085
		126.17	0.0011	0.0067
		237.24	0.0015	0.0135
4	G8-G9,R			
	G8-G9	119.03	0.0017	0.0096
		200.09	0.0018	0.0146

S.N	Node Revised	Maximum Length Travelled by Water from Farthest Point of Catchment and Converted Length, L	Catchment area of pasture at each side (Right/ Left)	Catchment area of built up at each side (Right/ Left)
		m	Sq. Km	Sq. Km
5	G8-F6,L			
	G8-F3,L	331.29	0.0014	0.0170
		400.82	0.0027	0.0372
	F3-F6,L	369.62	0.0023	0.0293
		140.71	0.0035	0.0225
6	F5-F6,R			
	F5-F6,R	222.69	0.0006	0.0056
7	F5-D4,L			
	F4-D3,R	163.77	0.0006	0.0044
	D1-D3,L	211.99	0.0017	0.0143
	F5-D4,L	158.65	0.0019	0.0132
		503.20	0.0035	0.0554
8	D2-D4,R			
	D2-D4,R	170.45	0.0004	0.0032
		470.45	0.0036	0.0544
9	MINOR DRAINS			
	J3-B1,L	161.14	0.0015	0.0104
	B1a-B1,R	174.27	0.0014	0.0102
	B1b-B3,L	169.62	0.0010	0.0074
	B1b-B3,R	215.68	0.0016	0.0141
	B1c-J6,L	215.68	0.0013	0.0112
	B1c-J6,R	215.68	0.0009	0.0080
	B1d-J7,L	218.58	0.0011	0.0098
	B1d-J7,R	240.19	0.0015	0.0139
	B1e-B6,L	219.75	0.0020	0.0178
	B1e-B6,R	219.75	0.0026	0.0231
	C11-B7,L	229.85	0.0017	0.0157
	C11-B7,R	261.12	0.0026	0.0256
	A-E1,R	203.29	0.0019	0.0157
		0.00	0.0000	0.0000
		0.00	0.0000	0.0000
		0.00	0.0000	0.0000
		0.00	0.0000	0.0000
		0.00	0.0000	0.0000
		0.00	0.0000	0.0000
		175.66	0.0015	0.0114
10	J3-C4,R			
	J3-C4,R	214.71	0.0026	0.0225
		295.70	0.0026	0.0282
11	C3-J13,L			
	C3-C4,L	148.67	0.0009	0.0061
12	C1-C5a,R			
	C1-C2,R	287.28	0.0006	0.0062
		105.35	0.0007	0.0040
	J8-C2,L	96.68	0.0006	0.0032
	J8-C5a,R	96.68	0.0003	0.0017
		193.05	0.0009	0.0073
13	C8a,C1-C5a,R,L			
	C8a-C8,R	192.54	0.0013	0.0107
	C9-C8,L	214.31	0.0012	0.0101
	C8a-C5	192.54	0.0014	0.0113
		208.88	0.0004	0.0033

S.N	Node Revised	Maximum Length Travelled by Water from Farthest Point of Catchment and Converted Length, L	Catchment area of pasture at each side (Right/ Left)	Catchment area of built up at each side (Right/ Left)
		m	Sq. Km	Sq. Km
		150.71	0.0005	0.0031
	C1-C2,L	287.28	0.0022	0.0237
	C3-C2,R	97.90	0.0006	0.0028
	C2-C5	150.71	0.0013	0.0085
	C5-C5a,L	121.13	0.0012	0.0073
14	C9-C11,R			
	C9-C11,R	214.31	0.0016	0.0137
		176.97	0.0017	0.0128
		303.41	0.0025	0.0272
			0.0003	0.0036
15	C4-C11,L			
	C4-C11,L	148.53	0.0023	0.0152
			0.0006	0.0042
16	F2-B10,L			
	J14-B9,L	73.65	0.0007	0.0029
	J14-B9,R	125.25	0.0006	0.0038
	F2-B10,L	297.35	0.0024	0.0257
		396.80	0.0025	0.0343
		190.33	0.0009	0.0075
17	F1-B10,L			
	F1-B8,L	216.65	0.0010	0.0089
		116.83	0.0019	0.0106
	F2-B10,R	291.58	0.0024	0.0258
		272.74	0.0009	0.0097
		117.11	0.0007	0.0041
		328.45	0.0013	0.0148
		190.33	0.0008	0.0063
18	E4-E1,L			
	E4-E1,L	175.30	0.0015	0.0114
		266.70	0.0022	0.0219
19	F2-F8a,R			
	F2-F3,R	492.00	0.0041	0.0641
	F3-F8a,R	363.00	0.0021	0.0267
		399.40	0.0046	0.0617
20	J13-F8a,L			
	J13-F8a,L	242.73	0.0016	0.0149
		96.98	0.0008	0.0040
22	D2-D1,L			
	D2-D1,L	129.50	0.0021	0.0131
23	J13-D1,R			
	J13-D1,R	183.44	0.0021	0.0161
			0.0009	0.0071
24	J14-d1,L			
	J14-d1,L	128.27	0.0012	0.0075

Source: DEDR, 2019

B. Sub-project Drainage Components

338. The components that have been adopted in the proposed project are described in the following section:

(i) Drains

339. Two types of drains that include Circular Drain & Rectangular Drain are proposed for this project based on the shape of the drain. The RCC Hume pipes of class NP- 3 of sizes 300mm to 1400mm has been used where circular section is chosen. The pipes will be joined/ tightened with rubber gaskets. The minimum cushion cover for the pipe will be maintained to 0.60m in blacktopped road. Depending upon the road and site condition, the cover becomes high. Likewise, the rectangular section of 0.35 m to 1.35m width and 0.55m to 1.10m depth will be used including 0.25m free board. In rectangular drain, the depth of drain becomes higher than the design depth based on the ground topography. The rectangular drain has been covered either by RCC slab provision with hole to enter the storm or MS grating for safety point of view and allows discharge to flow from ground surface. About 150-200m length close to outfall there is no manhole and drain cover.

340. The proposed drain will be laid within the right of way of the road. It is considered that there will be 2-3m footpath on either side of highway. The drain will be laid parallel and joining to the footpath. The drain is covered with some gap either by cover slab or MS grating to flow all the water into drain and provide access to light traffic also.

(ii) Manholes

341. Circular brick masonry manholes with CI cover/ MS grating are proposed for this project, which has provision of inner plastered surface to prevent the leakage and provide smooth flow. Depending upon the size of drainage, the proposed manhole has average (1.2-1.8) m internal diameter and varies to 1.2m-4.5m high based on designed flow. The spacing of manhole will be kept (30-50) m apart. Along with this, there will be provision of manholes at each road junction and drop. The top surface will correspond to the road ground level. If the footpath needs to be constructed in the future, the manhole height needs to be raised to the level of footpath and the flow inlet will be from side wall of the manhole.

342. The manhole cover will have either heavy duty CI or MS grating. Every alternate, MS grating will be provided to allow the overland flow. Likewise, 2 PE100, PN10 pipes of each 0.30 m diameter are will be provided at wall side to allow the access of the flood into drain.

(iii) Outfall

343. There are several possible outfalls available for the drainage of the storm. In total, 23 outfalls are identified and proposed for this drainage project. For Phase 1, 15 outfalls have been proposed while for Phase 2, the remaining 8 outfalls have been proposed. Its brief details are given in **Table IV-II**. There will be provision of gabion wall over the proposed outfalls to secure the drainage at its position.

Table IV-II: Outfall Structures

S.N.	Outfall/ Outlet	Outlet GL/ bank level	Pipe/ Drain invert level	Foundation bottom level	Height of gabions/ Masonry from drained	Phase 1 Or 2	Size of drain at outlet location	Flow from outlet, cumec	Priority
1	Outlet 1: E1 (Right) at Canal bank	76.20	75.03	74.00	1.03	1	1.4m dia NP-3 pipe	1.56	1
2	Outlet 2: B10 (Left) at canal bank	75.94	73.23	73.00	0.23	1	0.90m dia NP-3 pipe	0.49	1
3	Outlet 3: B10 (Right) at canal bank	76.21	73.33	71.83	1.50	1	0.90m dia NP-3 pipe	0.58	1

S.N.	Outfall/ Outlet	Outlet GL/ bank level	Pipe/ Drain invert level	Foundation bottom level	Height of gabions/ Masonry from drained	Phase 1 Or 2	Size of drain at outlet location	Flow from outlet, cumec	Priority
4	Outlet4: G9 (Left) at Pond bank	75.17	74.00	72.50	1.50	1	Rectangular drain of 1.0 m X 1.15m	1.14	1
5	Outlet5: G9 (Right) at Pond bank	75.13	74.15	72.65	1.50	1	Rectangular drain of 0.6 m X 0.55m	0.15	1
6	Outlet6: C4 (Right) at Canal bank	78.86	77.03	75.53	1.5	1	0.80m dia NP-3 pipe used	0.37	1
7	Outlet 7: A7/J1' (Left) at Canal bank	76.11	74.85	73.35	1.5	1	Rectangular drain of 0.8 m X 0.85m	0.41	2
	Outlet 9: A7/J1' (Right) at Canal bank	75.80	74.70	73.20	1.5	1	Rectangular drain of 0.65 m X 0.60m	0.18	2
8	Outlet 8: A7/J1' (Left) at Canal bank	76.00	74.48	72.98	1.5	2	Rectangular drain of 0.55 m X 0.35m	0.04	2
	Outlet 8: A7/J1' (Right) at Canal bank	76.00	74.82	73.32	1.5	2	Rectangular drain of 0.55 m X 0.35m	0.05	2
9	Outlet 10: C4 (Left) at Canal bank	79.36	78.23	76.73	1.5	1	0.30m dia NP-3 pipe	0.02	3
10	Outlet 11: C11 (Left) at Canal bank	79.36	76.91	75.41	1.5	1	0.60m dia NP-3 pipe	0.16	3
11	Outlet 12: C11 (Right) at Canal bank	78.59	76.66	75.16	1.5	1	0.80m dia NP-3 pipe	0.36	3
12	Outlet 13: C 5a (Left) at Pond	77.75	75.68	74.18	1.5	1	1.0m dia NP-3 pipe	0.86	3
13	Outlet 14: C 5a (Right) at Pond	77.79	76.47	74.17	2.3	1	0.5m dia NP-3 pipe	0.14	3
14	Outlet 15: F6 (Left) at Pond	74.14	73.21	71.71	1.5	1	1.0m dia NP-3 pipe	0.75	4
15	Outlet 16: F6 (Right) at Pond	73.66	73.00	71.50	1.5	2	Rectangular drain of 0.55 m X 0.35m	0.04	4
16	Outlet 17: F8a (Left) at Pond	75.42	74.55	73.05	1.5	2	Rectangular drain of 0.60 m X 0.45m	0.13	4
17	Outlet 18: F8a (Right) at Pond	75.46	72.96	71.46	1.5	1	1.2m dia NP-3 pipe	0.97	4
18	Outlet 19: D1 (Left) at Pond	75.42	74.74	73.24	1.5	2	Rectangular drain of 0.55 m X 0.35m	0.05	4
19	Outlet 20: D1 (Right) at Pond	75.41	74.36	72.86	1.5	2	Rectangular drain of 0.70 m X 0.55m	0.19	4
	Outlet 20: D1 (Right) at Pond	75.30	74.48	72.98	1.5	2	Rectangular drain of 0.55 m X 0.35m	0.03	4
20	Outlet 21: D4 (Left) at Pond	73.46	72.01	70.51	1.5	2	Rectangular drain of 0.80 m X 0.90m	0.52	4

S.N.	Outfall/ Outlet	Outlet GL/ bank level	Pipe/ Drain invert level	Foundation bottom level	Height of gabions/ Masonry from drained	Phase 1 Or 2	Size of drain at outlet location	Flow from outlet, cumec	Priority
21	Outlet 22: D4 (Right) at Pond	73.31	72.07	70.57	1.5	2	Rectangular drain of 0.75 m X 0.75m	0.35	4
								9.54	

Source: DEDR, 2019

344. The above given table shows that the invert level of outfall is closed (some cases it is below the bed level of pond or canal) to the bed of the pond or canal due to site condition. There may be backwater effect for short duration while the flow at the drain is maximum. In such case, water will flow gradually from the outlet and flow smoothly while the water from the outlet structures decreases.

345. The outlet/ outfall structures are proposed to retain the drain at its designed position. There are 13 pipes drain at outlet and 11 rectangular drain at outlet. The gabion outlet structures are proposed for pipe outfall and stone masonry chute/sloping towards outfall is proposed for rectangular drain outlet.

346. After the water level of outfall canal/ pond go down the stagnant water in the pipe/drain will flow into the canal / pond. These outfalls are located at the various location of the settlement as suggested by the Municipality.

(iv) Rain Water Inlet

347. Brick masonry inlets are proposed which will have inside plaster to prevent the leakage. Rectangular brick masonry rain water inlet box with iron grating on top are proposed. The rainwater inlets at certain intervals will be provided for a manhole at built up areas only to allow the surface water.

(v) Head Wall

348. Eleven brick masonry headwalls with RCC coping has been designed at the entry/start of drain. RCC has been provisioned at the bottom.

(vi) Blacktopped Road Cutting

349. Altogether, 2 road cuttings are required along the Harsaha near OHT site and bazaar highway at across 5 locations to lay the drainage pipe. The permission from the DoR is mandatory for this. It is envisaged that the municipality will be responsible to achieve the approval from DoR to construct the drain and associated structures on road.

C. Salient Features of the Project

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

Table IV-III: Salient Features of the Project

S.N.	Items	Description
1	**Name of Project**	Katahariya Storm Drainage Project
2	**Type**	Storm Drainage
3	**Study Level**	Detailed Engineering Design
4	**Location Area**	
	Province	2

S.N.	Items	Description	
	District	Rautahat	
	VDC/Municipality	Katahariya Municipality	
	Ward	4 & 5	
5	**Available Facilities**		
	Road	Along Hulaki road from Gaur to Kalaiya stretch via Garuda	
	Water Supply System	Hand pumps and recently ongoing construction of Third Small Town Water Supply Project in completion stage	
	Drainage	Few locations	
	Electricity	Available	
	Communication	Available	
	Health Services	Available	
	Banking Facilities	Available	
6	**Type of Structures**	**Phase-1**	**Phase-2**
	Headwall (nos)	11	Small drains in core settlements and drains under priority 5.
	Circular pipe drain (NP-3), (m)	6,668.38	
	Rectangular drain (m)	7,041.53	
	Total Drain length(m)	13,709.91	
	Circular Manhole (nos)	144	
	Rainwater inlet box (nos)	781	
	Gabion outfall (nos)	11	
	Stone masonry outfall(nos)	4	
	Collar	15	
7	**Social Status (Based on Water Supply Component)**		
	Present Household numbers	1635 HHs	
	Present Population (2016)	10,481	
	Base Year Population (2018)	11,057	
	Design Year Population (2038)	18,948	
	Weighted Growth Rate %	2.7%	
8	**Environment**		
	ADB Category	B, Only IEE necessary	
	IEE finding	No significant adverse impacts	
9	**Project Cost of Storm Drainage (NRs)**	**565,610,120.95**	
	GoN Contribution (85 %)	480,768,602.81	
	Local Authority / Users' Contribution (15 %)	84,841,518.14	

Source: DEDR, 2019

V. DESCRIPTION OF THE ENVIRONMENT

A. Physical Environment and Resources

(i) Landforms and Topography

351. The Project is in Katahariya Municipality, which is situated in Rautahat district of the Province 2 of Nepal. It lies between 26º58'03" N to 26º59'59" N latitude to 85º13'30" E to 85º14'52" E. It is at an altitude of 89-92 meter from the mean sea level. The project town has flat topography.

(ii) Geology and Soils

352. The project area is comprised of alluvial soil made up of alluvial deposits of mainly sand, clay, silt, gravels and coarse fragments by the Bagmati River & its tributaries. Being in a flood plain, the depth of groundwater is relatively low. The project area has bedrock such as quartzite and Feld spathic mica schist.

(iii) Climate

353. The climate prevailing in the project area is characterized by hot & humid summers & cool winters.The climate is hot temperate with the temperature ranging between a maximum of 40.8°C in summer to a minimum of about 3.4°C in winter. The climate is heavily influenced by the monsoon (June-September) with an average annual rainfall of about 1,650 mm.

354. There are two rainfall stations situated at Gaur (Station no. 0922) and Ramauli Bariya (Station no.0912) nearby the project site. The design team has collected daily rainfall data of both stations from the year 1991 to 2017 (27 years records) and maximum daily rainfall of each year from DHM and they are summarized in the table given below:

Table V-I: Maximum daily rainfall of the year, Ramauli Bariya

MM/DD/YY	Station Data	Day of The Year	Maximum Rainfall of the year	Maximum Rainfall/ Day	Maximum Rainfall/Hour (MM/Hr)	Remarks
7/2/91	183 165.4	183	165.4			
7/31/92	213 92.5	213	92.5			
7/30/93	211 195.5	211	195.5			
9/10/94	253 170.5	253	170.5			
8/13/95	225 89.5	225	89.5			
7/12/96	194 124.8	194	124.8			
6/30/97	181 169.5	181	169.5			
7/25/98	206 172.5	206	172.5			
7/1/99	182 124.0	182	124			
8/2/00	215 170.4	215	170.4			
8/19/01	231 121.4	231	121.4			
1/20/02	20 17.4	20	17.4	286.4	11.93	
7/1/03	182 212.2	182	212.2			
7/12/04	194 249.2	194	249.2			
8/26/05	238 162.5	238	162.5			
9/25/06	268 160.4	268	160.4			
6/15/07	166 135.4	166	135.4			
6/26/08	178 130.4	178	130.4			
7/30/09	211 120.4	211	120.4			
7/12/10	193 143.5	193	143.5			
7/20/11	201 124.4	201	124.4			
9/14/12	258 104.5	258	104.5			
10/15/13	288 40.5	288	40.5			

MM/DD/YY	Station Data	Day of The Year	Maximum Rainfall of the year	Maximum Rainfall/ Day	Maximum Rainfall/Hour (MM/Hr)	Remarks
8/13/14	225 100.5	225	100.5			
5/19/15	139 131.4	139	131.4			
9/12/16	256 126.5	256	126.5			
8/13/17	225 286.4	225	***286.4***			

Source: DHM, 2019

Table V-II: Maximum daily rainfall of the year, Gaur

MM/DD/YY	Station Data	Day Of the Year	Maximum Rainfall For the Year	Maximum Rainfall/Day	Maximum Rainfall/Hour (MM/Hr)	Remarks
7/3/91	184 90.0	184	90			
08/25/92	238 235	238	235			
08/30/93	242 146.0	242	146			
9/21/94	264 105.5	264	105.5			
8/16/95	228 162.0	228	162			
6/29/96	181 120.0	181	120			
6/29/97	180 120.0	180	120			
7/7/98	188 173.0	188	173			
6/29/99	180 165.2	180	165.2			
6/17/00	169 71.5	169	71.5			
8/26/01	238 82.2	238	82.2			
9/28/02	271 108.4	271	108.4			
7/2/03	183 180.0	183	180			
7/9/04	191 160.2	191	160.2	301.5	12.5625	
5/29/05	149 50.2	149	50.2			
1/1/06						DNA For the Year
7/27/07	208 150.0	208	150			
8/1/08	214 70.1	214	70.1			
7/20/09	201 84.0	201	84			
7/9/10	190 80.0	190	80			
7/16/11	197 92.4	197	92.4			
9/13/12	257 301.5	257	301.5			
4/12/13	102 0.0	102	0			
8/22/14	234 82.4	234	82.4			
4/25/15	115 24.0	115	24			
1/1/16						DNA For the Year
1/1/17						DNA For the Year

Source: DHM, 2019

355. During monsoons, the project area has been facing flooding and ponding problems since decades. Various flooding events were recorded yearly in this area resulting the loss of property & lives and access.

(iv) Air Quality

356. There are few industries in the project area. Air pollution is caused by fugitive dust from vehicle movements e.g. old and over smoky buses, tractor, heavy and overloaded trucks, old jeeps particularly over unpaved roads, construction activities, and wind action on unpaved exposed surfaces and industrial emissions from the wood mill, rice mill, and furniture. Gas emissions come from household cooking, open burning, and moving vehicles. Emissions from these sources are scattered regarding both locations and timing.

(v) Acoustic Environment

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

358.

359.

B. Ecological Resources

(i) Flora

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

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

S.N.	Scientific Name	Local Name	Family	Life Forms
1	*Shorea robusta*	Sal	Dipterocarpaceae	Trees
2	*Acacia catechu*	Khair	Leguminosae	Trees
3	*Terminalia tomentosa or T. alata*	Indian laurel/Asan	Combretaceae	Trees
4	*Adina cordifolia*	Karma or haldu	Rubiaceae	Trees
5	*Syzygium cumini*	Jaamun	Myrtaceae	Trees
6	*Dalbergia sissoo*	Sisau	Fabaceae	Trees
7	*Albizia procera*	Seto Siris	Fabaceae	Trees
8	*Melia azedarach*	Bakena/Bakaino	Meliaceae	Trees
9	*Tectona grandis*	Teak, Sagaun	Lamiaceae	Trees
10	*Aegle marmelos*	Bel (Wood Apple)	Rutaceae	Trees
11	*Lagerstroemia parviflora*	Bot Dhayaro	Lythraceae	Trees
	Non-Timber Forest Products			
1	*Bambusa*	Baans	Poaceae	Grass
2	*Emblica officinalis*	Amala (Indian Gooseberry)	Euphorbiaceae	Trees
3	*Terminalia chebula*	Harro	Combretaceae	Trees
4	*Terminalia bellirica*	Barro	Combretaceae	Trees
5	*Azadirahta indica*	Neem	Meliaceae	Trees
6	*Ziziphus nummularia*	Jhar Beri	Rhamnaceae	Shrubs
7	*Magnifera indica*	Aamp (mango)	Anacardiaceae	Trees
8	*Psidium guajava*	Amba (guava)	Myrtaceae	Shrubs
9	*Bombax ceiba*	Simal (silk cotton tree)	Malvaceae	Trees
10	*Ficus religiosa*	Pipal	Moraceae	Trees

Source: IEE Field Study, 2018

(ii) Fauna

361. Some species of mammals available in the project area is given below.The status of these mammals are as per IUCN & IBAT reports.

Table V-IV: Mammals in the Project Area

S. No.	Scientific Names	Common Names	Local Name	Status
1	Herpestes edwardsii	Common Mongoose	Nyauri Musa	LC
2	*Vulpes vulpes*	Fox	Fyauro	LC
3	*Canis aureus*	Golden Jackal	Syaal	LC
4	*Lepus nigrcollis*	Hare	Kharayo	LC
5	*Felis Chaus*	Jungle Cat	Ban Dhade	LC
6	*Bandicota indica*	Jungle Rat	Jungli Musa	LC
7	*Taphozous longimanus*	Long-winged Tomb Bat	Lampakhete Chamero	LC
8	*Macaca mulatta*	Rhesus Monkey	Rato Bandar	LC
9	*Funambulus sp.*	Squirrel	Lokharke	LC

Source: IEE Field Study, 2018

362. Some of the birds reported in the forest areas are listed in ***Table V-V***:

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

S.No.	Scientific Names	English Name	Local Names	Status
1	*Psittacula roseata*	Blossom headed parakeet	Gulafi Tauke Suga	NT
2	*Gallinula chloropus*	Common Moor Hen	Bagale Simkukhra	LC
3	*Culicicapa ceylonensis*	Grey-headed Canary-Flycatcher	Chanchale Arjunak	LC
4	*Cuculus micropterus*	Indian Cuckoo	Kafal Pakyo	LC
5	*Lophura leucomelanos*	Kalij Pheasant	Kalij	LC
6	*Corvus macrorhynchos*	Large Billed Crow	Kaalo Kag	LC
7	*Anas acuta*	Northern Pintail (Duck)	Suiropuchhre	LC
8	*Gallus gallus*	Red Jungle Fowl	Luinche	LC
9	*Pycnonotus jocosus*	Red whiskered bulbul	Shwet Bakchhya Jureli	LC
10	*Psittacula krameri*	Rose ringed parakeet	Kanthe Suga	LC
11	*Picus squamatus*	Scaly-bellied Woodpecker	Thulokatle Kathfor	LC

Source: IEE Field Study, 2018

363. The commonly found Herpito-fauna (reptiles & amphibians) observed in the project area are shown in ***Table V-VI***.

Table V-VI: List of Reptiles and Amphibians Found in the Project Area

S. N.	Scientific Name	English Name	Local Name	Status
1.	*Pseudoxenodon macrops*	Large Eyed False Cobra	Goman	LC
2.	*Bungarus caeruleus*	Common Karait	Karet	LC
3.	*Zootoca vivipara*	Common Lizard	Mausuli	LC
4.	*Duttaphrynus melanostictus*	Common Toad	Paha	LC
5.	*Sitana ponticeriana*	Fan Throated Lizard	Chheparo	LC
6.	*Ranacyanophylectis*	Stream Frog	Bhyaguta	LC

Source: IEE Field Study, 2018

(iii) Aquatic Biodiversity

364. The only river that flows nearby the settlement area is a Lal Bakaiya River. The river is mainly used for animal husbandry and fishery purpose. The main fish species found in this river is Barari. The threats to the natural resource due to development include decreases in the availability of natural resource and environmental pollution. The natural hazard such as flooding from the Lal Bakaiya River contributes towards degradation of cultivated land, bank cutting and loss of human life during the rainy season and its subsequent impact on the environment.

365. Similarly, other common fishes found in the project area are given in ***Table V-VII***.

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

S. N.	Scientific Name	English Name	Local Name	Status
1	*Monopterus albus*	Rice Swampeel	Bam	LC
2	*Channa gachua*	Dwarf Snakehead	Garahi	LC
3	*Cirrhinus mrigala*	Mrigal	Rohu	LC
4	*Labeo bata*	Minor Carp	Rohu	LC

Source: IEE Field Study, 2018

(iv) Protected Area

366. The Subproject will not encroach into, or be in close proximity to, any protected area or any physical cultural resources.

(v) Community Forests

367. The Subproject will not encroach into any forest area.

C. Socio-economic and Cultural Environment

(i) Settlement pattern

368. The settlement patterns in project area are mixed with dense linear settlement along main Katahariya Bazaar and densely cluster settlements in other areas. The settlement pattern is changing more towards urban pattern with market emerging along the main roads and settlements concentrating around the market area.

(ii) Caste & Ethnicity

369. The composition of community by caste/ethnicity is homogeneous in nature and mainly dominant by Madhesi caste groups about 84.6%, whereas about 15.4% of the households are from hill caste groups.

370. Terai Caste Group: The survey revealed that out of the 84,6% of Madhesi caste group living in service area, about 77.43% comprises of Sah, Teli, Yadav, Sah, Kalwar, Mahato, whereas only 4% are Terai Brahmans and only 3.3% are Terai Dalits (Chamar, Ram, Pashwan etc.).

Table V-VIII:Composition of Beneficiaries Households of Terai Caste Group

Cast/Ethnic Composition	Total	%
Madhesi (Sah, Das, Sonal, Mahato, Koiri, Teli, Yadav. Kalwar	1266	77.43
Brahman (Mishra, Pandit etc.)	64	3.9
Janajati	0	0
Dalit (Ram, Pashwan, Mushar etc.)	54	3.3
Total	**1384**	**84.6**

Source: Socio economic survey 2016

371. Hill Caste Group: Similarly, the study shows that about 15.4% of total household of the service area are from hill caste/ethnic groups. Among them, 9% are from Brahman/Chhetri caste groups whereas about 5% are from Newar, Magar, Tamang janajati caste groups. Only 1.4% falls under Dalit caste groups within the service area. Details of information are presented in the table below.

Table V-IX:Composition of Beneficiaries Households of Hill Caste Group

Caste/Ethnic Composition	Total	%
Brahman/Chhetri	144	8.8
Janajati	84	5.13
Dalit	23	1.40
Total	251	15.4

Source: Socio economic survey, 2016

(iii) Population and Households

372. The total population of the project town as per 2011 census was about 9,960 living in 1,564 households. The average annual growth rate of the VDC during 1991-2001 and 2001-2011 are 2.67 and 3.13 respectively. The ward-wise population of the project area of the town according to census, 2001 and 2011 has been presented below:

Table V-X: Population of the Concern Ward of Project Town of former Katahariya VDC (Proposed Settlements)

Municipality Ward	Former VDC Ward	W. Area (Ha)	Census 2001			Census 2011			Growth Rate (2001-2011), %
			HHs	Pop.	P. Densities (PPHA)	HHs	Pop.	P. Densities (PPHA)	
4	1	58.14	106	608	10.5	120	882	15.2	3.79
	2	269.08	187	1,013	3.8	224	1,343	5.0	2.86
	3	192.34	156	1,000	5.2	190	1,275	6.6	2.46
5	4	22.16	148	968	43.7	189	1,226	55.3	2.39
	5	33.99	48	303	8.9	59	384	11.3	2.4
	6	78.07	127	711	9.1	198	1,141	14.6	4.84
4	7	44.73	94	632	14.1	123	709	15.9	1.16
5	8	86.27	155	1,083	12.6	272	1,695	19.7	4.58
	9	33.33	143	998	29.9	189	1,305	39.2	2.72
	Total	**818.10**	**1,164**	**7,316**	**8.9**	**1,564**	**9,960**	**12.2**	**3.13**

Source: CBS 2001 and 2011

373. The above tables show that the average annual population growth rate of the project area increased at the rate of 3.13%.

374. The overall population density of the project area increased from 8.9 (2001 AD) to 12.2 (2011 AD) person per hectare. Comparisons of population densities in 2001 and 2011 revealed that only two wards (WN 5 and WN 8) have more than 4.5% incremental population densities. The consultants conducted a socio-economic survey in 2016 of the proposed service areas. It shows that the total population of the service area is 10,481.The following table shows the coverage of population including beneficiary households in the project area.

Table V-XI: Beneficiaries households of Katahariya

Municipality Ward No	Former VDC Ward No.	Total	
		HHs	Population
4	1	92	566
	2	218	1523
	3	188	1459
5	4	101	1298
	5	181	687
	6	133	1172
4	7	204	790
5	8	247	1346
	9	271	1640
	Total	**1,635**	**10,481**

Source: IEE Field Study, 2018

375. The total population of the municipality is 38,413 as per revised. The area covered by the municipality is 940.00 sq km.

(iv) Education and Health

376. **Education:** According to the institutional data obtained from the socio-economic survey, five educational institutions, including primary school to higher secondary level schools are existing within the service area. About 2444 people including 2395 students, 52 teachers and 6 other staffs are involved in these institutions.

377. The survey revealed that about 51.74 % (846) of household head are illiterate within the project area. Similarly, just literate ratio is 31% (506). Other details are presented in the table given below:

Table V-XII: Distribution of Population by Educational Status

Education of Households head	Ward									Grand Total	%
	1	2	3	4	5	6	7	8	9		
Illiterate	10	115	146	91	84	63	117	103	117	846	51.74
Literate	82	63	23	4	51	21	27	126	109	506	30.95
Primary	0	0	1	3	6	10	0	16	11	47	2.87
Secondary	0	11	1	0	0	0	2	0	3	17	1.04
SLC	0	10	2	0	9	12	4	01	7	45	2.75
Intermediate	0	0	15	2	17	26	50	0	24	134	8.20
Bachelor	0	19	0	1	14	1	4	1	0	40	2.45
Grand Total	**92**	**218**	**188**	**101**	**181**	**133**	**204**	**247**	**271**	**1635**	**100**

Source: Socio-economic survey 2016

378. **Health:** The socioeconomic survey also revealed that medical facilities for diagnosis and treatments are available in the service area. There are four medical centers in the municipality out of which three are privately owned and one is government managed. The conditions of these medical centers are primitive that provide only the basic healthcare facilities. Hence, people of this project town prefer to go to Garuda municipality for treatment, which is merely 8 kilometers far from Katahariya and has 10 medical centers with relatively modern healthcare services.

379. The survey revealed that cases of waterborne diseases such as diarrhea, dysentery, stomach aches and skin disease etc. are found to be very few. Similarly, it has also been observed that the cases of mortality by water related diseases are nil. The information related to water borne & communicable disease was crossed checked by visiting hospitals and health posts within the service area. According to the obtained information, out of 1489 people suffered from waterborne diseases, 9.42% (987) population suffered from diarrhea whereas only 0.81% (85) suffered from dysentery. Similarly, about 3.98% (417) suffered from other water borne diseases such as skin diseases, stomach pains, fever etc.

(v) Economic Activities

380. The economy of the municipality is extensively agrarian although most of the households in the project area depend on more than one occupation. During the household survey of the project area, the detailed data has been collected regarding the major occupation and economic activities of all the households. The survey shows that out of total 1635 households, the largest numbers of the population (about 53.52%) are engaged in agriculture, and about 26.12% population depends on the business. Similarly, about 11.5% and 7.6% of household heads are relying on remittance and labor.

381. Katahariya is famous for its vegetables and cattle market. It's also known as Katahariya Bazaar. It has a well-maintained Farmers' market (Vegetable) and Cattle (domestic-animal) market.

(vi) Existing Situation of the Utilities Associated with this project

a) Sanitation Facilities

382. The overall sanitary condition of the Project Area was not found good. The survey has observed that about 74 % of the total 1635 households in the project area do not have household latrine facilities.Nonetheless, the semi-urban area in the periphery of the project town including parts of some clusters within the proposed service area lack adequate sanitation and Open defecation is prevailing.

b) Drainage Facilities

383. There is no proper drainage system for storm as well as for the domestic sewage in Katahariya Town. The core area of the city has about 1 km of open surface drains.

384. c) Wastewater Management Practices

385. There is no sewerage system in the proposed service area. It has been observed that the wastewater is being discharged to the adjacent roadside drains. The survey shows that most of the households have provision of Septic tank in the urbanized areas of the town. Nevertheless, it should not be misunderstood that the waste water or sewerage from the septic tank will be drained out or mixed into the proposed drains. The proposed drain is solely for the access of storm drain in order to get rid of the flooding & pondage problems of the project town. Mixing of the waste water to the proposed drain is beyond the scope of the project.

386. d) Solid Waste Management

387. The municipality do not have systematic collection, conveyance and disposal of solid waste from the town area. The survey revealed that 90% of total 75 sampled households are disposing domestic solid waste in the pit near the house whereas 6.7% of them hand over to private collector. Likewise, 2.7% of them reported that they are disposing in Kitchen garden or other places. It was observed that the respondent have sufficient knowledge about the improperly managed solid waste that may affect the public health and surrounding environment.

388. e) Transportation

389. The mode of transportation mostly used include: local buses, micro buses, sumo, rickshaws and electric safari. It is also connected from Gaur, district headquarter and Chandranigahpur, the point of East West High way. The main road passes through the bazaar area whereas other wards and cluster of the VDC are connected through the gravelled and earthened road. The nearest airport is the Simara in Bara district about 98 km, where daily flights from Kathmandu are being operated. Day and night bus services are easily available for Kathmandu and other major towns.

390. f) Communication and Electricity

391. There is provision of regular services of landline phone and mobile service within the project area. All kinds of modern telecommunication services are available at the reasonable price. Major national daily newspapers as well as local newspapers are available within the project town.The project area is well connected to the national electricity grid provided by National Electricity Authority (NEA) and hence, 24 hours supply of electricity is available in this project town.

392. g) Archeological Areas/Sites

393. There are local temples at various locations within the project areas as would be expected in a typical Nepali urban centre. One of the famous temple of Katahariya is Boudhimai Temple.

(vii) Existing Institutions involved in Water Supply and Sanitation Field

394. The main institutions involved in water supply & sanitation sector within the project area are Katahariya Municipality Office; Water Supply & Sanitation Division Office (WSSDO), Gaur, Rautahat; Water Users & Sanitation Committee and some NGOs. WSSDO, Rautahat has been actively supporting WUSC to complete the water supply system and carry out WASH activities in the project area. WUSC shall manage the water supply system after completion.

395. Water Supply and Sanitation User's Association

396. The Katahariya Water Supply and Sanitation User's Committee consist of 10 members representing various clusters within the service area. The executive committee consists of 7 male and 3 female members. The WUSC was registered in the Water Resource Committee, Rautahat in 2071/4/29 B.S. as per the Water Resource Act-2049 and Water Resource Rule 2050. It has been involved in the management and improvement of the water supply system in Katahariya. The name of present WUSC members and their designation are presented in ***Table V-XIII***.

Table V-XIII: Members of Katahariya Town Project WUSC

S.N.	Name	Position
1	Mr. Chhote Lal Mishra	Chairperson
2	Mr. Jamun Thakur	Vice Chairperson
3	Mr. Yogendra Shah	Secretary
4	Mr. Ram Pravesh Shah	Treasurer
5	Mr. Jung Bahadur Rokka Chhetri	Member
6	Ms. Jayanti Devi	Member
7	Ms. Fula Devi	Member
8	Mr. Sarad Lal Mahato	Member
9	Mr. Sarad Lal Gupta	Member
10	Mr. Sakuntala Devi	Member

Source: Socio-economic Survey, 2016

397. It is noted that this WUSC has no responsibilities in operation and maintenance activities for this storm drainage project. This WUSC is solely for the implementation of Katahariya Water Supply Project. All O & M activities will be carried out by the local authority/Municipality.

398. Governmental Organizations/NGOs/CBOs

399. There are various governmental organizations that includes Nepal Telecom – Katahriya Branch, Nepal Electricity Authority, Katahariya Municipality Office, Police Station, Post Office etc. are available in the project town. Various financial institutions (Banks & Cooperatives) are existing in the area and providing services to the community. The existing financial institutions include Nepal Bank Limited, Gramin Bikash Bank Ltd., Deprosc Laghubitta Bikas Bank Limited, Agricultural Development Bank, Global IME Bank, Nepal Bangladesh Bank Limited, Kailash Bikas Bank Limited, Sanima Bank etc.. Similarly, some cooperatives like Nirdhan Utthan

Laghubitta Bittiya Sanstha Limited, Mero Microfinance Bittiya Sanstha Ltd., etc. are also actively involved in the project area.

400.

(viii) Other Development Activities

401. **Industries:** There are various small scale scale industries like Ply Industries, Rice Mills, Poultry Farming, Furniture Industries, Dairy Industries etc. in the project town. The survey also shows that there are various hotels & lodges available within the project area that have been boosting the economic activities of the project town.

402. **Agricultural Development:** The areas adjoining the project area even within the municipal boundary are good for agriculture. The survey report shows that around 53.52% population of the project area is dependent upon the agriculture products. The area is famous for its vegetable production

VI. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION/AUGMENTATION MEASURES

403. The anticipated environmental impacts are mainly categorized into two viz., Beneficial Impacts and Adverse Impacts on the basis of its negative and positive significance. This is then further categorized into four impacts that includes i) Impact on Physical Environment, ii) Impact on Biological Environment, iii) Impact on Chemical Environment and iv) Impact on Socio-economic Environment, based upon the effects on the existing environment. These impacts are sub divided into three categories based upon the project phase that includes i) Design Phase, ii) Construction Phase and iii) Post Construction (Operation & Maintenance) Phase. These impacts are discussed below in detail.

A. Beneficial Impacts

404. Proper & effective management of storm drain falls under the sanitation facility that each human being seeks for better hygiene. Hence, this proposed project will be the milestone for the emerging town like Katahariya to proceed for further development. Some of the major beneficial impacts of the project are described below along with suggestions for achieving optimal benefits.

405. The development of water and sanitation facilities will have numerous beneficial impacts on individuals as well as to the entire community. Availability of effective drainage system is one of the basic human needs that falls under sanitation facilities. Also, any development efforts aimed at improving water and sanitation needs of an area will significantly contribute towards improving the quality of life of that area. Some of the major beneficial impacts of the project are categorized below:

(i) Impact on Socioeconomic Environment

a) Construction Phase

1) Employment Generation

406. The project will generate direct employment opportunities to the local people of the area.The construction activities of the proposed project will offer the locals a grand opportunity to be engaged in the proposed project activities as either skilled or non-skilled workers in terms of their proficiency. The main target group for this benefit is People relying on daily wages. The socioeconomic survey shows that 6.3% (103) of total 1635 households have to rely on labour/daily wages. Hence, this project will be beneficial to this 6.3% of total households. The amount of money earned by the local people will somehow increase the local economy thereby reducing the chances of seasonal migration of the local people depending upon daily wages works to survive.

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

408. The enhancement measures for this impact include;

- Recommend contractor to employ local people by giving high priority to women and under privileged group as far as possible.
- Ensure equity in provision of wages to both male as well as female labors.

2) Skill Enhancement

409. The construction of the project will not only provide direct employment opportunities but also ensure the transfer of skills and technical proficiency to the local workforce. The project activities such as construction of intakes, treatment plant, valve chambers, buildings, public toilets etc. will provide transferable skills. In future, these skills will be a plus point for the locals in any relevant work as such. Hence, this benefit is targetted to the local people relying on daily wages (6.30% of total 2302 population of 1635 total HHs) of this proposed project area if they are made involved in the proposed construction works.

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

411. The enhancement measures for this impact include;

- Making a proper work plan and code of conduct during the construction period.
- Provision of regular hands on training to the workers during the project construction period

3) Local trade and business opportunity

412. The proposed project will directly add in building business opportunity within the area. As construction work involves a lot of human resources, some grocery stores and, agriculture and livestock product will gain a momentum in the vicinity of the construction site. This will boost the local trade and business sector. Similarly, procurement of locally available construction materials will also help to improve the local trade and business opportunity. The main target group for this beneficial impact is local people involved in local business sector. The socioeconomic survey shows that about 18.20% (508) and only 0.9% (25) of total 2798 HHs are involved in business and industry sector respectively.Though the target group quantity is not so significant, the enhancement of local trade & business opportunity will be fruitful to these people. This may further boost the local trade & economy.

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

414. The enhancement measures for this impact include;

- Recommend contractor to give priority to the local products during procurement of construction of materials.
- Priority also will be given to local services like grocery stores, tea shops, hotel & restaurants etc. during the entire construction period.

b) Operation Phase

1) Improved health and hygiene

415. Deteriorating water quality and unsanitary conditions are often the causes of waterborne communicable diseases. Properly managed storm drainage system will minimise the flooding problem which in turn will help to improve health & hygiene. It is because in its absence, flooding problem may arise and it will contaminate surface water bodies that could be

the source of water to the concerned people. This may result in the outbreak of communicable waterborne diseases that will then affect health & hygiene of the people.

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

417. The enhancement measures for this impact include;

- Regular maintenance of the drainage components should be done so that the project operates smoothly and the benefits are intact.

2) Improvement on Surface Water Flooding and Ponding

418. Storm Drains are designed to drain excess rain/storm to the possible water bodies. Thus, the proposed storm driange system provides easy access to the excess storm to the proposed outfalls. This in turn improves the surface water flooding & pondage problems that is still prevailing in the proposed town during monsoons.

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

420. The enhancement measures for this impact include;

- Regular supervision to avoid clogging of drains and regular cleaning of the the proposed drains.

3) Increased Urban Aesthetic Value

421. Implementation of Storm Drainage system reduces the risks of pondage problems and street flooding problems during the monsoons. This makes the street free of litters and other floatable wastes. This makes the surroundings well organized and enhances the urban aesthetic value.

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

423. The enhancement measures for this impact include;

- Regular cleaning of the drainage components to avoid the choking problems of the proposed drains and to make the benefits intact.

4) Increased Land Value

424. Storm Drainage system is one of the most important infrastructures for the urban development. Hence, this proposed project will increase rural-town migration due to availability of better infrastructures. This will boost economic level of the town. The increased economic level may increase the value of the land.

425. These benefits can be maximized by ensuring regular maintenance of water supply and sanitation components and by promoting land development activities in the area.

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

427. The enhancement measures for this impact include;

- Ensuring regular maintenance of the drainage components

- Promoting urbanization through proper land development activities in the area.

428. Overall, the Subproject will lead to improved public health and environment, significantly improving the quality of life of Katahariya town residents.

429. The following given table shows the significance of the impacts based on the scoring that has been taken from National EIA Guidelines, 1993.

Table VI-I: Summary of Impact Matrix of Beneficial Issues of the project

Beneficial Impacts	Impact Rating				
	Nature	Magnitude	Extent	Duration	Rating
Construction Phase					
Employment Generation	D	H (60)	L (20)	ST (5)	Very Significant (85)
Skill Enhancement	ID	M (20)	L (20)	LT (20)	Significant (60)
Local Trade and Business	D	M (20)	L (20)	LT (20)	Significant (60)
Operation Phase					
Improved Health and Hygiene	D	H (60)	L (20)	LT (20)	Very Significant (100)
Improvement on Surface Water Flooding and Ponding	D	H (60)	L (20)	LT (20)	Very Significant (100)
Increased Urban Aesthetic Value	D	H (60)	L (20)	LT (20)	Very Significant (100)
Increased Land Value	ID	L (10)	L (20)	LT (20)	Significant (50)

Source: National EIA Guidelines, 1993 & IEE Study 2018/019

Note: Scoring is done based on following;

Nature of Impact: D = Direct; IN = Indirect;

Magnitude, H = High (60); M = Medium/Moderate (20); and L = Low (10)

Extent, R = Regional (60), L = Local (20); and S = Site-specific (10)

Duration, LT = Long-term (20), MT = Medium-term (10); and ST = Short-term (5)

The points/scoring are taken from the National EIA Guidelines, 1993

Significance of Impact

Total Score: More than 75 : Very Significant

50-75 : Significant

Less than 50 : Insignificant

B. Adverse Impacts

(ii) Impacts on Physical Environment

a) Design Phase

1) Soil Erosion & Slope Instability

120. During design phase, there is possibility of incorporation of sloped areas due to which construction activities in such area may result in soil erosion and slope instability.

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

122. The mitigation measures for this impact include;

- Incorporate measures and sites for handling excessive spoil materials
- Incorporate drainage plan in final design

b) Construction Phase

1) Soil Erosion & land surface disturbance

430. Excavation and digging of trenches during construction has the potential to cause erosion and cave in thereby causing soil erosion, silt runoff and unsettling of street surfaces. Unorganized disposal of the excavated earth can disturb the street surface and decrease the value of the area where it is disposed. The activity as such will be a discomfort to the road users and inhabitants.

431. The construction activities for this may result in Slope Instability and Landslides due to site clearance and earthwork excavation works.

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

433. The mitigation measures for this impact include;

- Protecting the foundation from damage during backfilling
- Using the right backfill materials
- Compacting the backfill
- Final finishing the subgrade to ensure that water drains away from the foundation

2) Spoil Disposal & Gully Erosion

434. Inappropriate disposal of spoils from the construction activities may result in gullying and erosion of spoil tips especially when it is combined with unmanaged surface water runoff. This leads to destruction of vegetations, damage to agricultural lands and destruction to private property. This will affect the people possessing those agricutural lands as well as the anticipated properties.

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

436. The mitigation measures for this impact include;

- Follow Spoil Management Plan as included in ***Appendix 2D.***
- Use of excess Spoil or Soil for filling depressed areas or borrow pits wherever possible.
- Appropriate disposal of Spoil at the designated places.
- Spoils should not be disposed on natural drainage paths, canals and other infrastructures.
- Provision of toe walls and retaining walls to protect the erosion of disposed spoils.
- Provision of proper drainage, vegetation and adequate protection against erosion at the Spoil Disposal Site.

3) Air Pollution

437. There will be greater impact on air quality from the inadequately managed or haphazard project activities that includes: (i) earthworks such as clearing, grubbing, excavations, and drilling especially during dry seasons; (ii) demolition works; (iii) stockpiling of natural aggregates, excavated materials and spoils; (iii) transport, loading and unloading of natural aggregates; (iv) movement of construction-associated vehicles; (v) on-site rock crushing and concrete mixing; (vi) burning of firewoods for cooking & heating in work and labour camps and (vii) open burning of solid waste by workers.

438. These activities may increase dust, carbon, monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons in the air. This will affect the construction workers, people residing in this area and the passers by.

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

440. The mitigation measures for this impact include;

- Strict Prohibition of open burning of solid waste
- Watering of dry exposed surfaces and stockpiles of aggregates at least twice daily, as necessary;
- If re-surfacing of disturbed roads cannot be done immediately, spreading of crushed gravel over backfilled surfaces;
- Conduct Air Quality Test for dust nuisance (PM 10 and PM 2.5) at key settlement and market area, school, hospital at least once in a month during dry working season (Jan-June).
- Use of Construction/ Transportation Vehicles complying with NVMES,2069
- Regular inspection & maintenance of construction/transportation vehicles
- Supply of clean cooking fuel to workers instead of allowing them to use firewood for cooking

4) Noise Pollution

441. Noise-emitting construction activities include earthworks, rock crushing, concrete mixing, demolition works, movement and operation of construction vehicles and equipment, and loading and unloading of coarse aggregates. The significance of noise impact will be high in areas where noise-sensitive institutions such as healthcare and educational facilities are situated. This will affect the construction workers, people residing in this area and the passers by.

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

443. The mitigation measures for this impact include;

- Restricting noisy activities to daytime and overtime work to avoid using noisy equipment;
- Prohibit the use of pressure horn by transportation vehicles
- Conduct noise level test once a year during peak construction stage at location near school, hospital and settlements especially at certain locations of Katahariya Core Bazaar Area like Near Health Posts, Near Schools areas and Residential Areas.

- Avoid noise generating activities like excavation works, dismantling for excavation works, loading & unloading of construction materials, noise of material transportation vehicles etc. during school time and at hospital area if any.
- Regular inspection & maintenance of construction/transportation vehicles to ensure the use of Vehicles complying with NVMES,2069 B.S.
- Regular inspection & maintenance to ensure the use of equipments/machinery that comply with applicable emission standards of GoN i.e., National Noise Standard Guidelines, 2012
- Regular inspection & maintenance to ensure the use of Diesel Generators complying with National Diesel Generator Emission Standard,2012

5) Generation of solid waste & waste water from construction sites and worker's camp

444. During construction phase, generation of solid waste & waste water from the construction sites and workers camp are likely to create nuisance in the surroundings. Soil runoff from the construction site may lead to off-site contamination (particularly during rainy season). Similarly, Improper disposal of construction debris may lead to off-site contamination of water resources. Unmanaged solid waste &effluent from workers camp may contaminate the surroundings. This will affect the construction workers, people residing in this area and the passers by.

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

446. The mitigation measures for this impact include;

a) Construction Wastes

- Adopt 3R (Reduce, Reuse & Recycle) concept
- Ensure storage areas are secure, safe & weatherproof.
- Management of reusable wastes
- Sale of Recyclable wastes to scrap dealer
- Final Disposal of Bio degradable solid wastes
- Avoid over ordering of construction materials to the extent possible. This will be challenging as it requires strong coordination with the concerned contractors, as it cannot be made mandatory. However, it is not impossible too to coordinate with the contractors in this regard.
- Use standard size & quantity of construction materials.
- Construct garland drains to reduce the runoff from the stockpiles.

b) Solid Wastes, Wastewater and Sewage from labour camp

- Adopt Segregation of Solid Waste (3R Concept) based on being biodegradable or non-biodegradable. It is because decomposers cannot break down non-biodegradable wastes and their disposal poses a big problem.
- Management of biodegradable wastes that includes food waste, paper waste, biodegradable plastic, etc. by any suitable processes that include Composting & Incineration. If these two processes are not possible then, the wastes shall be managed either by handing over these wastes to the municipality waste collectors who will finally

dispose those wastes to the landfill sites of the project town or by disposing those wastes to the burial pits at suitable place.

- Non-biodegradable wastes like glass, plastics & metals shall be managed by reusing them for site use or selling them to scrap dealers instead of disposing them
- Strict Prohibition on open incineration of solid wastes & use of plastic materials to minimize the quantity of plastic wastes.
- Construction of the temporary latrines with temporary soak pits & septic tanks within the campsite for proper disposal of sewage.
- Provide temporary but proper drainage system for proper outlet of waste water generated from cooking practices adopted by the workers
- Employ local people from nearby villages to maximum extent possible. It will minimize the number of workers residing at worker's camp. Lesser the number of people, lesser will be the solid waste & effluent generated. However, it cannot be made mandatory because availability of local people with required skills will not be ensured at the time of construction.

6) Accidental Leakage or Spillage of Stored Fuel/Chemicals

447. During construction phase, there will be requirement of storage of fuel/chemicals. During the process of storage and handling process, there is possibility of accidental leakage or spillage of stored fuel/chemicals. If not removed quickly, the spilled chemicals/fuel may be absorbed by the floor.This may lead towards the contamination of soil & water. This will affect the community living around this area.

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

449. The mitigation measures for this impact include;

- Provision of well managed storage site
- Organize awareness programs for the workers responsible for handling fuel/chemicals
- Supervise workers to handle fuel/chemicals properly
- Use of spill kit materials to block flow and prevent discharge to nearby water bodies
- Scatter the Sawdust, sand or dry soil over the area of spill and leave for few minutes to soak up the fuel/chemical. So, availability of saw dust, sand or dry soil should be ensured in the store
- Regular Inspection Visit to the storage site to inspect the leakage of the stored container of fuel/chemical

7) Impact on Land Use Pattern

450. As the construction works of the proposed project start, there will be possibility of influx of people from the nearby areas of the project town to this project town. This will in turn increase the population of the project area which may lead towards change in land use pattern within the core area in haphazard manner. Arable land may be converted to settlement areas. Unstable land may also be used for planned areas. Hapazard cutting of sloped areas may be done to increase settlement areas. The unmanageable land is the main reason behind the destruction of the environment.The effect will be indirect in nature.This will be affecting the people residing within the core area of the project.

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

452. The mitigation measures for this impact include;

- Avoid the acquisition of private and agricultural land for the construction of project components.
- Monitoring on the haphazard land use & planning by the concerned authority.

8) Haphazard Disposal of Dismantled Debris

453. The proposed project also involves dismantling activities for rehabilitation of existing intakes, for pipe laying works and other miscellaneous works. This will result in the generation of dismantled debris.

454. Similarly, after the completion of construction works, the temporary facilities like labour camps, stockpiling sites, temporary toilets etc. needs to be dismantled immediately. The dismantled properties in the form of debris if not properly and instantly disposed off, may create nuisance in the surroundings. This may degrade the environmental quality. This will affect the people living nearby the haphazardly disposed places and even the construction workers also.

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

456. The mitigation measures for this impact include;

- Immediate Response on handling of dismantled debris.
- Segregation of Dismantled Debris
- Adopt 3R (Reduce, Reuse& Recycle) concept
- Sale of Recyclable Wastes to Scrap Vendors/Dealers

(iii) Impacts on Biological Environment

a) Construction Phase

1) Impact on Flora & Fauna

457. The proposed drainage lines run along the E-W Highway due to which there will be no chance of interference of the project in any of the forest areas. However, there may be requirement of clearing of some bushes and shrubs along the highway. There is no requirment of cutting trees. Similarly, during drainage line construction, some of the top soil may be lost.

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

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

460. The mitigation measures for this impact include;

- Replace the excavated top soil to its original position after the completion of pipe laying work
- Re-vegetating disturbed slopes and grounds, as applicable;

- Awareness programs regarding policy related to the conservation of existing flora & fauna, to the workers prior to the construction and the community during various meetings and discussion programs
- Regular Monitoring

2) Impacts on Aquatic Life

461. During construction phase, nearby water bodies may be used by the workers for their daily activities like waste disposal, sanitation activities which may pollute the river quality which in turn lead the habitat of aquatic life towards risk.

462. Similarly, the construction works for the proposed Outfalls may also contaminate the quality of exisitng & proposed sources affecting the aquatic habitat.

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

464. The mitigation measures for this impact include;

- Strict Monitoring on the daily activities of workers
- Provision of temporary but well-equipped toilets
- Restriction to workers from fishing
- Adopt measures mentioned above for the solid waste management

b) Operation Phase

1) Impact on Aquatic Life

123. As there is possibility of discharge of wastewater and solid waste disposal from the local people into the drain, there is possibility of pollution of water flowing in the storm drain that may result in the pollution of the Outfall Rivers. This will affect the aquatic lives of those outfall rivers.

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

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

- Direct discharge of the wastewater and solid waste to the proposed drains will be discouraged through strict monitoring to the operators involved.
- Regular monitoring of the constructed drains to prevent entry of wastewater into the drains by enforcing strict regulations.

(iv) Impacts on Chemical Environment

a) Construction Phase

1) Impacts on Water Quality of the nearby rivers

465. During construction phase, there is high possibility of nearbyrivers i.e., Lal Bakaiya River, to be polluted due to the chance of disposal of solid wastes by the workers and poor sanitation behavior of the workers. This will lower the water quality of these water bodies.Polluted water bodies will be detrimental to aquatic life as well as to the health of people relying mainly on the river and streams as sources of water for drinking and other domestic uses.

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

467. The mitigation measures for this impact include:

- Appropriate Design of Septage Disposal through design of toilets with septic tanks
- Disposing of spoils or excess soils as free filling materials as soon as possible
- Locating temporary storage areas on flat grounds and away from main surface drainage routes;
- Shielding temporary storage areas with sandbags
- Adopt measures mentioned above for the solid waste management
- Provision of adequate water supply and sanitation facilities at work sites.
- Strict supervision on the behavior of workers for the waste management as well as sanitation behavior and monitoring the workers to manage the wastes properly.
- Conduct water quality test of Lal Bakaiya River once a year in dry season by the contractor.

b) Operation Phase

1) Impact on Water Quality of River used as Outfall

468. It has already been mentioned that there is high possibility of the proposed storm drains carrying other unnecessary pollutants like waste water, solid wastes, street litters etc. This may result in the pollution of the outfall rivers degrading the water quality of the river. This impact will be more troublesome during dry season when the flow will be less and self cleansing capacity of the river will be less.

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

470. The mitigation measures for this impact include:

- Regular Cleaning of Drains
- Regular Monitoring on the sanitation behavior of the locals.
- Conduct water quality test of Lal Bakaiya River once a year in dry season by the O & M entity

(iv) Impacts on Socioeconomic Environment

a) Design Phase

1) Health & Safety of Community & Workers

471. During design phase, if the project components are designed without focusing on the health & safety of community & workers, it will have greater impact on socio-economic environment.

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

473. The mitigation measures for this impact include:

- Training on Community Health & Safety Hazards by DSMC by disseminating information about this through training manuals, photographs & documents related to safety.

2) Damage to the existing facilities

474. During construction works, there is requirement of demolition of certain portion of the highway as well as feeder roads. This type of demolition works may damage the existing road pavement. This may create discomfort to the roadusers and vehicles. Though this problem appears during construction phase, its mitigation measure should be considered during design phase. Hence, this impact is categorized for design phase.

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

476. The mitigation measures for this impact include:

- Provide budget for restoration/replacement of damaged utilities.

b) Construction Phase

1) Community Health & Safety Hazards

477. Overall, communities will be exposed to cross-cutting threats from construction's impacts on air and water quality, ambient noise level; mobility of people/goods/services; accesses to properties/economic activities/social services; service disruptions, etc. Communicable and transmittable diseases may potentially be brought into the community by construction workers.

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

479. The mitigation measures for this impact include:

- Contractor's implementation of EMP
- Adequate lighting, temporary fence, reflecting barriers and signage at active work sites;
- Contractor's preparedness in emergency response;
- Adequate dissemination of GRM and Contractor's observance/implementation of GRM

2) Worker's Health & Safety Hazards

480. Workers will also be exposed to the cross-cutting threats of the impacts above during construction. Inadequate supply of safe/potable water and inadequate sanitation facilities to

the worker's camp; poor sanitation practices on site; poor housing conditions; the handling and operation of construction equipment; handling of hazardous substances; exposure to extreme weather and non-observance of health and safety measures, pose additional threats to the health and safety of construction workers. Construction workers may also be potentially exposed to communicable and transmittable diseases in the community and the workforce. The events of flash flood each year during monsoons in this project town were recorded. If the construction works are carried out during monsoons, there is high risk of occurrence of flooding events that may pose threats to the occupational (worker's) health & safety hazards.

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

482. The mitigation measures for this impact include:

- Submission of Simple OHS plan for employer's approval that involves appropriate health & safety arrangement that includes minimum requirements for various activities like Excavation works, Works within the confined spaces, use of warning signs, boards & signage, Use of PPE, Accident & Emergency Response and Monitoring & Reporting.
- Comply Labor Act,2074 (2017) of GoN
- Train all site personnel regarding environmental health and safety as like in design phase by DSMC & Contractors
- Provide Personal Protective Equipment (PPEs)to workers that includes protective clothing, helmets, goggles, boots and other equipment designed to protect the wearer's body from injury or infection and ensure their effective usage
- Require workers to wear high visibility clothes
- Exclude public from worksites
- Maintain accident reports and records.
- Make first aid kits readily available
- Maintain hygienic accommodation in work camps
- Ensure uncontaminated water for drinking, cooking, and washing,
- Assure clean eating areas
- Make sure sanitation facilities are readily available
- Provide adequate space and light to the camp site
- Adequate supply of potable water to the camps and good sanitation within camps
- Provide medical insurance coverage for workers
- Ensure moving equipment is outfitted with audible backup alarms;
- Hearing protection equipment enforced in noisy environment
- Chemical and Material storage areas need to be marked clearly
- Implementation of Emergency Preparedness Response Plan to mitigate the impacts of flooding problems that includes i) Reporting of Incidents; ii) Investigation of incidents and iii) Prepared for availability of Stretchers, Life buoys, first aiders, first aid kits etc.

3) Traffic Congestion

483. The road along which the proposed drainage line is laid, may be susceptible to traffic congestion during drainage construction works that may provide discomfort to the passer-by & shopkeepers and may obstruct the daily activities of the people living in that area . This will also interrupt the smooth traffic flow.

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

485. The mitigation measures for this impact include:

- The excavated trench should be backfilled promptly.

- The contractor will be accountable to provide signage at appropriate locations indicating available alternate access routes to minimize traffic disruptions.
- The contractor will have to ensure access to shops and residences using simple wooden walkways.
- Follow Traffic Management Plan

4) Public Protests

486. Due to the interruption of traffic flow along the proposed drainage lines especially along Katahriya Bazaar Road, there is high chance of protests by the local people. This may interrupt the construction activities of the proposed project.

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

488. The mitigation measures for this impact include:

- Public Consultation should be carried out at various stages & locations as per requirement.
- Implement Grievance Redress Mechanism
- Pre-notify the public regarding the construction works that may hinder their daily activities and Coordinate with them properly

5) Disruption to Local Vendor's Business

489. The construction works along the proposed drainage line may disrupt local vendor's business as the construction activities may obstruct their customers to have easy & direct access to their shops. This may hamper their daily business activities.

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

491. The mitigation measures for this impact include:

- Adopt "zero soil" approach thorugh prompt backfilling right after completion of drain construction. In general, execution of excavation works is such that excavtion will be done in a few meters length i.e., 50m at a time followed by pipe laying, backfilling over the pipe and removal of all surplus material from the site.
- Provision of temporary access to the shops through provision of planks
- Pre-notify the vendors regarding the construction works that may hinder their daily activities and Coordinate with them properly

6) Mobilization of Child Labor

492. During construction period, there is possibility of mobilization of child labor by the contractors which is against the Child Labor Prohibition Act,2000 as child labor deprives children off their childhood and their right to education,health, safety and moral development.

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

494. The mitigation measures for this impact include:

- As the Child Labor Prohibition Act, 2000 states that “No Child having not attained the age of 14 years shall be engaged in works as a laborer” during mobilization, provision

for the requirement of submission of the citizenship certificate of each labor,should be made.

- During contract agreement, the agreement by the contractor to follow Child Labor Prohibition Act, 2000 and Child Labour Prohibition Rules & Regulations,2006, should be made.

7) Impact on Sustainability of Works

495. If the construction works are carried out during monsoons, there is high risk of flooding in the proposed drainage line areas. This anticipated flooding problems may damage the storm drains being constructed. This will unsustain the constrcution works of the proposed project.

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

497. The mitigation measures for this impact include:

- Avoid construction works during monsoons
- After every flooding events, the contractor must conduct engineering investigation of built structures and implement the necessary corrective actions immediately as Emergency Response Preparedness.

8) Damage to the existing utilities

498. During the construction phase, while excavating for the proposed drainage lines, the existing paved as well as unpaved road will also get damaged. This will obviously create discomfort to the people as the proposed drainage line is along the bazaar area. This will also destroy the aesthectic view of the proposed site due to dismantling activities followed by constcution activities.

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

500. The mitigation measures for this impact include:

- Rehabilitation & Restoration Works
- Promote greening of the length of the road where storm drainage pipe is laid to maintain the aesthetic view of the proposed site. But, for this, the approval from DoR is the must as the road carriageway is under the jurisdiction of DoR. If approval granted, it can be implemented using items not covered by BoQ.

c) Operation Phase

1) Pollution in Newly Constructed Storm Drains

126. As there is possibility of discharge of wastewater and of solid waste disposal from the local people into the drain, there is possibility of pollution of water flowing in the storm drain that may result in the occurrence of disease vector that in turn may affect the public health.

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

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

- Regular monitoring of the constructed drains to prevent entry of wastewater into the drains by enforcing strict regulations.
- Conduct yearly dry season water quality test at U/S and D/S of storm drainage outfalls

2) Blocking/Chocking of Drains

129. Due to the illegal entry of wastewater from the building as well as the possibility of disposal of waste materials by people, there is high chance of blocking & choking of drains.

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

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

- Regular monitoring of the constructed drains to prevent entry of wastewater into the drains by enforcing strict regulations.
- Conduct yearly dry season water quality test at U/S and D/S of storm drainage outfalls
    - Regular Cleansing and Desilting of the drains
    - Provision of adequate human resources for regular maintenance
- Establish a functional and efficient drain monitoring and cleaning management system with sufficient annual budget allocation and assignment of human resources.

3) Impact on Recipient Water Bodies

132. According to the detailed design, the main outlets of the drainage line proposed for this project are the existing rivers. Hence, if not properly monitored, there may be the chance of pollution in the recipient water bodies, which may worsen the surroundings.

133. ***The impacts are thus direct in nature, local in extent, medium in magnitude and short-term in duration.***

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

- Regular monitoring of the constructed drains to prevent such kind of pollution.
- Conduct yearly dry season water quality test at U/S and D/S of storm drainage outfalls

4) Non-Sustainability of Services or Completed Works

501. The flooding events each year during monsoons in this project town were recorded. Hence, the sustainability of the proposed system may be susceptible to risk as there is high chance of occurrence of flood events. These issues will be more intense with the Operator's disregard of the impacts flooding events during operation.

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

503. The mitigation measures for this impact include:

- WUSC should conduct engineering investigations of completed works and implement the necessary corrective actions without delay if any such events occur. This shall involve preparation of Emergency Preparedness & Response Plan and Immediate Implementation of this plan after any seismic event.

- Strengthening Institutional Capacity and Policy Compliance through various project related capacity building programs
- Carrying out regular O & M with effectiveness through proper management of WUSC.

135. The summary of the impact matrix depicting evaluation of the anticipated adverse environmental impacts through impact rating in terms of nature, magnitude, extent and duration based on National EIA guidelines,1993, field study, checklists and expert judgments are tabulated below:

Table VI-IISummary of Impact Matrix of Adverse Issues

Adverse Issues	Impact Rating				
	Nature	Magnitude	Extent	Duration	Rating
A) Impacts on Physical Environment					
i) Design Phase					
Soil Erosion & Slope Instability	D	M (20)	L (20)	ST (5)	Insignificant (45)
ii) Construction Phase					
Soil Erosion & Land Surface Disturbances	D	M (20)	L (20)	ST (5)	Insignificant (45)
Spoil Disposal & Gully Erosion	D	M (20)	L (20)	ST (5)	Insignificant (45)
Air Pollution	ID	M (20)	R (60)	ST (5)	Very Significant (85)
Noise Pollution	D	H (60)	L (20)	ST (5)	Very Significant (85)
Generation of Solid Waste & Wastewater from the construction site & worker's camp	D	M (20)	L (20)	LT (20)	Significant (60)
Accidental Leakage or Spillage of Stored Fuel/Chemicals	D	M (20)	L (20)	LT (20)	Significant (60)
Impact on Land Use Pattern	D & ID	M (20)	L (20)	LT (20)	Significant (60)
Haphazard Disposal of Dismantled Debris	D	M (20)	L (20)	LT (20)	Significant (60)
B) Impacts on Biological Environment					
i) Construction Phase					
Impacts on Flora and Fauna	D	M (20)	L (20)	ST (5)	Insignificant (45)
Impacts on Aquatic Life	D	M (20)	L (20)	ST (5)	Insignificant (45)
ii) Operation Phase					
Impacts on Aquatic Life	D	M (20)	L (20)	LT (20)	Significant (60)
C) Impacts on Chemical Environment					
i) Construction Phase					
Impacts on Water Quality of the nearby rivers	D	M (20)	R (60)	ST (5)	Very Significant (85)
ii) Operation Phase					
Impacts on Quality of River used as Outfall	D	M (20)	L (20)	LT (20)	Significant (60)
D) Impacts on Socio-economic Environment					
i) Design Phase					
Health & Safety of Community	ID	M (20)	L (20)	LT (20)	Significant (60)

Adverse Issues	Impact Rating				
	Nature	Magnitude	Extent	Duration	Rating
& Workers					
Damage to the existing facilities	D	M (20)	L (20)	ST (5)	Insignificant (45)
ii) Construction Phase					
Community Health and Safety Hazards	ID	M (20)	L (20)	ST (5)	Insignificant (45)
Workers' Health and Safety Hazards	ID	M (20)	L (20)	ST (5)	Insignificant (45)
Traffic Congestion	D	M (20)	L (20)	ST (5)	Insignificant (45)
Public Protests	D	M (20)	L (20)	ST (5)	Insignificant (45)
Disruption to local vendor's business	D	M (20)	L (20)	ST (5)	Insignificant (45)
Mobilization of Child Labor	ID	M (20)	L (20)	LT (20)	Significant (60)
Impacts on the sustainability of works	D	H (60)	L (20)	ST (5)	Very significant (85)
Damage to the existing facilities	D	M (20)	L (20)	ST (5)	Insignificant (45)
iii) Operation Phase					
Pollution in Newly Constructed Storm Drains	ID	M (20)	L (20)	LT (20)	Significant (60)
Blocking/Choking of Drains	D	M (20)	L (20)	LT (20)	Significant (60)
Impacts on Recipient Water Bodies	D	M (20)	L (20)	ST (5)	Insignificant (45)
Non-Sustainability of Services or Completed Works	ID	M (20)	L (20)	LT (20)	Significant (60)

Source: National EIA Guidelines, 1993 & IEE Study 2018/019

Note: Scoring is done based on following;
Nature of Impact: D = Direct; IN = Indirect;
Magnitude, H = High (60); M = Medium/Moderate (20); and L = Low (10)
Extent, R = Regional (60), L = Local (20); and S = Site-specific (10)
Duration, LT = Long-term (20), MT = Medium-term (10); and ST = Short-term (5)

The points/scoring are taken from the National EIA Guidelines, 1993

Significance of Impact
Total Score: More than 75 : Very Significant
50-75 : Significant
Less than 50 : Insignificant

504. The above given table shows that *Air Pollution*, *Noise Pollution, Impacts on Water Quality of nearby rivers and Impact on Sustainability of Works* are evaluated as "Very Significant". However, if the mitigation measures as described above for these impacts are properly adopted, these impacts would not be problematic for the project implementation. Apart of this, the ***Table VI-II*** also shows that some impacts are insignificant & some are significant. The best way to avoid these impacts is to follow the proposed mitigation measures and to implement them effectively.

C. Significance of Impact Rating

136. The significance of impact rating as shown in the above table is that it helps to determine the severity of each anticipated adverse impact. This will help to recommend suitable mitigation measures for each impact based on its severity. This will help to allocate budget required for the implementation of the proposed mitigation measures. As per the severity, the impact rating shall act as a means of making policy and legislations more rational, predictable and scientific. This will also help to establish close and routine monitoring requirement or criteria for mitigating impacts. This will further help to recommend the needs of adopting special checklists, if required. Moreover, this will assist to advance towards the environmental auditing during construction and operation phase, as one of the most important environmental management tools. This auditing enables to assess the actual environmental impacts, accuracy of prediction, effectiveness of environmental mitigation measures adopted and functioning of monitoring mechanism.

137. Similarly, regarding the beneficial impacts also, this impact rating enables to assess accuracy of prediction, the effectiveness of the proposed enhancement measures and functioning of monitoring mechanism.

138. Hence, the main significance of impact rating is that it reflects the authenticity of impact assessment in which the significance is interpreted in terms of acceptability of impacts that can be either in terms of legal requirements or public/stakeholders' satisfaction.

VII. ANALYSIS OF ALTERNATIVES

A. With- and Without-Subproject Alternatives

505. Analysis of the alternatives of the proposed project is another important process of IEE study that will help to assess the feasibility of the project in regard to technical, environmental & social aspects. Primarily, this involves two alternatives that includes "Without Project" or "Do-nothing" Alternative and "With Project" Alternative.

(i) Without-project' or 'do-nothing' alternative

506. "Without Project" or "Do-nothing" Alternative study on the existing drainage system was conducted to analyze the existing condition of the project town in the absence of the proposed project.

507. The study shows that Storm Drainage system in the proposed town has become necessary due to flat topography and frequent flooding during rainy season. It may appear as a more serious problem to be addressed once the urbanization strides. Regarding this issue and the demand & priority of WUSC, this project has been proposed. Besides this, there are some issues regarding drainage in the project town that are briefly discussed below:

- The existing drains of the project town seem to be constructed without proper planning & design.
- There is no such development plan prepared for this project town until date.
- Being a sparsely developed settlement and relatively rural in nature, natural or manmade watercourses used for irrigation have been used as drains. Most of these watercourses discharge in fields without being connected into water bodies nearby.

508. 'Without Subproject' or 'Do-Nothing' alternative toughens the chance of accumulation of flooding problems during monsoons. This may result in immense losses to the people residing within this project town and physical environment. This also results in water pollution and environmental degradation of waterways. This will increase the risk of bacterial infection resulting health issues that will obviously have impact on public health, animal health and the health of the ecosystems.

509. This would further impede (i) further social and economic development of the municipality, (ii) fundamental right related to health as guaranteed in Constitution of Nepal (Article 35) that says that "Every citizen shall have the right of access to clean drinking water and sanitation", (iii) Goal of National Urban Water Supply & Sanitation Sector Policy,2009 (Final Draft) to ensure the socio-economic development, improved health status and quality of life of urban populations, including the poor and marginalised, through the provision of sustainable water supply and sanitation services and protection of the environment and (iv) Nepal's delivery of its commitment to SDG 6th to increase the proportion of the population with sustainable access to safe drinking water and basic sanitation.

510. Beside this, 'Do-Nothing' alternative has one positive aspect as it may prevent the service area of the project town from the susceptibility towards the anticipated environmental impacts of this proposed project. However, for this only positive aspect, it will be irrational to ignore the likely impacts. Hence, 'Do-Nothing' alternative cannot be better option to be followed in order to get rid of the anticipated environmental impacts as these environmental impacts can either be avoided or minimized by suitable mitigation measures.

(ii) With Project alternative

511. With Project Alternative was also analyzed by envisaging the likely benefits of the proposed project. The analysis shows that the proposed sub project is the best alternative to overcome the aforementioned threats that is likely to occur in the absence of this subproject. With the Subproject 10,481 populations (2016) will be benefitted from reliable and efficient storm drainage system. In overall, the 'with subproject alternative' will bring about improved public health and living environment that will contribute to improved quality of life in the project municipality.

512. Hence, the 'with project' alternative will contribute to the realization of the Updated 15-Yr Development Plan for Small Towns Water Supply & Sanitation Sector, compliance with the fundamental right related to health as guaranteed in Constitution of Nepal (Article 35), fulfillment of Goal of National Urban Water Supply & Sanitation Sector Policy,2009 (Final Draft) and the delivery of Nepal's commitment to SDG 6.

513. Along with this, the limitation of "Without Project" Alternatives regarding high risk of flooding & soil erosion, susceptibility of anticipated pollution in agricultural fields and improperly designed existing drains leads to choose "With Project" Alternative. The proposed sub project is the best alternative to overcome the aforementioned threats that is likely to occur in the absence of this subproject.

B. Alternatives Relative to Planning and Design

139. The system alternatives need to be developed to assess the most cost-effective, reliable and efficient system that can serve the design population. Our study shows that the proposed project is a unique system and there are no alternatives proposed in the proposed project. However, the proposed project has been divided into two phases that includes Phase1 & Phase 2 based on priority as it has already been described clearly in *Section A of Chapter 4*.

140. Depending upon the overland flow and risk factor, the major parts of the proposed drainage lines have been identified and included in the Phase 1 while the remaining parts have been proposed in the Phase 2. The design of both phase 1 and 2 has already been carried out. The phase 1 will be implemented under ADB fund while the Phase 2 relies either on the design-based resources available within the municipality or any other potential sources.

VIII. ENVIRONMENTAL MANAGEMENT PLAN

A. Introduction

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

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

(i) Institutional Arrangement

a) Executing and Implementing Agencies

516. The Ministry of Water Supply (MoWS) is the executing agency with the responsibility of project execution delegated to the Department of Water Supply and Sewerage Management (DWSSM).

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

Prior to construction:

- MoWS deputizes a qualified staff to act as the Environmental Safeguard Officer of the Project management office (PMO).
- MoWS establishes the grievance redress mechanism, including setting up the Grievance Redress Committee.
- The Water Supply and Environmental Division of the MoWS is responsible for reviewing and approval of the IEE Report.
- DWSSM reviews the IEE Report prepared by the Design, Supervision and Management Consultant Team's Environmental Safeguard Expert (DSMC-ESE) before forwarding this to MoWS.
- DWSSM prepares the ToRs for the Environmental Safeguard Specialist that engages to support PMO and for the Environmental Safeguard Specialists of the two Design, Supervision and Management Consultants that will be appointed to prepare the projects.

b) Safeguard Implementation Arrangement

518. **Project Management Office (PMO):** A project officer (Environment) is engaged in PMO to ensure implementation of environmental safeguards. He/ she is provided with necessary consultant support, and capacity development and training. The responsibilities of the Environment Officer are:

- review and confirm existing IEEs and EMPs are updated based on detailed designs, that new IEEs/EMPs prepared by DSMCs comply to exclusion criteria and project selection guidelines as stipulated in the EARF and government rules; and recommend for approval to PMO;
- approve subproject environmental category;
- ensure that EMPs are included in bidding documents and civil works contracts;
- provide oversight on environmental management aspects of subprojects and ensure EMPs are implemented by RPMOs and contractors;
- establish a system to monitor environmental safeguards of the project including monitoring the indicators set out in the monitoring plan of the EMP;
- facilitate and confirm overall compliance with all Government rules and regulations regarding site and environmental clearances as well as any other environmental requirements as relevant;
- supervise and provide guidance to the RPMOs to properly carry out the environmental monitoring and assessments as per the EARF;
- review, monitor and evaluate effectiveness with which the EMPs are implemented, and recommend necessary corrective actions to be taken;
- consolidate monthly environmental monitoring reports from RPMOs and submit semi-annual monitoring reports to ADB;
- ensure timely disclosure of final IEEs/EMPs in project locations and in a form accessible to the public;
- address any grievances brought about through the Grievance Redress Mechanism (GRM) in a timely manner as per the IEEs;
- undertake regular review of safeguards-related loan covenants, and the compliance during program implementation; and
- organize periodic capacity building and training programs on safeguards for project stakeholders, PMO, RPMOs, and WUAs.

519. **Regional Project Management Offices (Eastern and Western RPMOs):**The environmental officer assigned by DWSSM to the RPMOs receives support from (i) the PMO environmental officer, (ii) environmental specialist from PMQAC; and (iii) the environmental specialist and EMP monitors of the regional DSMCs to carry out the following:

- prepare new IEEs and EMPs in accordance with the EARF and government rules;
- include EMPs in bidding documents and civil works contracts;
- comply with all government rules and regulations;
- take necessary action for obtaining rights of way;
- oversee implementation of EMPs including environmental monitoring by contractors;
- take corrective actions when necessary to ensure no environmental impacts;
- submit monthly environmental monitoring reports to PMO; and
- address any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs.

520. **PMQAC:** The Project Management and Quality Assurance Consultants (PMQAC) provides 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.

521. **Regional DSMCs:**The RDSMCs provides support to the RPMOs in the following areas:

- prepare quality feasibility studies, detailed engineering designs, safeguards documents and bid documents
- provide effective construction supervision and contract management of all water supply and sanitation components implemented under the project in its region
- assist the RPMOs with the overall planning, implementation and monitoring of each subproject during all stages of implementation including adherence to all environmental and social safeguards requirements
- work closely with the Water User and Sanitation Committees (WUSCs), respective project municipalities and communities to ensure that the citizens are aware of project benefits and their responsibilities
- ensure that poor and vulnerable groups will benefit equally from the project.

522. **Civil Works Contracts and Contractors**: EMPs are to be included in bidding and contract documents and verified by PMO and RPMOS. The contractor mobilizes a full-time EMP assurance and OHS staff in the project. The curriculum vitae of the staff is submitted for Employer's approval and appoint before mobilizing at site. The contractors are to carry out all environmental mitigation and monitoring measures outlined in their contract. The contractor submits a construction EMP (CEMP) and take Employer's approval before mobilizing at site. The approved EMP is included in the contract. The contractor has to comply with the contract provision. The government will ensure that bidding and contract documents include specific provision requiring contractors to comply with all; (i) applicable labor laws and core labor standards on (a) prohibition of child labor as define in national legislation for construction and maintenance activities, (b) equal pay for equal work of equal value regardless of gender, ethnicity or caste (c) elimination of forced labor; and (ii) the requirement to disseminate information on sexually transmitted diseases including HIV/AIDS to employees and local communities surrounding the project site.

523. **Capacity Building**: The PMQAC safeguards experts (environmental and social) is responsible for training the (i) PMO's safeguards officers (environmental and social); (ii) RPMOs' engineers and social development officers. Training modules requires to cover safeguards awareness and management in accordance with both ADB and government requirements as specified below:

- Environmental Safeguards
  - (a) sensitization on ADB's policies and guidelines on environment;
  - (b) introduction to environment and environmental considerations in water supply and wastewater projects;
  - (c) review of IEEs and integration into the project detailed design;
  - (d) improved coordination within nodal departments; and

(e) monitoring and reporting system. The contractors will be required to conduct environmental awareness programs and orientation to the workers prior to deployment to work sites.

- Social Safeguards
  (a) sensitization on ADB's policies on Involuntary Resettlement and Indigenous People;
  (b) introduction to social safeguards assessment and document requirements;
  (c) Consultation and participations requirements;
  (d) Project GRM and ADB's Accountability Mechanism (AM); and
  (e) monitoring and reporting system.

524. **Local Authority/Municipality:** The Municipality is the eventual operators of this Katahariya Storm Drainage Project. The key tasks and responsibilities of the local authority/municipality are, but not limited to:

Prior to construction

- Facilitate public consultation and participation, information dissemination and social preparation.
- Provide available data to the DSMC-ESS during the IEE study
- Participate in the training program.

During construction

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

During operation

- Implement the EMP.
- Prepare the environmental monitoring report as per IEE.
- Ensure observance of the grievance redress mechanism.

525. Licensed and accredited laboratory: It is recommended that a licensed and accredited laboratory be engaged to conduct water quality monitoring in the first few years of operation and to train the O & M team of Municipality on the same.

B. Environmental Management Plan (EMP)

526. The table given below gives brief details on the Environmental Management plan (EMP) that is to be implemented for the project implementation.

Table VIII-I: Environmental Management Plan Matrix

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
A. Adverse Impacts					
1. Impacts on Physical Environment					
a) Design Phase					
Topography/Geology	Soil Erosion & Slope Instability	• Incorporate measures and sites for handling excessive spoil materials • Incorporate drainage plan in final design	PMO, RPMO, & DSMC	Incorporated in final design and communicated to contractors	Before award of contract, During Detailed Design Phase
b) Construction Phase					
Topography/Geology	Erosion & Land Surface Disturbance	• Protecting the foundation from damage during backfilling • Using the right backfill materials • Compacting the backfill • Final finishing the subgrade to ensure that water drains away from the foundation	Contractor	• Site Condition • Contractor's Log Book regarding the construction activities • Field Photographs	Weekly Basis During Construction Phase
Spoil Management	Inappropriate disposal of spoils from the construction activities may result in gullying and erosion of spoil tips especially when it is combined with unmanaged surface water runoff.	• Follow Spoil Management Plan as included in Appendix 2D. • Use of excess Spoil or Soil for filling depressed areas or borrow pits wherever possible. • Appropriate disposal of Spoil at the designated places. • Spoils should not be disposed on natural drainage paths, canals and other infrastructures. • Provision of toe walls and retaining walls to protect the erosion of disposed spoils. • Provision of proper drainage, vegetation and adequate protection against erosion at the Spoil Disposal Site.	Contractor	• Spoil Management Plan • Photographs • Construction of Spoil Disposal Site	During Construction Phase
Air Quality	Air Pollution	• Strict Prohibition of open burning of solid waste	Contractor	Written Notice/Code of Conduct	During award of contract
				Visible Emission	Weekly Basis During Construction
				Parameters related to monitoring of solid waste management	

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		• Watering of dry exposed surfaces and stockpiles of aggregates at least twice daily, as necessary;	Contractor	Number of water Tank/s	Weekly Basis During Construction
				Capacity of Water Tank/s	
				Daily/Weekly Frequency/Timing of water spraying	
				Locations of water spraying	
		• if re-surfacing of disturbed roads cannot be done immediately, spreading of crushed gravel over backfilled surfaces;	Contractor	• Contractors Log Book of Materials to ensure the use of crushed gravel • Photographs	Weekly Basis During Construction
		• Conduct Air Quality Test for dust nuisance (PM 10 and PM 2.5) at key settlement and market area, school, hospital at least once in a month during dry working season (Jan-June).	Contractor	• Air Quality Test Reports • Photographs	Monthly Basis
Air Quality	Air Pollution	• Use of Construction/ Transportation Vehicles complying with NVMES,2069	Contractor	Number and types of vehicles in use	During Construction
				Certifying documents for each vehicle	
		• Regular inspection & maintenance of construction/transportation vehicles	Consultant & Contractor	Contractor's/Consultant's log book of vehicle inspection & maintenance	Daily Basis/During Construction
		• Supply of clean cooking fuel to workers instead of allowing them to use firewood for cooking.	Contractor	Written Notice/Code of Conduct	Prior to construction
				Type of fuel supplied to camps	Weekly Basis during construction
				Quantity of fuel supplied to camps	Weekly Basis during construction
Acoustic Environment	Noise Pollution	• Restricting noisy activities to daytime and overtime work to avoid using noisy equipment;	Contractor	Written Notice	Prior to construction
		• Prohibit the use of pressure horn by transportation vehicles	Contractor	Written Notice/Code of Conduct	Daily Basis
				Number of vehicles fitted with pressure horns	
				Maximum Sound Level of Pressure Horn	
		• Conduct noise level test once a year during peak construction stage at location near school, hospital and settlements	Contractor	• Noise Level Test Reports • Photographs	Yearly Basis
		• Avoid noise generating activities like excavation	Contractor	• Number of complaints	Monthly Basis

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		works, dismantling for excavation works, loading & unloading of construction materials, noise of material transportation vehicles etc. during school time and at hospital area if any.		from the sensitive receptors • Contractor's Work Schedule	
		• Regular inspection & maintenance of construction/transportation vehicles to ensure the use of Vehicles complying with NVMES,2069 B.S.	Contractor	Contractor's/Consultant's log book of vehicle inspection & maintenance	Daily Basis
		• Regular inspection & maintenance to ensure the use of equipment/machinery that comply with applicable emission standards of GoN i.e., National Noise Standard Guidelines, 2012	Contractor	Contractor's/Consultant's log book of equipment/machinery inspection & maintenance	Daily Basis
		• Regular inspection & maintenance to ensure the use of Diesel Generators complying with National Diesel Generator Emission Standard,2012	Contractor	Contractor's/Consultant's log book of equipment/machinery inspection & maintenance	Daily basis
Solid Waste	Haphazard Disposal of Wastes	**a) Construction Wastes**			
		• Adopt 3R (Reduce, Reuse & Recycle) concept	Contractor	• Daily/Weekly quantity/volume of reusable/recyclable SW collected	Daily basis
		• Ensure storage areas are secure, safe & weatherproof.	Contractor	• Locations of stockpiling sites	Daily basis
		• Management of reusable wastes	Contractor	• Number of cases of onsite reuses	Daily basis
		• Sale of Recyclable wastes to scrap dealer	Contractor	• Daily/Weekly quantity/volume of such wastes sold to or given to scrap vendors • Frequency of sale to scrap vendors	Daily basis
		• Final Disposal of Bio degradable solid wastes	Contractor	• Number/size of burial pits for final disposal of bio-degradable solid waste • Location of burial sites • Frequency of burials	Daily basis
		• Avoid over ordering of construction materials to the extent possible. This will be challenging as it requires strong coordination with the concerned	Contractor	• Contractor's log book of construction materials	Daily basis

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		contractors as it cannot be made mandatory. However, it is not impossible too to coordinate with the contractors in this regard. • Use standard size & quantity of construction materials.			
		• Construct garland drains to reduce the runoff from the stockpiles.	Contractor	• Location of construction sites	Daily basis
Solid Waste	Haphazard Disposal of Wastes	**b) Solid Wastes, Wastewater and Sewage from labor camp**			
		• Adopt Segregation of Solid Waste (3R Concept) on the basis of being biodegradable or non-biodegradable. It is because non-biodegradable wastes cannot be broken down by decomposers and their disposal poses a big problem.	Contractor	• Number of Colored Bins to segregate wastes into biodegradable & non-biodegradable wastes	Daily basis during construction
		• Management of biodegradable wastes that includes food waste, paper waste, biodegradable plastic, etc. by any suitable processes that include Composting & Incineration. If these two processes are not possible then, the wastes shall be managed either by handing over these wastes to the municipality waste collectors who will finally dispose those wastes to the landfill sites of the project town or by disposing those wastes to the burial pits at suitable place	Contractor	• Daily/Weekly quantity/Volume of Biodegradable solid waste collected • Site Photographs • Contractor' Log Book	Daily basis during construction
		• Non-biodegradable wastes like glass, plastics & metals shall be managed by reusing them for site use or selling them to scrap dealers instead of disposing them	Contractor	• Daily/Weekly quantity/volume of such wastes sold to or given to scrap vendors • Frequency of sale to scrap vendors/dealers	Daily basis during construction
		• Strict Prohibition on open incineration of solid wastes & use of plastic materials to minimize the quantity of plastic wastes.	Contractor	• Written Notice	Prior to Construction & During Construction
		• Construction of the temporary latrines with temporary soak pits & septic tanks within the camp site for proper disposal of sewage.	Contractor	• State of well managed camp site with latrine facilities	Daily basis
		• Provide temporary but proper drainage system for proper outlet of waste water generated from cooking practices adopted by the workers	Contractor	• State of well managed camp site with drainage facilities	Daily basis

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		• Employ local people from nearby villages to maximum extent possible. It will minimize the number of workers residing at worker's camp. Lesser the number of people, lesser will be the solid waste & effluent generated. However, it cannot be made mandatory because availability of local people with required skills will not be ensured at the time of construction.	Contractor	• Contractor's Workers Log Book	Prior to the construction
Handling of Fuels/Chemicals	Accidental Leakage or Spillage of Stored Fuel/Chemicals	• Provision of well managed storage site	Contractor	• Location of storage site	Weekly Basis during construction
		• Organize awareness programs for the workers responsible for handling fuel/chemicals	DSMC & Contractor	• Records of awareness programs in the form of minutes, photographs	Prior to the construction
		• Supervise workers to handle fuel/chemicals properly	DSMC & Supervisor of Contractor	• Records of any accidental spillage/leakage	Daily Basis During Construction
		• Use of spill kit materials to block flow and prevent discharge to nearby water bodies	Contractor	• Contractor's log book of materials procured for construction	Weekly Basis During Construction
		• Scatter the Sawdust, sand or dry soil over the area of spill and leave for few minutes to soak up the fuel/chemical. So, availability of saw dust, sand or dry soil should be ensured in the store	Contractor	• Frequency of use of saw dust, sand or dry soil	Weekly Basis During Construction
		• Regular Inspection Visit to the storage site to inspect the leakage of the stored container of fuel/chemical	DSMC & Contractor	• State of well-maintained storage container	Weekly Basis During Construction
Land Use Pattern	Change in land use pattern in haphazard manner	• Avoid the acquisition of private and agricultural land for the construction of project components. • Monitoring on the haphazard land use & planning by the concerned authority.	PMO & DSMC	Details of land ownership and State of proposed land	During Detailed Design Phase
Dismantled Debris	Haphazard Disposal of Dismantled Debris	• Immediate Response on handling of dismantled debris	Contractor	State of well-maintained site condition after the completion of dismantling works	Daily Basis After Construction and Prior to Operation
		• Segregation of Dismantled Debris • Adopt 3R (Reduce, Reuse& Recycle) concept	Contractor	Number of Colored Bins	Daily Basis
		• Sale of Recyclable Wastes to Scrap Vendors/Dealers	Contractor	• Quantity/Volume of such wastes sold to or given away to scrap vendors • Frequency of sale to	Daily Basis

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
				scrap vendors	
2. Impacts on Biological Environment					
a) Construction Phase					
Flora & Fauna	Loss of vegetation, Loss of habitat of faunas	• Replace the excavated top soil to its original position after the completion of pipe laying work	Contractor	State of before and after condition of the site	Daily Basis During Construction
		• Re-vegetating disturbed slopes and grounds, as applicable;	Contractor	State of revegetated slopes & grounds	Weekly Basis During Construction
Flora & Fauna	Loss of vegetation, Loss of habitat of faunas	• Awareness programs regarding policy related to the conservation of existing flora & fauna, to the workers prior to the construction and the community during various meetings and discussion programs	PMO, DSMC & Contractor	Minutes & Photographs of Programs	Prior to Construction
		• Regular Monitoring	DSMC & RPMO	Contractor's Log Book	Daily Basis During Construction
Aquatic Life	Loss of habitat of aquatic life	• Strict Monitoring on the daily activities of workers	Contractor & DSMC	State of Labor Camp Site	Weekly Basis
		• Provision of temporary but well-equipped toilets	Contractor & DSMC	Location of these temporary facilities	Weekly Basis
		• Restriction to workers from fishing	Contractor & DSMC	Written Notice	Daily Basis During Construction
		• Adopt measures mentioned above for the solid waste management	Contractor & DSMC	• Number of Colored Bins to segregate wastes • Daily/Weekly quantity/Volume of Biodegradable solid waste collected	Daily Basis During Construction
b) Operation Phase					
Aquatic Life	Pollution of water bodies endangering aquatic lives	• Direct discharge of the wastewater and solid waste to the proposed drains will be discouraged through strict monitoring to the operators involved. • Regular monitoring of the constructed drains to prevent entry of wastewater into the drains by enforcing strict regulations.	WUSC	State of disposal of raw sludge and State of nearby water bodies	Weekly Basis
3. Impacts on Chemical Environment					
a) Construction Stage					

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Water Quality	Pollution on outfall rivers by poor sanitation practices of the workers	• Appropriate Design of Septage Disposal through design of toilets with septic tanks	Contractor, DSMC	• Semi Annual Environmental Monitoring Report • State of well managed toilets	Prior to Construction as well as During Construction
		• Disposing of spoils or excess soils as free filling materials as soon as possible	Contractor	• Spoil Management Plan • Location of Spoil Disposal Site	During Construction
		• Locating temporary storage areas on flat grounds and away from main surface drainage routes; • Shielding temporary storage areas with sandbags	Contractor	State of well managed temporary storage area	Monthly Basis
		• Adopt measures mentioned above for the solid waste management	Contractor	• Number of Colored Bins to segregate wastes • Daily/Weekly quantity/Volume of Biodegradable solid waste collected	Daily Basis
		• Providing adequate water supply and sanitation facilities at work sites. • Strict supervision on the behavior of workers for the waste management as well as sanitation behavior and monitoring the workers to manage the wastes properly.	Contractor	State of camp site with required temporary facilities	Weekly Basis
		• Conduct water quality test of Lal Bakaiya River once a year in dry season by the contractor	Contractor	• Water Quality Test Reports	Yearly Basis
b) Operation Stage					
		• Regular Cleaning of Drains • Regular Monitoring on the sanitation behavior of the locals	WUSC O & M Team	State of well-maintained drainage systems	Monthly Basis
		• Conduct water quality test of Lal Bakaiya River once a year in dry season by the O & M entity	O & M team	Water Quality Test Reports	Yearly Basis
4.Impact on Socio-economic Environment					
a) Design Phase					
Health & Safety of Community & Workers	Lack of provision will have impact during construction	• Training on Community Health & Safety Hazards by DSMC by disseminating information in regard to this through training manuals, photographs & documents related to safety.	PMO, RPMO & DSMC	Photographs & Minutes	During detailed design phase and Prior to Construction

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Existing Facilities	Demolition of existing pavement	• Provide budget for restoration/replacement of damaged utilities.	DSMC, RPMO, PMO, Contractor	Approved BoQ	During detailed design phase
b) Construction Phase					
Community Health & Safety	• Cross-cutting threats from construction's impacts on air & water quality, ambient noise level; mobility of people/goods/services; accesses to properties/ economic activities/social services; disruptions, etc. • Communicable and transmittable diseases may potentially be brought into the community by construction workers.	• Contractor's implementation of EMP	Contractor, RPMO, DSMC	Review of EMP	During Construction Phase, Weekly Basis
		• Adequate lighting, temporary fence, reflecting barriers and signage at active work sites;	Contractor	State of well managed construction site with lighting, fencing and signage facilities.	During Construction Phase, Monthly Basis
		• Contractor's preparedness in emergency response;	Contractor	Emergency Response Plan	During Construction, Weekly Basis
		• Adequate dissemination of GRM and Contractor's observance/implementation of GRM.	Contractor	• Grievance Redress Form • State of GRC	During Construction, Monthly Basis
Workers Health &Safety	There is invariably a safety risk when construction works such as excavation and earthmoving are conducted in urban areas. Workers need to be mindful of the occupational hazards, which can arise from working at height and excavation works.	• Submission of Simple OHS plan for employer's approval that involves appropriate health & safety arrangement that includes minimum requirements for various activities like Excavation works, Works within the confined spaces, Use of warning signs, boards & signage, Use of PPE, Accident & Emergency Response and Monitoring & Reporting	Contractor	• OHS Plan Submitted	Prior to the start of the construction
		• Comply Labor Act (1992) of GoN • Train all site personnel regarding environmental health and safety as like in design phase by DSMC & Contractors • Provide **Personal Protective Equipment (PPEs)**to workersthat includes protective clothing, helmets, goggles, boots and other equipments designed to protect the wearer's body from injury or infection and ensure their effective usage • Require workers to wear high visibility clothes	Contractor	• Site –Specific H&S plan • Record of H&S orientation training like Photographs &Minutes • Availability of personal protective equipment at construction site • Environmental Site Inspection Report	Visual inspection by RPMO (monthly) and DSMC-ESS on a weekly basis. Frequency and sampling sites to be finalized during detailed design and final location of project components
		• Exclude public from worksites	Contractor	State of properly fenced construction site area	Weekly Basis during construction
		• Maintain accident reports and records.	Contractor	Number of accidents as per site records	Weekly Basis during construction

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		• Make first aid kits readily available	Contractor	Equipped first-aid stations	Weekly Basis during construction
Workers Health &Safety	There is invariably a safety risk when construction works such as excavation and earthmoving are conducted in urban areas. Workers need to be mindful of the occupational hazards, which can arise from working at height and excavation works.	• Maintain hygienic accommodation in work camps • Ensure uncontaminated water for drinking, cooking, and washing, • Assure clean eating areas • Make sure sanitation facilities are readily available • Provide adequate space and light to the camp site	Contractor	State of well managed workers' camp	Monthly Basis during construction
		• Adequate supply of potable water to the camps and good sanitation within camps	Contractor	Records of supply of uncontaminated water	Weekly Basis during construction
		• Provide medical insurance coverage for workers	Contractor	Medical Insurance Documents	Prior to the construction
		• Ensure moving equipment is outfitted with audible backup alarms; • Hearing protection equipment enforced in noisy environment	Contractor	Contractor's Log Book of Machinery & Equipment	Weekly Basis during construction
		• Chemical and Material storage areas need to be marked clearly	Contractor	Clear Signage Board for Chemical and Material Storage Area	Monthly Basis
		• Implementation of Emergency Preparedness Response Plan to mitigate the impacts of flooding problems that includes i) Reporting of Incidents; ii) Investigation of incidents and iii) Prepared for availability of Stretchers, Life buoys, first aiders, first aid kits etc.	Contractor	• Investigation Reports • Emergency Preparedness Response Plan • Contractor's Materials Log Book	Monthly Basis
Traffic Congestion	Interference in the daily activities of people	• The excavated trench should be backfilled promptly. • The contractor will be accountable to provide signage at appropriate locations indicating available alternate routes to minimize disruptions. • The contractor will have to ensure access to shops and residences using simple walkways. • Follow Traffic Management Plan	Contractor	• Site Visit and Photographs of Sites • Traffic Management Plan	Daily Basis

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Public Protests	Interruption of Smooth Traffic Flow along the proposed drainage line area	• Public Consultation should be carried out at various stages & locations as per requirement. • Implement Greivance Redress Mechanism • Pre-notify the public regarding the construction works that may hinder their daily activities and Coordinate with them properly	DSMC, PMO & Contractor	• Minutes of Public Consultations. • Pre notification through formal written notice or verbal (Miking)	Prior to the Construction
Local Vendor's Business	Discomfort to the customers to get access to the shops	• Adopt "zero soil" approach thorugh prompt backfilling right after completion of drain construction. In general, execution of excavation works is such that excavtion will be done in a few meters length i.e., 50m at a time followed by pipe laying, backfilling over the pipe and removal of all surplus material from the site.	Contractor	Field Visits and Contractor's Work Schedule	Weekly Basis
		• Provision of temporary access to the shops through provision of planks	Contractor	Photographs	Weekly Basis
		• Pre-notify the vendors regarding the construction works that may hinder their daily activities and Coordinate with them properly	Contractor	Written Notice or Miking	Prior to the construction
Deployment of Child Labor	Deprivation of Children's right to education, health, safety and moral development is deprived	• As the Child Labor Prohibition Act, 2000 states that "No Child having not attained the age of 14 years shall be engaged in works as a laborer" during mobilization, provision for the requirement of submission of the citizenship certificate of each labor,should be made.	Contractor & PMO	Citizenship Certificate of the workers	Prior to Construction
		• During contract agreement, the agreement by the contractor to follow Child Labor Prohibition Act, 2000 and Child Labour Prohibition Rules & Regulations,2006, should be made.	Contractor & PMO	Contract Document	During award of contract
Sustainability of Works	Damage to unsettled/ unfinished/uncured and/or completed structures and affecting structural integrity by anticipated flooding risks.	• Avoid construction works during monsoons • After every flooding events, the contractor must conduct engineering investigation of built structures and implement the necessary corrective actions immediately	Contractor	Monthly Progress Report and Contractor's Log Book	Construction Phase
Existing Facilities	Damage to the existing road pavement creating discomfort to the people	• Rehabilitation & Restoration Works	Contractor, RPMO, DSMC	Bid Document & BoQ	During Construction Phase on Daily Basis
		• Promote greening of the length of the road where storm drainage pipe is laid to maintain the aesthetic view of the proposed site. But, for this, the approval from DoR is the must as the road carriageway is under the jurisdiction of DoR. If	Contractor & PMO	• Approval Letter from DoR • Photographs • Contractor's Work Schedule	Right after the construction

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		approval granted, it can be implemented using items not covered by BoQ.			
c) Operation Phase					
Pollution in Newly Constructed Storm Drains	Possibility of Discharge of wastewater and solid waste disposal by the locals	• Regular monitoring of the constructed drains to prevent entry of wastewater into the drains by enforcing strict regulations.	WUSC	Site Visit	Weekly Basis
		• Conduct yearly dry season water quality test at U/S and D/S of storm drainage outfalls	O & M Team	• Water Quality Test Reports • Photographs	Yearly Basis
Blocking & Chocking of Drains	Illegal entry of wastewater from the building as well as the possibility of disposal of waste materials by people	• Regular monitoring of the constructed drains to prevent entry of wastewater into the drains by enforcing strict regulations	PMO, RPMO& DSMC	State of operation system of water treatment plants	Monthly Basis during operation
		• Conduct yearly dry season water quality test at U/S and D/S of storm drainage outfalls	O & M Team	• Water Quality Test Reports • Photographs	Yearly Basis
		• Regular Cleansing and Desilting of Drains	O & M Team	State of Safe Storage Site	Monthly Basis during operation
		• Provision of Adequate Human Resources for regular maintenance	PMO & DSMC	Detailed Design Drawings & Contractor' Working drawings	During Construction
Blocking & Chocking of Drains	Illegal Entry of wastewater from the building as well as the possibility of disposal of waste materials by people	• Establish a functional and efficient drain monitoring and cleaning management system with sufficient annual budget allocation and assignment of human resources.	O & M Team	WUSC Monitoring Reports	Prior to the start of the operation stage
Impact on Recipient Water Bodies	Chance of pollution in the Recipient Water Bodies	• Regular monitoring of the constructed drains to prevent such kind of pollution	WUSC	WUSC Monitoring Reports	Monthly Basis
		• Conduct yearly dry season water quality test at U/S and D/S of storm drainage outfalls	O & M Team	• Water Quality Test Reports • Photographs	Yearly Basis
Non-Sustainability of Services or Completed Works	Disruption in water supply service by sudden seismic events or climate change droughts	• WUSC should conduct engineering investigations of completed works and implement the necessary corrective actions without delay if any such events occur. This shall involve preparation of Emergency Preparedness & Response Plan and Immediate Implementation of this plan after any seismic event.	• WUSC	• WUSC Monitoring Report • Emergency Preparedneaa & Response Plan	• Immediate after any flash flood events
		• Strengthening Institutional Capacity and Policy Compliance through various project related capacity building programs	WUSC	• Photographs of capacity building programs • Minutes of such programs • WUSC Monitoring Report	During project cosntruction and During initial stage of operation phase

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		• Carrying out regular O & M with effectiveness through proper management of WUSC.	WUSC	WUSC Monitoring Report	Right after the completion of project construction
B. Beneficial Impacts					
1.Impact on Socioeconomic Environment					
a) Construction Phase					
Income	Employment Generation	• Recommend contractor to employ local people by giving high priority to women and under privileged group as far as possible. • Ensure equity in provision of wages to both male as well as female labors.	DSMC, Contractor & WUSC	• Contractors Log Book • Number of local labors employed in project • Consultant Monitoring Report	During Project Construction
Personal Skills	Skill Enhancement	• Making a proper work plan and code of conduct during the construction period. • Provision of regular hands on training to the workers during the project construction period	DSMC, Contractor & WUSC	• Contractors Log Book • Hands on training Photographs • WUSC monitoring report	During Project Construction
Local trade & business opportunity	Enhanced Local trade & business opportunity	• Recommend contractor to give priority to the local products during procurement of materials. • Priority also will be given to local services like grocery stores, tea shops, hotel & restaurants etc. during the entire construction period.	DSMC, Contractor & WUSC	• Contractors Materials Log Book • WUSC monitoring report	During Project Construction
b) Operation Phase					
Health & Hygiene	Improved health & hygiene	• Regular maintenance of the water supply components should be done so that the project operates smoothly and the benefits are intact	WUSC	• Photographs • Number of complaints received, if any • WUSC monitoring report	During O & M
Social Comfort	Improvement on Surface Water Flooding and Ponding	• Regular supervision to avoid clogging of drains and regular cleaning of the proposed drains	• WUSC • Local Authority	• Photographs • Number of complaints received, if any • Number of flooding or pondage events, if any • Monitoring Reports	During O & M
Aesthetic Beauty	Increased Urban Aesthetic Value	• Regular cleaning of the drainage components to avoid the choking problems of the proposed drains and to make the benefits intact.	• WUSC • Local Authority	• Photographs • Number of complaints received, if any	O & M phase
Economy	Increased Land Value	• Ensuring regular maintenance of the drainage components • Promoting urbanization through proper land development activities in the area	• WUSC	• Monitoring Reports	O & M phase

Source: IEE Field Study 2018/019

C. Environmental Monitoring Program

141. Environmental monitoring will be done during construction on three levels:

(i) Monitoring the development of project performance indicators by the PMO-ESS;

(ii) Monitoring implementation of mitigation measures by the Contractor; and

(iii) Overall regulatory monitoring of environmental issues by the PMO.

142. In addition to regular monitoring on-site (at the subproject level) by the ICG and DSMC-ESS on the EMP implementation of the mitigation measures, monitoring of key environmental parameters is proposed. ***Table VIII-II*** presents the indicative environmental monitoring program for the subproject, which includes environmental parameters, with a description of the sampling stations, the frequency of monitoring, applicable standards, and responsible agencies.

Table VIII-II: Environmental Monitoring Program

SN	Field	Stage	Parameters	Location	Frequency	Standards	Responsibility
1.	Air quality	Before construction to establish baseline Construction phase	PM10 SO2 NOx	Worksite locations Along drainage line construction	24-hour monitoring once in a season (except monsoons) during the construction	National Ambient Air Quality Standards, 2003	Contractor
2.	Noise and vibration levels	Before construction to establish baseline Construction phase	Equivalent day and night time noise levels	Worksite locations Along drainage line construction and Worker's Campsite locations	Once in a season (except monsoons) during construction	National Noise Standard Guidelines, 2012	Contractor

Source: IEE Study 2018/019

D. Institutional Capacity Development Program

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

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

Table VIII-III: Training Program for Environmental Management

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

Source: IEE Study 2018/019

E. Staffing Requirement and Budget

145. Staffing requirement includes the: (i) deputizing a DWSSM or PMO staff as the PMO environmental safeguards officer; (ii) deputizing WSSDO staff as RPMOS environmental engineers in each subproject town; (iii) engagement of a PMO-environmental safeguards specialist to provide technical assistance and guidance to the PMO and partly to the RPMOS and capacity development/training; and (iv) a DSC environmental safeguards specialist to conduct the IEEs and prepare the IEE reports according to the provisions of this EARF.

The costs required for implementing the EMP will cover the following activities:

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

(ii) Application for environmental clearances; and

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

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

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

148. The operation phase for mitigation measures are good operating practices to mitigate the environmental impacts of this phase & the responsibility remains to WUSC. WUSC will conduct all monitoring during operation and maintenance.

149. The indicative cost of EMP implementation is shown in ***Table VIII-IV***.

Table VIII-IV: Indicative Cost of EMP Implementation

No.	Particulars	Stages	Unit	Total Number	Rate (NRs.)	Cost (NRs.)	Cost Covered by
A.	**Consultants Costs**						
1.	Environmental safeguard specialist (1 person)	Project Implementation Period	person months	3	100,000	300,000.00	Cost covers only remuneration, which together with budget for travel covered in the PMQAC contract
2.	Social Safeguard Specialist	Entire Project Implementation Period	person months	3	100,000	300,000.00	Cost covers only remuneration, which together with budget for travel covered in the DSMC contract
3.	Support Staffs	Entire Project Implementation Period	person months	24	35,000	840,000.00	Cost covers only remuneration, which together with budget for travel covered in the DSMC contract
B.	**Local Level Monitoring & Mitigation Measures**						
a)	Local Level Monitoring Measures						
1.	Air quality monitoring	Pre-construction (baseline) Construction	No. of sampling activities	2	50,000	100,000.00	Civil works contract
2.	Noise levels monitoring	Pre-construction (baseline) Construction	No. of sampling activities	2	20,000	40,000.00	Civil works contract
3.	Water Quality	Pre-construction (baseline) Construction Operation and Maintenance (for water supply and wastewater treatment subprojects)	No. of sampling activities	2	20,000	40,000.00	Civil works contract
b)	Mitigation Measures						

No.	Particulars	Stages	Unit	Total Number	Rate (NRs.)	Cost (NRs.)	Cost Covered by
1.	Protection Works for Soil Erosion & Land surface Disturbances that includes Prompt Backfilling, Construction of Gabion Wall, RRM, Drainage Structures	Construction					Civil works contract
3.	Watering of dry exposed surfaces and stockpiles of aggregates at least twice daily				50,000.00	50,000.00	
5.	Solid Waste Management	Construction			200,000.00	200,000.00	
	Accidental Leakage or Spillage of Stored Fuel/Chemicals				50,000.00	50,000.00	
6.	Revegetating disturbed slopes & grounds	Construction			50,000.00	50,000.00	
7.	Provision of temporary but well-equipped toilets	Construction			75,000.00	75,000.00	
8.	Provision of Spoil Disposal Site	Construction			50,000.00	50,000.00	
9.	Provision of Camp Site	Construction			25,000.00	25,000.00	
10.	Provision of Stockpiling Site	Construction			75,000.00	75,000.00	
12.	Temporary Fencing, Use of Reflecting Barrier, Signage, Adequate Lighting	Construction			50,000.00	50,000.00	
13.	Provision of PPE to workers	Construction			100,000.00	100,000.00	
14.	Provision of Planks to provide access to shops & homes	Construction			30,000	30,000	

No.	Particulars	Stages	Unit	Total Number	Rate (NRs.)	Cost (NRs.)	Cost Covered by
15.	Emergency Response Preparedness	Construction			200,000.00	200,000.00	
	Preparation of Emergency Response Plan and Immediate implementation of this plan	Operation			165,000.00	165,000.00	
	Engineering Investigations after any flash flood event, if any				200,000.00	200,000.00	
	Total Cost of Local Level Monitoring & Mitigation Measures					**1,500,000.00**	
C.	**Capacity Building**						
1.	(i) Orientation workshop for officials involved in the project implementation on ADB Safeguard Policy Statement, Government of Nepal environmental laws and regulations, and environmental assessment process;	Module 1- on environmental assessment and review framework (EARF) and EMP implementation to be conducted by PMO-ESS (prior to contract of award for civil works) Module 2 – Any time after Module 1	Lump sum			400,000	Covered under Output 2 - Improved Institutional Capacity and Project Implementation Platform

No.	Particulars	Stages	Unit	Total Number	Rate (NRs.)	Cost (NRs.)	Cost Covered by
	(ii)induction course contractors, preparing them on environmental management plan (EMP) implementation and environmental monitoring requirements related to mitigation measures; and taking immediate action to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of implementation; and						
	(iii)lessons learned information sharing						
				Total Capacity Building Costs		**400,000.00**	
D.	**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 expense.
		Environmental assessment and environmental clearances as per ECA and ECR requirements	Lump sum	1	500,000.00	500,000.00	Covered under the DSMC contract
				Total Administrative Costs		**500,000.00**	
E.	**Other Costs**						

No.	Particulars	Stages	Unit	Total Number	Rate (NRs.)	Cost (NRs.)	Cost Covered by
1.	Public consultations and information disclosure	Information disclosure and consultations during preconstruction and construction phase, including public awareness campaign through media	As per requirement	Lump sum	350,000	350,000	Covered under PMO budget
2.	Grievance redress mechanism (GRM) implementation	Costs involved in resolving complaints (meetings, consultations, communication, and reporting/ information dissemination)	As per requirement	Lump sum	200,000	200,000	Covered under PMO budget
3.	Any unanticipated impact due to project implementation	Mitigation of any unanticipated impact arising during construction phase and defect liability period		Lump sum	Contractor's liability	As per insurance requirement	Civil works contract – contractor's insurance
	Total Indicative Cost of EMP Implementation					**3,390,000.00**	

Source: IEE Study 2018/019

527. The lump sum amount of NRs. 1,500,000.00 has been estimated to execute all the necessary environmental mitigation measures. Including this amount, the total indicative cost of EMP implementation is NRs. 4,390,000.00

Note: The breakdown cost is based on past similar project experience however, independent cost may alter without altering the total cost. This cost has been included in BoQ under lump sum of Civil Works.

F. Implementation Schedule

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

Table VIII-V: Environmental Management Implementation Schedule

Activity			**Indicative Time Frame**
SUBPROJECT IMPLEMENTATION			
	Detailed Design & Bidding Documents		
	Procurement		
	Construction		
	Defects Liability Period		
	Operation and Maintenance		
ENVIRONMENTAL MANAGEMENT			
	Overall		
	1.	Design Review and Technical Audit Consultant of Environmental Specialist	Starting (4 yrs of intermittent inputs)
	2.	PMO's submission of Environmental Monitoring Report (EMR)	
		Monthly EMR for Subproject's Monthly Progress Report	8th day after effective month
		Semi-Annual EMR during construction for submission to ADB	8th day after effective 6-months
		Annual EMR for submission to ADB	8th day after effective year
	Before Construction Mobilization		
	1.	Finalization of EMP, (if applicable) revision of IEE	
	2.	ADB review & approval of revised IEE & EMP.	
	3.	Obtaining Government's approval of IEE Report	
	4.	Community preparation (including disclosure of Final IEE & its EMP)	
	5.	Establishment of baseline data (as set out in the EMP)	(shall have been done before award of contract)
	6.	Preparation of C-EMP by selected Contractor, review of C-EMP	before start of works on site
		against SPS-compliant EMP.	or establishment of construction- related facilities.
	Construction		
		Mobilization to Demobilization	
	1.	Implementation of mitigation measures and conduct of environmental effects monitoring following the C-EMP.	
	2.	Submission of Environmental Monitoring Report (EMR)	
		Monthly, by Contractor	5th day of the month following the effective month
		Quarterly, by Contractor or by Licensed Laboratory	3rd day of the month following the effective quarter
	Operation (potentially could start even before DLP is over)		
	1.	Implementation of mitigation measures & monitoring activities as	Starting Q/Q Y
		specified in the EMP	
	2.	Submission of EMR	Starting Q/Q Y
		Monthly, by Operator	5thday of the month following the effective month

Activity			Indicative Time Frame
		Quarterly, by Operator or (if applicable) by Licensed Laboratory	3rd day of the month following the effective quarter

Source: IEE Study 2018/019

Table VIII-VI: Proposed Topics for Capacity Building/Training

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

Source: IEE Study 2018/019

IX. INFORMATION DISCLOSURE, CONSULTATION & PARTICIPATION

A. Stakeholder Consultation & Participation

529. Stakeholder consultation and participation is an essential process in project preparation. It is also a part of information disclosure. It will disseminate as well as collect information regarding the proposed project by involving various stakeholders that includes Key Informant Interviews, Stakeholders Meetings, Focus Group Discussions (FGD), On-site discussions with WUSC and Random Field Interviews. The minutes of various meetings undertaken during field visits are also included in ***Appendix 4.***

530. This stakeholder consultation requires the analysis of stakeholders through the identification of the potential participants and the methods of their involvement. The table given below illustrates the concerned stakeholders of the proposed project that will have either primary or secondary.

Table IX-I:Stakeholder Analysis & Mapping

S.N.	Stakeholders	Primary[3]	Secondary[4]	Stakeholders 'Role or Interest	Level of Influence
1.	Government of Nepal		✓	It is the executive and central body.	High
2.	Ministry of Water Supply (MoWS)		✓	It is the lead executive agency and is responsible for policy coordination, guidance, review of programs, ensuring that all aspects relevant to achieve the objective of the project and for sustaining the improved services to the required level.	High
3.	ADB		✓	It supports government of Nepal in improving and enhancing the existing water supply service.	Medium
4.	Department of Water Supply and Sewerage Management		✓	It is the lead-implementing agency and works under MoWS with the responsibility of planning, implementation, operation, repair & maintenance of the proposed project.	High
5.	DWASH-CC		✓	It provides coordination in the preparation of local WASH plans with inputs from WASH sector actors and in the effective implementation of the local plans related to this project.	High

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

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

S.N.	Stakeholders	Primary[3]	Secondary[4]	Stakeholders 'Role or Interest	Level of Influence
5.	UWSSP, PMO, RPMO & DRTAC		✓	It is responsible in successfully implementing the proposed project ctivities, establishing coordination with ADB & GoN and managing day to day activities at municipality levels.	High
6.	Town Development Fund (TDF)		✓	TDF will assist the project municipality conducting financial appraisal of the proposed project and advice DWSSM on its outcomes prior to the start of detailed design process.	High
7.	Local Bodies (Municipality & Ward Offices)		✓	It is responsible for establishing coordination with the implementing agency. Here, the municipality will be also responsible for policy compliance as well as for addressing public protests if any.	High
8.	DSMC		✓	It will assist PMO & RPMO in the overall planning, implementation and monitoring of the project activities regarding environmental & social safeguards requirements.	High
9.	Households (Families & Individuals)	✓		They are the main beneficiaries and are benefitted by the provision of effective storm drainage system.	Low
10.	Contractors, Petty Contractors		✓	It is responsible for bidding for works and involved in the construction of the proposed project.	Low
11.	Local Technicians/Plumbers	✓		This group will be benefitted through the increased work opportunities related to construction works of the proposed project.	Low
12.	Unemployed Locals	✓		This group will be benefitted through the increased work opportunities related to construction works of the proposed project.	Low
13.	Local Vendors	✓		This group will be affected by the drainage line construction along the road where the proposed drainage line is constructed.	Low
14.	Schools & Hospitals	✓		This group will be benefitted by the provision of enhanced and improved continuous water supply service.	Low

S.N.	Stakeholders	Primary[3]	Secondary[4]	Stakeholders 'Role or Interest	Level of Influence
15.	Commercial Establishments (Private Enterprises)	✓		This group is benefitted by enhancing their business by supplying items to the construction employees regarding their basic needs.	Low
16.	Scrap Vendors	✓		This group will be benefitted by purchasing the recyclable wastes generated from the construction activities as well as from workers camp.	Low
17.	Local Leaders		✓	This group will facilitate to establish strong coordination between the local people and the project authority.	High

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

531. The consultations were carried out on various dates at various locations within the project town for the discussion of the anticipated environmental impacts that may result from the construction of the proposed project. The consultations were undertaken with key stakeholders that include Local Bodies, Beneficiaries Households, TDF, PMO, RPMO & DRTAC in line with ADB's requirements pertaining to environment and social considerations. The key concerns of the people related to the project that includes Implementation of the safeguard policy framework in field level, Delivering the information regarding safeguard activities to local level, Willingness to pay, Upfront cash collection and People's participation in project implementation were discussed.

B. Major Issues Raised by the Stakeholders

532. The major issues raised by the key stakeholders during stakeholder consultation are as follows:

i. The project town is in need of efficient storm drainage system.
ii. Flooding problem is severe in the project town during monsoons.
iii. The project should give priority to local people while hiring for the construction activities.
iv. The project must consider solid waste management issues during construction period.
v. The proposed project must address the socioeconomic problems that may be observed during the construction period at the proposed drainage line areas like Traffic Congestion, Disruption to Local Vendors, Discomfort to the passerby, Interruption to the traffic flow,Noise Pollution, Air Pollution, Damage to the existing facilities etc.

533. The assurance made by the study team regarding the issues raised by the stakeholders are as follows:

i. The proposed project will address the problems faced by the people of Katahariya Municipality due to the absence of proper & effective storm drainage system.

ii. The socioeconomic problems raised by the stakeholders have been considered in IEE study and this IEE study has proposed mitigation measures for these issues. Accordingly, for ensuring the effective implementation of the proposed mitigation measures, EMP will be prepared and the contractor will be enforced to consider, follow and implement the EMP during construction.

iii. The solid waste management plan will be prepared,followed and implemented during the construction phase of the project that includes Spoil Management & Disposal, Disposal of Dismantled Debris and Management of Construction Wastes & Solid Wastes.

iv. Local workers of Katahariya municipality will be given priority for employment to the extent possible however; it requires strong coordination with the concerned contractor.

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

i. During construction, if change in design, alignment, and location, the PMO and ICG will hold at least one public consultation to solicit perceived impacts, issues, concerns and recommendations from affected communities;

ii. Before construction, the PMO and ICG will conduct an information, education and communication (IEC) campaign among the affected communities about the upcoming construction, its anticipated impacts, the grievance redress mechanism, contact details and location of the PMO and ICG, and status of compliance with the Government's environmental safeguard requirements. Billboards about the subproject, implementation schedule and contact details of the executing agency, PMO-ES, ICG-ESA and Contractors will be set up at strategic locations. The grievance redresses procedure and details will be posted at the offices of the ICG, WUSC and VDC;

iii. During construction, regular random interviews will be conducted by the ICG-ESA every month to monitor environmental concerns of subproject communities;

iv. During operation, periodic random interviews will be conducted by the ICG and WUSC to monitor the environmental concerns of subproject communities;

v. The public consultations and information disclosure will be continuous throughout the project cycle. PMO and ICG will be responsible for designing and implementing such aspects on the ground.

535. The GoN-approved IEE Report (in English), will be available at the offices of PMO, ICG, and WUSC for the perusal of interested parties. Copies may be made available upon formal request. IEE and environmental monitoring reports will be disclosed on the ADB's and STWSSSP website. This will be also as a part of Information Disclosure.

X. GRIEVANCE REDRESS MECHANISM

A. Purpose of the Grievance Redress Mechanism

536. A project-specific grievance redress mechanism (GRM) will be established to receive, evaluate and facilitate resolution of affected persons' concerns, complaints, and grievances related to social, environmental and other concerns on the project. The GRM will aim to provide a time-bound and transparent mechanism to resolve such concerns. The mechanism, developed in consultation with key stakeholders, will ensure that: (i) the basic rights and interests of every person adversely affected by the social and environmental performance of a Project are protected; and (ii) their concerns are effectively and timely addressed.

537. A common GRM will be in place for social, environmental or any other grievances related to the project. The GRM will provide an accessible forum for receiving and facilitating resolution of affected persons' grievances related to the project. Project will publish the sample grievance registration form on its website, and publish it in local language, at the hoarding board of each of the participating WUA or municipalities' office. Every grievance shall be registered with careful documentation of process adopted for each of the grievance handled, as explained below. The environmental and social safeguards officer (ESO/SSO) at the project management office (PMO) will have the overall responsibility for timely grievance redress on environmental and social safeguards issues. The Social Safeguards Officer at the Regional Project Management Office (RPMO) will be the focal person for facilitating the grievance redress at the local level.

538. A municipal-level public awareness campaign will be conducted on a regular basis as shown in the Communication & Public Participation Plan (CAPP) of the project to ensure awareness on the project and its GRM. The social and environmental safeguards experts of the PMQAC and RDSMCs will support the WUA or municipalities in conducting municipality-wide awareness campaigns, which will ensure that all stakeholders including poor and vulnerable are aware of the GRM and project's entitlements.

B. Proposed Set-Up

539. A Grievance Redress Committee (GRC) will be formed at the Municipality level, comprising the Mayor as Chairperson of GRC, and Regional Project Manager RPMO as Secretary. The GRC members will comprise of (1) WUSC Secretary; (2) RPMO Engineer; (3) RPMO social /environmental (as relevant) officer, (4) representative of affected persons, (5) RDSMC's safeguards specialist (social/environment as relevant), (6) a representative of reputable and relevant CBO/SHG/organization working in the project area as invitee[5] , and (7) contractor's representative. The secretary of the GRC will be responsible for convening timely meetings and maintaining minutes of meetings. The concerned social safeguards expert of RDSMC will support the RPMO safeguard's officer and Project Manager of RPMO to ensure that grievances, including those of the poor and vulnerable are addressed. All GRCs shall have at least two women committee members. Along with representatives of the APs, civil society and eminent citizens can be invited as observers in GRC meetings.

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

540. The functions of the local GRC are as follows: (i) provide support to affected persons on problems arising from environmental or social disruption; asset acquisition (if necessary); and eligibility for entitlements, compensation and assistance; (ii) record grievances of APs, categorize and prioritize them and provide solutions within 15 days of receipt of complaint by WUA or local bodies; and (iii) ensure feedback to the aggrieved parties about developments regarding their grievances and decisions of the GRC.

541. The GRM procedure is outlined below in detail, with each step having time-bound schedules and responsible persons to address grievances and indicating appropriate persons whose advice is to be sought at each stage, as required:

(i) First Level of GRM (WUA level): The first-level, which is also the most accessible and immediate venue for quick resolution of grievances will be the contractors, RDSMC field engineers and RPMO supervision personnel, who will immediately inform the WUA. Any person with a grievance related to the project works can contact UWSSP to file a complaint. The municipal-level field office of the RPMO, in WUA's building, will document the complaint within 24 hours of receipt of complaint in the field, and WUA or local bodies will immediately address and resolve the issue at field-level with the contractor, supervision personnel of RPMO and RDSMC field engineers within 5 days of receipt of a complaint/grievance. The assigned RDSMC's Social Mobilizer will be responsible to fully document: (i) name of the person, (ii) date of complaint received, (iii) nature of complaint, (iv) location and (v) how the complaint was resolved. If the complaint remains unresolved at the local level within 5 days, the WUA will forward the complaint to the municipality level GRM.

(ii) Second Level of GRM (Municipality level): The complainant will be notified by the WUA that the grievance is forwarded to the Municipality-level GRC. The M level GRC will be called for a meeting, called and chaired by the Mayor. The GRC will recommend corrective measures at the field level and assign clear responsibilities for implementing its decision within 10 days of receipt of complaint by WUA. If the grievance remains unresolved within 10 days of receipt of complaint by WUA, the matter will be referred to the third level. The RPMO Engineer will be responsible for processing and placing all papers before the GRC, recording decisions, issuing minutes of the meetings, providing feedback to complainants and taking follow up actions so that formal orders are issued and decisions are carried out.

(iii) Third Level of GRM (PMO Level): Any unresolved or major issues at Municipality level will be referred to the PMO for final solution. The PMO's Project Director (PD) will have special meeting to find solutions. Decision has to be made within 15 days of receipt of complaint by WUA. The PD will sign off on all grievances received by the PMO. The concerned Deputy Project Director (DPD) and environmental and social safeguards officers (ESO & SSO) of PMO will be involved with support from the PMQAC's social/environment safeguards experts. The SSO will be responsible to convey the final decision to the complainant.

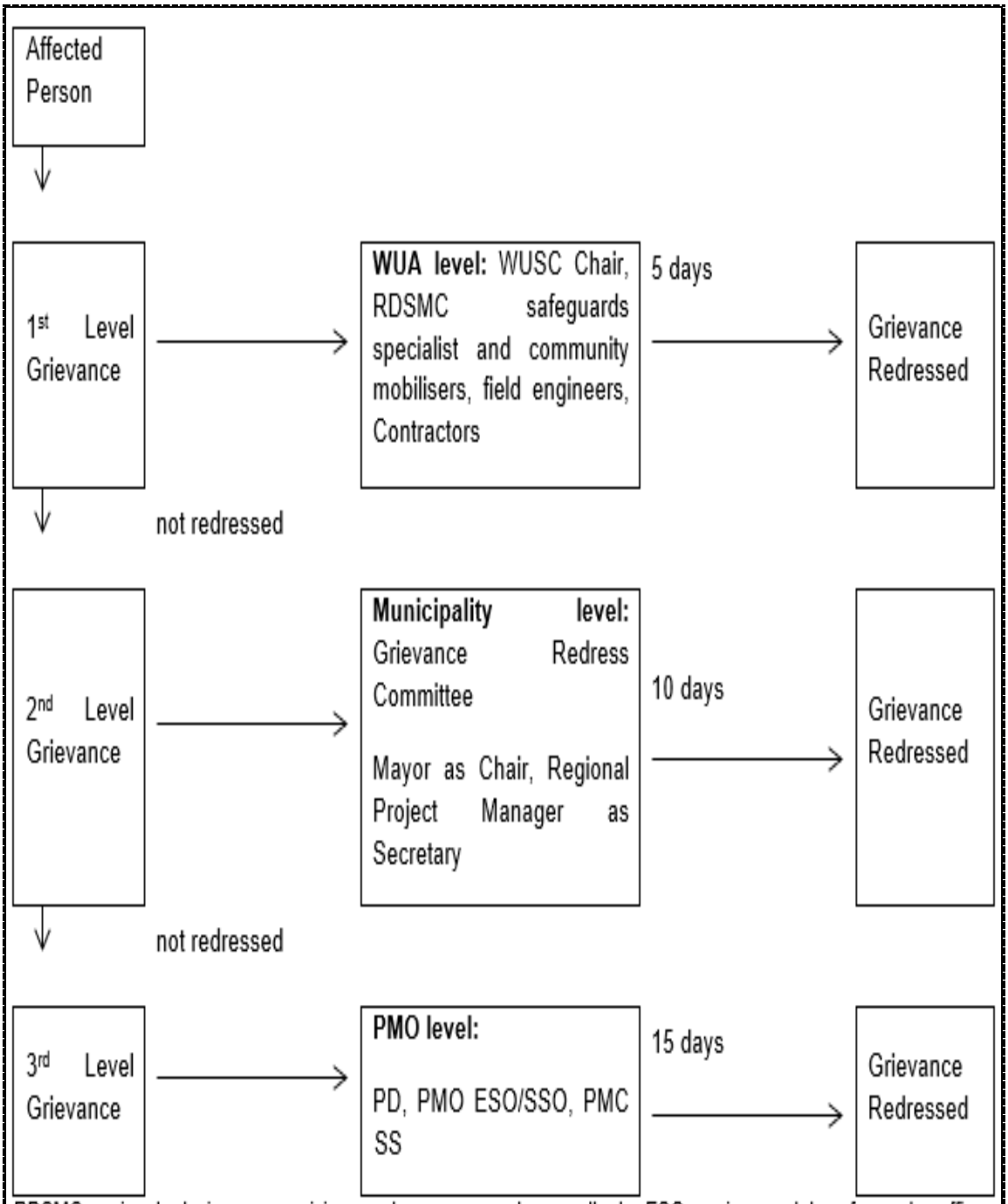
542. The complainant will have to fill up Grievance Redress Form as shown in ***Appendix 2B*** to file the complaint. All paperwork (details of grievances) needs to be completed by the

WUA member secretary assisted by RDSMC and circulated to the WUA Chairperson and members. At Municipality level, the RPMO Engineer will be responsible for circulation of grievances to the Regional Project Manager, DWSSM, Mayor and other GRC members, prior to the scheduled meetings. The RPMO's Engineer will be responsible for follow-through of all escalated grievances. All decisions taken by the GRC will be communicated to the APs by the RPMO's SSO.

543. Despite the project GRM, an aggrieved person shall have access to the country's legal system at any stage and accessing the country's legal system can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM.

544. In the event that the established GRM is not in a position to resolve the issue, the affected person also can use ADB's Accountability Mechanism (AM) through directly contacting (in writing) the Complaint Receiving Officer (CRO) at ADB headquarters or the ADB Nepal Resident Mission. The complaint can be submitted in any of the official languages of ADB's developing member countries (DMCs). The ADB's AM information will be included in UWSSP Information Datasheet (PID), to be published in web and distributed to the affected communities, as part of the project GRM.

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



RDSMC=regional design, supervision and management consultant; ESO=environmental safeguards officer, SDO=social development officer, SSO=social safeguards officer, GRC = grievance redress committee; PD = project director; PMC = project management consultant; PMO = project management office.

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

XI. MONITORING & REPORTING

546. RPMO is the main monitoring agency of the proposed project that will monitor and measure the progress of EMP implementation with assistance from DMSC. The monitoring activities will correspond with the project's risks and impacts, and will be identified in the IEEs for the subprojects. In addition to recording information on the work and deviation of work components from original scope, PMO, RPMOs & DSMC will undertake site inspections and document review to verify compliance with the EMP and progress toward the final outcome. Along with this, Ministry of Water Supply (MoWS) as well as Ministry of Forests & Environment (MoFS) under Government of Nepal will also undertake monitoring process through random field visits to review the project performance.

547. RPMOs will submit monthly monitoring and implementation reports to PMO, who will take follow-up actions, if necessary. PMO will submit semi-annual monitoring reports to ADB. This report will be based on the Sample Semi-Annual Monitoring Report Template given in ***Appendix 2E*** and Sample Environmental Site Inspection Report given in ***Appendix 2F***. The subproject budgets will reflect the costs of monitoring and reporting requirements.

548. For subprojects likely to have significant adverse environmental impacts, PMO will retain qualified and experienced external experts to verify its monitoring information. PMO environmental safeguard specialist will document monitoring results, identify the necessary corrective actions, reflect them in a corrective action plan, and for each quarter, will study the compliance with the action plan developed in the previous quarter. Compliance with loan covenants will be screened by the PMO.

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

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

XII. CONCLUSION

550. The IEE study indicates that:

- The proposed project, its components, are not within or adjacent to environmentally sensitive areas.
- The proposed project will reduce the increased risk of flooding during monsoons.
- The proposed project will bring about: (i) the benefits of easy access to rivers for storm runoff reducing risks of flooding and loss of lives & private property; (ii) promotion of good hygiene and sanitation practices and reduced health and safety risks as positive impacts; and (iii) enhanced community health, improved quality of life and safe communities as outcomes.
- Along with positive outcomes, the proposed project will also have negative impacts as discussed above in Chapter VI. As per our IEE study, four of the adverse impacts that includes *Air Pollution*, *Noise Pollution, Impacts on Water Quality of nearby rivers and Impact on Sustainability of Works* are evaluated as "Very Significant". However, these impacts would not be problematic for the project implementation if the activities that stimulate this impact to occur are properly controlled through the mitigation measures.
- Some of the adverse impacts are also evaluated as *Significant*. However, these will not be sufficient to threaten or weaken the surrounding resources. Mitigation measures, integral to socially and environmentally responsible construction practices, will be commonly used at construction sites and the contractors will be aware about it. Hence, mitigation measures would not be difficult to implement.
- Similarly, Insignificant impacts can either be avoided or simply mitigated through the proposed mitigation measures.
- The environmental management plan (EMP) as mentioned above in Chapter VIII, if duly considered, followed and implemented during project construction activities, then the environmental issues will not be issues to be worried about.
- If the responsible body mentioned in the EMP matrix shown in the ***Table VIII-I*** properly takes up the responsibility for the implementation of mitigation measures for the likely impacts resulting from the various activities of the project, then, the environment of the project area will be safe and less affected from the project activities.
- Regular monitoring with good operation & maintenance service including prompt action on damage of the constrcuted drains if any; will lessen the risks of the ineffective implementation of the proposed project and will sustain the system.
- None of the anticipated environmental impacts of the proposed project is significant enough to go for either detailed EIA study or further especial study.
- As per ADB Categorization, the proposed project falls under "Category B". As per EPR 1997 (Latest Amendments 2017) Schedule H, this IEE study fulfills the requirements of IEE criteria. This IEE thus fulfills the policy requirements of both the ADB and the GoN. This indicates that IEE study is sufficient for the effective implementation of Katahariya Storm Drainage Project.

- The IEE study shows that project benefits outweigh the risks and these potential risks can be overcome through proper planning and management.

551. Based on the above findings, the classification of the Katahariya Storm Drainage Project as "Category B" is confirmed, no further special study or detailed EIA needs to be undertaken and people of Katahariya Municipality will get rid of flooding and pondage problems during monsoons, they have been experiencing for decades.

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APPENDIXES

Appendix 1

Rapid Environmental Assessment Checklist, Preliminary Climate Risk Screening Checklist and No Mitigation Scenario (Scoping Checklist) for Katahariya Storm Drainage Project

RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST FOR KATAHARIYA STORM DRAINAGE PROJECT

Instructions:

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

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

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

Country/Project Title: **NEP: Third Small Town Water Supply and Sanitation (Sector) Project**

Subproject: **Katahariya Storm Drainage Project**

Screening Questions	Yes	No	Remarks
A. PROJECT SITING IS THE PROJECT AREA			
▪ DENSELY POPULATED?		√	Katahariya Municipality has a moderate population density.
▪ HEAVY WITH DEVELOPMENT ACTIVITIES?		√	
▪ ADJACENT TO OR WITHIN ANY ENVIRONMENTALLY SENSITIVE AREAS?			
• CULTURAL HERITAGE SITE		√	
• PROTECTED AREA		√	
• WETLAND		√	
• MANGROVE		√	
• ESTUARINE		√	

Screening Questions	Yes	No	Remarks
• BUFFER ZONE OF PROTECTED AREA		√	
• SPECIAL AREA FOR PROTECTING BIODIVERSITY		√	
• BAY		√	
B. POTENTIAL ENVIRONMENTAL IMPACTS Will the Project cause…			
▪ impairment of historical/cultural monuments/areas and loss/damage to these sites?		√	
▪ Interference with other utilities and blocking of access to buildings; nuisance to neighboring areas due to noise, smell, and influx of insects, rodents, etc.?	√		Regarding the access to buildings and roadside shops, it may interfere to some extent, but it can be avoided by providing temporary access to buildings and shops.
▪ Dislocation or involuntary resettlement of people		√	
▪ Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		√	
▪ Impairment of downstream water quality due to storm discharge		√	
▪ Environmental pollution due to illegal entry of waste water in drain	√		This can be avoided through regular monitoring.
▪ social conflicts arising from displacement of communities?		√	
▪ Risk and vulnerabilities related to occupational health and safety due to physical, chemical and biological hazards during project construction and operation?		√	
▪ Discharge of hazardous materials to the proposed drain and danger to workers?		√	
▪ Road blocking and temporary flooding due to land excavation during the rainy season?	√		Road blocking problem may arise but it can be mitigated through precautionary measures**.**
▪ Noise and dust from construction activities	√		EMP provides mitigation measures.
▪ Traffic disturbances due to construction material transport and wastes	√		EMP provides mitigation measures.
▪ Temporary silt runoff due to construction	√		
▪ Hazards to public health due to illegal entry of waste water to the storm drains	√		EMP provides mitigation measures.

Screening Questions	Yes	No	Remarks
▪ Deterioration of water quality due to discharge of storm to the recipient water bodies	√		The proposed storm drain is solely for conveying storm, hence, there is less chance of pollution. However, EMP provides mitigation measures.
▪ dislocation or involuntary resettlement of people?		√	
▪ large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		√	
▪ social conflicts if workers from other regions or countries are hired?	√		Expected as low concern. Priority will be given to local workers.
▪ Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction?	√		EMP provides mitigation measures.
▪ Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?		√	

Preliminary Climate Risk Screening Checklist

Country/Project Title: Katahariya Storm Drain Project
Sector:
Subsector:
Division/Department:

Screening Questions	Score	Remarks

Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides?	0	Investments in the proposed project will not likely be affected by climate change and extreme weather events due to the siting of project.
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters? (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	2	For the project town, rainfall data of Rautahat District (Gaur Station) from 1991 AD to 2017 AD has been collected from DHM.
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity, and hydro-meteorological parameters) affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	0	
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	Regular operation and maintenance will not allow this effect to occur

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

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

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

Other Comments:_____
_____
_____

Prepared by: _____

NO MITIGATION SCENARIO (SCOPING CHECKLIST) FOR KATAHARIYA STORM DRAINAGE PROJECT

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
1. Will construction, operation or decommissioning of the Project involve actions which will cause physical changes in the locality (topography, land use, changes in waterbodies, etc)?				
1.1	Permanent or temporary change in land use, land cover or topography including	Yes	Temporary change in land use at the designated stockyards by disposing	No, it is short term and is limited to construction period

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
	increases in intensity of land use?		excess of excavated materials	only
1.2	Clearance of existing land, vegetation and buildings?	No		
1.3	Creation of new land uses?	No		
1.4	Pre-construction investigations e.g. boreholes, soil testing?	No		
1.5	Construction works?	Yes	Same as 1.1	
1.6	Demolition works?	Yes	Will require demolition of road section for excavation works for pipelines & drainage lines	No. It will be readily rehabilitated.
1.7	Temporary sites used for construction works or housing of construction workers?	Yes	There is a chance of disposal of the daily wastes to the nearby water bodies by the construction workers	No, there will be provision to prohibit such actions.
1.8	Above ground buildings, structures or earthworks including linear structures, cut and fill or excavations?	Yes	Earthworks may bring change in land use disrupting the roads & market area.	No, the spoils will be readily disposed and the immediate backfilling works will be done.
1.9	Underground works including mining or tunnelling?	No		
1.10	Reclamation works?	No		
1.11	Dredging?	No		
1.12	Coastal structures *eg* seawalls, piers?	No		
1.13	Offshore structures?	No		
1.14	Production and manufacturing processes?	Yes	The on-site concrete mixing activities shall be carried out within the proposed component area and will occupy land that brings change in land use.	Not significant. The area covered to conduct such activities will be within the construction site
1.15	Facilities for storage of goods or materials?	Yes	There is requirement of stockpiling site. Hence, certain portion land needs to be occupied for the installation of stockpiling site.	Not significant. The proposed location belongs to government area.
1.16	Facilities for treatment or disposal of solid wastes or liquid effluents?	No		
1.17	Facilities for long term housing of operational workers?	No		
1.18	New road, rail or sea traffic during construction or operation?	No		
1.19	New road, rail, air, waterborne or other transport infrastructure including new or altered routes and stations, ports, airports etc?	No		

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
1.20	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	No		
1.21	New or diverted transmission lines or pipelines?	No		
1.22	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?	No		
1.23	Stream crossings?	No		
1.24	Abstraction or transfers of water from ground or surface waters?	No		
1.25	Changes in water bodies or the land surface affecting drainage or run-off?	No		
1.26	Transport of personnel or materials for construction, operation or decommissioning?	No		
1.27	Long term dismantling or decommissioning or restoration works?	No		
1.28	Ongoing activity during decommissioning which could have an impact on the environment?	No		
1.29	Influx of people to an area in either temporarily or permanently?	No		
1.30	Introduction of alien species?	No		
1.31	Loss of native species or genetic diversity?	No		
1.32	Any other actions?	No		
2. Will construction or operation of the Project use natural resources such as land, water, materials or energy, especially any resources which are non-renewable or in short supply?				
2.1	Land especially undeveloped or agricultural land?	No		
2.2	Water?	No		
2.3	Minerals?	No		
2.4	Aggregates?	No		
2.5	Forests and timber?	No		
2.6	Energy including electricity and fuels?	No		
2.7	Any other resources?	No		
3. Will the Project involve use, storage, transport, handling or production of substances or materials which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health?				
3.1	Will the project involve use of substances or materials which are hazardous or toxic to human health or the	No		

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
	environment (flora, fauna, water supplies)?			
3.2	Will the project result in changes in occurrence of disease or affect disease vectors (eg insect or water borne diseases)?	Yes	The surroundings of the worker's camp may be affected through inadequate supply of water and poor sanitation practice.	No because it is limited to construction period only and it can also be avoided by provision of safe access to water, sanitation and health care
3.3	Will the project affect the welfare of people eg by changing living conditions?	No		
3.4	Are there especially vulnerable groups of people who could be affected by the project eg hospital patients, the elderly?	No		
3.5	Any other causes?	No		
4. Will the Project produce solid wastes during construction or operation or decommissioning?				
4.1	Spoil, overburden or mine wastes?	Yes	The spoil if not readily disposed at safe site, it will occupy the land and may create discomfort to the passer-by.	No, because it is short term and can also be avoided by provision of immediate disposal of the spoils at safe site
4.2	Municipal waste (household and or commercial wastes)?	Yes	The living environment of worker's camp may be polluted by the waste generated by the workers.	No, it is short term
4.3	Hazardous or toxic wastes (including radioactive wastes)?	No		
4.4	Other industrial process wastes?	No		
4.5	Surplus product?	No		
4.6	Sewage sludge or other sludge from effluent treatment?	No		
4.7	Construction or demolition wastes?	Yes	• Air Pollution by the dust generated from the wastes • Discomfort to the passer-by if the wastes are not safely disposed	No, because it is limited to the construction phase only and there will be provision of immediate waste disposal
4.8	Redundant machinery or equipment?	No		
4.9	Contaminated soils or other material?	No		
4.10	Agricultural wastes?	No		
4.11	Any other solid wastes?	No		

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
5. Will the Project release pollutants or any hazardous, toxic or noxious substances to air?				
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources?	Yes	Changes in Air Quality is expected due to use of diesel generators as well as use of vehicles.	Not significant because use of diesel generator and vehicles will comply the GoN standard.
5.2	Emissions from production processes?	No		
5.3	Emissions from materials handling including storage or transport?	Yes	Dust generation by the handling of materials like cement, aggregates etc.	No -there will be regular monitoring
5.4	Emissions from construction activities including plant and equipment?	Yes	Dust generation by construction works like earthworks	No -there will be regular monitoring
5.5	Dust or odours from handling of materials including construction materials, sewage and waste?	Yes	Air pollution by the dust generation during unloading of materials like aggregates.	No -there will be regular monitoring
5.6	Emissions from incineration of waste?	No		
5.7	Emissions from burning of waste in open air (*eg* slash material, construction debris)?	Yes	The locality of the worker's camp may be affected by the open burning of waste generated from the worker's camp.	No, because it is limited to the local area only and is limited to the duration up to which the labors will be residing.
5.8	Emissions from any other sources?	No		
6. Will the Project cause noise and vibration or release of light, heat energy or electromagnetic radiation?				
6.1	From operation of equipment eg engines, ventilation plant, crushers?	Yes	The surrounding area may be disturbed by the noise and vibration of the engines & concrete mixers.	Not significant because it is short term and the preventive measure will be adopted.
6.2	From industrial or similar processes?	No		
6.3	From construction or demolition?	Yes	The continuous demolition of RoW of road section for drain construction may generate noise.	No because it is short term (limited to construction phase). EMP provides mitigation measures.
6.4	From blasting or piling?	No		
6.5	From construction or operational traffic?	Yes	Use of transportation vehicles for carrying construction materials may affect core market (Katahariya Bazaar) areas and settlement areas.	Not significant - because it is short term.
6.6	From lighting or cooling systems?	No		

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
6.7	From sources of electromagnetic radiation (consider effects on nearby sensitive equipment as well as people)?	No		
6.8	From any other sources?	No		
7. Will the Project lead to risks of contamination of land or water from releases of pollutants onto the ground or into sewers, surface waters, groundwater, coastal waters or the sea?				
7.1	From handling, storage, use or spillage of hazardous or toxic materials?	No		
7.2	From discharge of sewage or other effluents (whether treated or untreated) to water or the land?	No		
7.3	By deposition of pollutants emitted to air, onto the land or into water?	Yes	The water bodies or land nearby the workers camp may be polluted by the daily activities of the workers residing there temporarily.	Not significant because there is provision of strict monitoring of this area.
7.4	From any other sources?	No		
7.5	Is there a risk of long term build up of pollutants in the environment from these sources?	No		
8. Will there be any risk of accidents during construction or operation of the Project which could affect human health or the environment?				
8.1	From explosions, spillages, fires etc from storage, handling, use or production of hazardous or toxic substances?	No		
8.2	From events beyond the limits of normal environmental protection eg failure of pollution control systems?	No		
8.3	From any other causes?	No		
8.4	Could the project be affected by natural disasters causing environmental damage (*eg* floods, earthquakes, landslip, *etc*)?	No		
9. Will the Project result in social changes, for example, in demography, traditional lifestyles, employment?				
9.1	Changes in population size, age, structure, social groups *etc*?	Yes	There will be rural to urban migration that will affect the existing community, cultural identity, economic conditions etc.	Yes, the entry of new community may disturb the existing community groups.
9.2	By resettlement of people or demolition of homes or communities or community facilities eg schools,	No		

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
	hospitals, social facilities?			
9.3	Through in-migration of new residents or creation of new communities?	Yes	Easy & Safe access to water supply and sanitation will attract people from the neighboring remote areas to achieve improved living standards.	Yes, the entry of new community may hurt the sentiments of the existing community.
9.4	By placing increased demands on local facilities or services eg housing, education, health?	No		
9.5	By creating jobs during construction or operation or causing the loss of jobs with effects on unemployment and the economy?	Yes	Requirement of labor for the construction works prioritize the local people hence, providing employment opportunities to the local people.	Yes, because the skills they learnt during their employment period can be utilized in the future in other similar kind of works.
9.6	Any other causes?	No		
Question - Are there any other factors which should be considered such as consequential development which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality?				
9.1	Will the project lead to pressure for consequential development which could have significant impact on the environment eg more housing, new roads, new supporting industries or utilities, etc?	No		
9.2	Will the project lead to development of supporting facilities, ancillary development or development stimulated by the project which could have impact on the environment eg: • supporting infrastructure (roads, power supply, waste or waste water treatment, etc) • housing development • extractive industries • supply industries other?	No		
9.3	Will the project lead to after-use of the site which could have an impact on the environment?	No		
9.4	Will the project set a precedent for later developments?	Yes	The safe access to sanitation activities through the provision of efficient drainage system by this project may create	Yes, because it will be the important factor for the sustainable development of the

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
			opportunities for other development infrastructures.	emerging town like Katahariya
9.5	Will the project have cumulative effects due to proximity to other existing or planned projects with similar effects?	No		

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

Question - Are there features of the local environment on or around the Project location which could be affected by the Project? • Areas which are protected under international or national or local legislation for their ecological, landscape, cultural or other value, which could be affected by the project? • Other areas which are important or sensitive for reasons of their ecology e.g. • Wetlands, • Watercourses or other waterbodies, • the coastal zone, • mountains, • forests or woodlands • Areas used by protected, important or sensitive species of fauna or flora e.g. for breeding, nesting, foraging, resting, overwintering, migration, which could be affected by the project? • Inland, coastal, marine or underground waters? • Areas or features of high landscape or scenic value? • Routes or facilities used by the public for access to recreation or other facilities? • Transport routes which are susceptible to congestion or which cause environmental problems? • Areas or features of historic or cultural importance?	Yes, the core Katahariya bazaar area may be susceptible to traffic congestion during drainage construction works that may provide discomfort to the passer-by as well as other environmental problems too.
Question - Is the Project in a location where it is likely to be highly visible to many people?	Yes. The project components like drainage lines run along the bazaar area, former VDC office area and busy road areas.
Question - Is the Project located in a previously undeveloped area where there will be loss of greenfield land?	No
Question - Are there existing land uses on or around the Project location which could be affected by the Project? For example: • Homes, gardens, other private property, • Industry, • Commerce,	No

• Recreation, • public open space, • community facilities, • agriculture, • forestry, • tourism, • mining or quarrying	
Question - Are there any plans for future land uses on or around the location which could be affected by the Project?	No
Question - Are there any areas on or around the location which are densely populated or built-up, which could be affected by the Project?	No
Question - Are there any areas on or around the location which are occupied by sensitive land uses which could be affected by the Project? • hospitals, • schools, • places of worship, • community facilities	No
Question - Are there any areas on or around the location which contain important, high quality or scarce resources which could be affected by the Project? For example: • groundwater resources, • surface waters, • forestry, • agriculture, • fisheries, • tourism, • minerals.	No
Question - Are there any areas on or around the location of the Project which are already subject to pollution or environmental damage e.g. where existing legal environmental standards are exceeded, which could be affected by the project?	No
Question - Is the Project location susceptible to earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions e.g. temperature inversions, fogs, severe winds, which could cause the project to present environmental problems?	No
Question - Is the Project likely to affect the physical condition of any environmental media? • The atmospheric environment including microclimate and local and larger scale climatic conditions? • Water - eg quantities, flows or levels of rivers, lakes, groundwater. Estuaries, coastal waters or the sea? • Soils - eg quantities, depths, humidity, stability or erdodibility of soils? • Geological and ground conditions?	Yes, but the effects are insignificant and EMP provides mitigation measures.
Question - Are releases from the Project likely	Yes, the construction activities may affect local air

to have effects on the quality of any environmental media? • Local air quality? • Global air quality including climate change and ozone depletion • Water quality – rivers, lakes, groundwater. Estuaries, coastal waters or the sea? • Nutrient status and eutrophication of waters? • Acidification of soils or waters? • Soils • Noise? • Temperature, light or electromagnetic radiation including electrical interference? • Productivity of natural or agricultural systems?	quality through dust emissions. It also generates noise through the use of vehicles for transporting materials and demolition works.
Question - Is the Project likely to affect the availability or scarcity of any resources either locally or globally? • Fossil fuels? • Water? • Minerals and aggregates? • Timber? • Other non-renewable resources? • Infrastructure capacity in the locality - water, sewerage, power generation and transmission, telecommunications, waste disposal roads, rail?	No
Question - Is the Project likely to affect human or community health or welfare? • The quality or toxicity of air, water, foodstuffs and other products consumed by humans? • Morbidity or mortality of individuals, communities or populations by exposure to pollution? • Occurrence or distribution of disease vectors including insects? • Vulnerability of individuals, communities or populations to disease? • Individuals' sense of personal security? • Community cohesion and identity? • Cultural identity and associations? • Minority rights? • Housing conditions? • Employment and quality of employment? • Economic conditions? • Social institutions?	• Yes, this project may offer employment to the local people to involve as a construction worker. • This project also may result in the occurrence or distribution of disease vector due to the temporary settlement of workers as they may not have access to safe water supply and sanitation. However, this is not significant as EMP provides mitigation measures.

Checklist 3: Significance of Impacts

Questions to be Considered	
1. Will there be a large change in environmental conditions?	No
2. Will new features be out-of-scale with the existing environment?	No
3. Will the effect be unusual in the area or particularly complex?	No
4. Will the effect extend over a large area?	No
5. Will there be any potential for trans boundary impact?	No

6. Will many people be affected?	No
7. Will many receptors of other types (fauna and flora, businesses, facilities) be affected?	No
8. Will valuable or scarce features or resources be affected?	No
9. Is there a risk that environmental standards will be breached?	No
10. Is there a risk that protected sites, areas, features will be affected?	No
11. Is there a high probability of the effect occurring?	No
12. Will the effect continue for a long time?	No
13. Will the effect be permanent rather than temporary?	No
14. Will the impact be continuous rather than intermittent?	No
15. If it is intermittent will it be frequent rather than rare?	No
16. Will the impact be irreversible?	No
17. Will it be difficult to avoid, or reduce or repair or compensate for the effect?	No

Appendix 2: Environmental Standards, Sample Forms & Report Template

Appendix 2A
Relevant Environmental Quality Standards

National Ambient Air Quality Standards for Nepal, 2003

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

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

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

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

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

National Noise Standard Guidelines, 2012

Receptor / Source	National Noise Standard Guidelines, 2012 (dB)		WHO Guideline Values for Noise Levels Measured Out of Doors * (One Hour L_{Aeq} in dBA)	
	Day	Night	07:00 - 22:00	22:00 - 07:00
Industrial area	75	70	70	70
Commercial area	65	55		
Rural residential area	45	40	55	45
Urban residential area	55	50		
Mixed residential area	63	55		
Quiet area	50	40	-	-
Water pump	65		-	
Diesel generator	90		-	

* Guidelines for Community Noise, WHO, 1999.

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

Tolerance limits for wastewater to be discharged into inland surface waters from combined wastewater treatment plant (generic standards)

Characteristics	Tolerance Limit
Total Suspended solids, mg/L, Max	50
Particle size of total suspended particles	Shall pass 850-micron Sieve.
pH	5.5 to 9.0
Temperature	Shall not exceed 40 degree C in any section of the stream within 15 meters down-stream from the effluent outlet.
Biochemical oxygen demand (BOD) for 5 days at 20 degree C, mg/L, Max	50
Oils and grease, mg/L, Max	10
Phenolic compounds, mg/L, Max	1
Cyanides (as CN), mg/L, Max	0.2
Sulphides (as S), mg/L, Max	2
Radioactive materials:	
a. Alpha emitters, c/ml, Max	7-Oct
b. Beta emitters, c/ml, Max	8-Oct
Insecticides	Absent
Total residual chlorine, mg/L	1
Fluorides (as F), mg/L, Max	2
Arsenic (as As), mg/L, Max	0.2
Cadmium (as, Cd), mg/L, Max	2
Hexavalent chromium (as Cr), mg/L, Max	0.1
Copper (as Cu), mg/L, Max	3
Lead (as Pb), mg/L, Max	0.1
Mercury (as Hg), mg/L, Max	0.01
Nickel (as Ni), mg/L, Max	3
Selenium (as Se), mg/L, Max	0.05
Zinc (as Zn), mg/L, Max	5
Ammonical nitrogen, mg/L, Max	50
Chemical Oxygen Demand, mg/L, Max	250
Silver, mg/L, Max	0.1

Appendix 2B
Sample Grievance Redress Form

Sample Grievance Redress Form

(To be available in Nepalese and English)

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

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

FOR OFFICIAL USE ONLY

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

Appendix 2C
SAMPLE TRAFFIC MANAGEMENT PLAN

A. Principles

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

(i) the safety of pedestrians, bicyclists, and motorists travelling through the construction zone;
(ii) protection of work crews from hazards associated with moving traffic;
(iii) mitigation of the adverse impact on road capacity and delays to the road users;
(iv) maintenance of access to adjoining properties
(v) Avoid hazards in
(vi) Addressing issues that may delay the project.

B. Operating Policies for TMP

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

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

C. Analyze the impact due to street closure

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

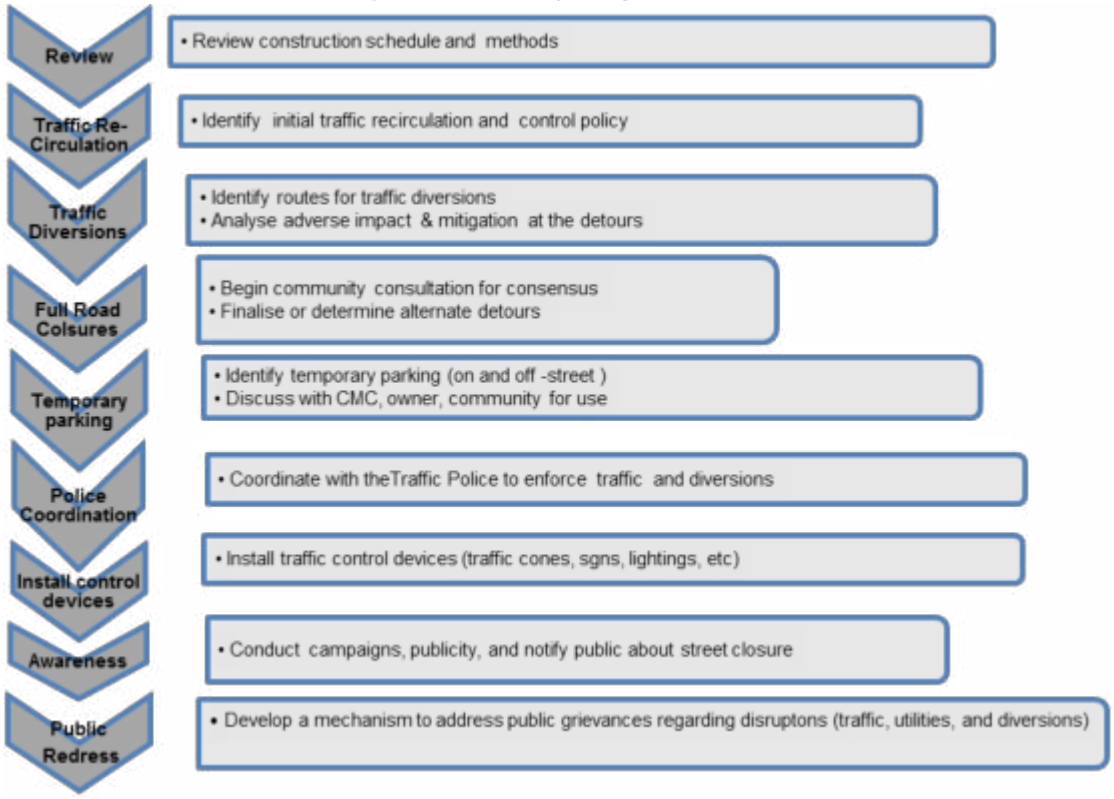
(i) approval from the ICG, local administration to use the local streets as detours;
(ii) consultation with businesses, community members, traffic police, PWD, etc., regarding the mitigation measures necessary at the detours where the road is diverted during the construction;
(iii) determining of the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

(vi) contacting emergency service, school officials, and transit authorities to determine if there are impacts to their operations; and

(vii) developing a notification program to the public so that the closure is not a surprise. As part of this program, the public should be advised of alternate routes that commuters can take or will have to take as result of the traffic diversion.

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

Figure A1: Policy Steps for the TMP



D. Public awareness and notifications

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

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

project will notify the public about the roadblocks and traffic diversion through public notices, ward level meetings and city level meeting with the elected representatives.

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

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

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

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

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

E. Vehicle Maintenance and Safety

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

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

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

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

- Signs
- Pavement Markings

- Channelizing Devices
- Arrow Panels
- Warning Lights

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

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

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

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

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

Appendix 2D
Spoil Management Plan

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

Objectives of SMP: The objectives of SMP are:

- **A** To minimize spoil generation where possible
- **B** Maximize beneficial reuse of spoil from construction works in accordance with spoil management hierarchy
- **C** Mange onsite spoil handling to minimize environmental impacts on resident and other receivers
- **D** Minimize any further site contamination of land, water, soil
- **E** Manage the transportation of spoil with consideration of traffic impacts and transport related emissions

Structure of SMP:

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

Aspects and potential impacts

The key aspects of potential impacts in relation to SMP are listed in table below

Aspects	Potential Impacts
Air Quality	Potential for high winds generating airborne dust from the stock piles
Sedimentation	Potential for sediment laden site runoff from spoil stockpiles and potential for spillage of spoil from truck on roads
Surface and groundwater	Contamination of surface and ground water
Noise	Associated with spoil handling and haulage and storage
Traffic	Impacts associated with spoil haulage
Land Use	Potential for spoil to be transported to a receivable site that doesn't have permission for storage/disposal
Design specifications	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, mud mix materials, reusable materials

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

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

Identification of possible safe disposal sites for spoil: Those spoils, which can't be reuse, shall be properly disposed in designated areas, such disposal areas should be identified in project locations. Such disposal areas should be safe from environmental aspects, there should not be any legal, and resettlement related issues. Such areas need to be identified and prior cliental approval should be obtained to use it as spoil disposal area. The local administration must be consulted and if required permission should be obtained from them.

Storage and Stockpiling Transportation and Haulage route

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

SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

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

Appendixes

F Photos

G Summary of consultations

H Copies of environmental clearances and permits

I Sample of environmental site inspection Report

J Others

Appendix 2E
Environmental Safeguards Compliance Monitoring Report Template

{Environmental and/or Social} Monitoring Report

{Annual/Semestral/Quarterly} Report
{Month Year}

{Short Country Name}: {Project Title-Subproject}

Prepared by {complete and accurate name of implementing agency or external monitoring agency} for the {complete name of the borrower} and the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of {Day Month Year})

{The date of the currency equivalents must be within 2 months from the date on the cover.}

Currency unit	–	{currency name in lowercase (Symbol)}
{Symbol}1.00	=	${ }
$1.00	=	{Symbol_____}

ABBREVIATIONS

{AAA}	–	{spell out (capitalize only proper names)}
{BBB}	–	{spell out}
{CCC}	–	{spell out}

{WEIGHTS AND MEASURES}

{symbol 1 (full name 1)}	–	{Definition 1}
{symbol 2 (full name 2)}	–	{Definition 2}
{symbol 3 (full name 3)}	–	{Definition 3}

{GLOSSARY}

{Term 1}	–	{Definition 1}
{Term 2}	–	{Definition 2}
{Term 3}	–	{Definition 3}

NOTE{S}

(i) The fiscal year (FY) of the Government of {name of borrower} {and its agencies} ends on {day month}. FY before a calendar year denotes the year in which the fiscal year ends, e.g., FY2011 ends on {day month} 2011. {Note: If FYs are not referred to within the text, delete the entire note and change NOTES to NOTE.}

(ii) In this report, "$" refers to US dollars. {Note: If a second $ currency is referred to in the text, e.g., NZ$ or S$, add: unless otherwise stated. In the text, use “$” for US dollars and the appropriate modifier, e.g., NZ$ or S$, for other currencies that use the “$” symbol.}

This {environmental and/or social} monitoring report is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

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

{Read and delete:

(i) **Guidelines:** Following requirements of the ADB Safeguard Policy Statement (2009) and the *Operations Manual* section on safeguard policy (OM F1), borrowers/clients are required to establish and maintain procedures to monitor the status of implementation of safeguard plans and ensure progress is made toward the desired outcomes. Borrowers/clients are required to submit the following monitoring reports for ADB review:

Project Category	**Frequency of Reports**
Environment category A	• Semi-annual monitoring reports during project construction • Annual monitoring reports during project operation
Environment category B	• Periodic monitoring reports as deemed appropriate
Involuntary resettlement category A and B	• Semiannual monitoring reports
Indigenous peoples category A and B	• Semiannual monitoring reports
Highly complex and sensitive deemed by ADB	• Quarterly monitoring reports

The level of detail and comprehensiveness of a monitoring report is commensurate with the complexity and significance of social and environmental impacts. A safeguard monitoring report may include the following elements:

(a) Background/context of the monitoring report (adequate information on the project, including physical progress of project activities, scope of monitoring report, reporting period, and the monitoring requirements including frequency of submission as agreed upon);
(b) Changes in project scope and adjusted safeguard measures, if applicable;
(c) Qualitative and quantitative monitoring data;
(d) Monitoring parameters/indicators and methods based on the monitoring plan/program previously agreed upon with ADB;
(e) Monitoring results compared against previously established benchmarks and compliance status (e.g., national environmental emission and ambient standards and/or standards set out in the WB's EHS guidelines; timeliness and adequacy of environmental mitigation measures; IR compensation rates and timeliness of payments, adequacy and timeliness of IR rehabilitation measures including serviced housing sites, house reconstruction, livelihood support measures, and training; budget for implementing EMP, RP, or IPP, timeliness and adequacy of capacity building, etc.);
(f) Monitoring results compared against the objectives of safeguards or desired outcomes documented (e.g. IR impacts avoided or minimized; livelihood restored or enhanced; IP's identity, human right, livelihood systems and cultural uniqueness fully respected; IP not suffer adverse impacts, environmental impacts avoided or minimized, etc.);
(g) If noncompliance or any major gaps identified, include a corrective action plan;
(h) Records on disclosure of monitoring information to affected communities;
(i) Identification of key issues, or complaints from affected people, or recommendations for improvement;
(j) Monitoring adjustment measures recommended based on monitoring experience/trends and stakeholder's response;
(k) Information about actual institutional arrangement for implementing the monitoring program/plan provided or adjusted, as may be required;
(l) Proposed items of focus for the next report and due date.

(ii) **Page limit:** Not applicable.
(iii) **OSEC editing:** Not required.}

Appendix 2F
Sample Environmental Site Inspection Report

Project Name
Contract Number

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

WEATHER CONDITION: _____

INITIAL SITE CONDITION:_____

CONCLUDING SITE CONDITION:

Satisfactory_____Unsatisfactory_____ Incident_____ Resolved _____ Unresolved _____

INCIDENT:
Nature of incident:
_____
Intervention Steps:
_____
Incident Issues

Resolution

Project Activity Stage	Survey	
	Design	
	Implementation	
	Pre-Commissioning	
	Guarantee Period	

Inspection

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

Site Restored to Original Condition Yes [ ] No [ ]

Signature
_____

Sign off

_____ _____
Name **Name**
Position **Position**

Appendix 3
Proximity Report on Katahariya Town
Generated by IBAT

ibat | FOR BUSINESS
Integrated Biodiversity Assessment Tool

Proximity report generated by the Integrated Biodiversity Assessment Tool

Site name	Kathariya SWD Nepal
Latitude/Longitude	26° 58' 2" North, 85° 13' 30" East
Date generated	20th June 2018
Generated by	asiandb
Company	ADB

About this report

This report presents the results of a proximity analysis to identify the biodiversity features and species which are located within 1 km, 5 km and 10 km.

Data used to generate this report

IUCN and UNEP-WCMC, 2017. *The World Database on Protected Areas (WDPA) [On-line], March 2018.*

BirdLife International (on behalf of the KBA Partnership), 2016. *Key Biodiversity Areas: December 2016 version.*

IUCN, 2017. *The IUCN Red List of Threatened Species grid analysis of range maps. Version 2017-3 (December).*

Limitations

This report provides an indication of the potential biodiversity-related features - protected areas, key biodiversity areas and species - close to the specified location. It provides an early indication of potential biodiversity concerns, and can provide valuable guidance in making decisions. For example, this information can be helpful when assessing the potential environmental risk and impact of a site, categorising investments/projects, preparing the terms of reference for an impact assessment, focusing attention on key species of conservation concern and sites of known conservation value, and reviewing the results of an impact assessment.

The report does not provide details of potential indirect, downstream or cumulative impacts. Furthermore, the report should be regarded as a " first-step", providing a set of conservation values sourced from global data sets, and is not a substitute for further investigation and due diligence, especially concerning national and/or local conservation priorities.

For ultimate accuracy, distance calculations are performed by reprojecting the spatial data (as shown through the map viewer) to an equal distance projection, and so may not match precisely the results shown on the map.

Protected Areas and Key Biodiversity Areas

The following sites are found within the selected buffer distances:

Features within 1 km

There are no features within 1 km.

Features within 5 km

There are no features within 5 km.

Features within 10 km

There are no features within 10 km.

IUCN RED LIST OF THREATENED SPECIES

Given suitable habitat, the following species are potentially found close to the area of interest:

Taxonomic group	Scientific Name	Common Name	IUCN Red List category
Amphibians	*Amolops formosus*		LC
Amphibians	*Amolops marmoratus*		LC
Amphibians	*Duttaphrynus himalayanus*	Himalayan Toad	LC
Amphibians	*Duttaphrynus melanostictus*	Black-spectacled Toad	LC
Amphibians	*Duttaphrynus stomaticus*		LC
Amphibians	*Euphlyctis cyanophlyctis*		LC
Amphibians	*Fejervarya limnocharis*	Asian Grass Frog	LC
Amphibians	*Fejervarya nepalensis*	Nepal Wart Frog	LC
Amphibians	*Fejervarya pierrei*	Pierre's Wart Frog	LC
Amphibians	*Fejervarya syhadrensis*	Bombay Wart Frog	LC
Amphibians	*Fejervarya teraiensis*	Terai Wart Frog	LC
Amphibians	*Hoplobatrachus crassus*	Jerdon's Bullfrog	LC
Amphibians	*Hoplobatrachus tigerinus*	Indian Bullfrog	LC
Amphibians	*Humerana humeralis*		LC
Amphibians	*Hylarana chitwanensis*		NT
Amphibians	*Hylarana tytleri*		LC
Amphibians	*Megophrys parva*	Concave-crowned Horned Toad	LC
Amphibians	*Microhyla ornata*	Ant Frog	LC
Amphibians	*Nanorana blanfordii*		LC
Amphibians	*Nanorana polunini*		LC
Amphibians	*Ombrana sikimensis*		LC
Amphibians	*Polypedates maculatus*	Himalayan Tree Frog	LC
Amphibians	*Polypedates taeniatus*		LC
Amphibians	*Polypedates zed*		DD
Amphibians	*Rhacophorus maximus*		LC
Amphibians	*Scutiger sikimmensis*		LC
Amphibians	*Sphaerotheca breviceps*		LC
Amphibians	*Sphaerotheca maskeyi*		LC
Amphibians	*Theloderma asperum*	Hill Garden Bug-eyed Frog	LC
Amphibians	*Uperodon systoma*	Marbled Balloon Frog	LC
Birds	*Abroscopus albogularis*	Rufous-faced Warbler	LC
Birds	*Abroscopus schisticeps*	Black-faced Warbler	LC
Birds	*Accipiter badius*	Shikra	LC
Birds	*Accipiter gentilis*	Northern Goshawk	LC
Birds	*Accipiter nisus*	Eurasian Sparrowhawk	LC
Birds	*Accipiter trivirgatus*	Crested Goshawk	LC
Birds	*Accipiter virgatus*	Besra	LC

Birds	*Acridotheres fuscus*	Jungle Myna	LC
Birds	*Acridotheres ginginianus*	Bank Myna	LC
Birds	*Acridotheres tristis*	Common Myna	LC
Birds	*Acrocephalus agricola*	Paddyfield Warbler	LC
Birds	*Acrocephalus dumetorum*	Blyth's Reed-warbler	LC
Birds	*Acrocephalus stentoreus*	Clamorous Reed-warbler	LC
Birds	*Actinodura egertoni*	Rusty-fronted Barwing	LC
Birds	*Aegithalos iredalei*	Red-headed Tit	LC
Birds	*Aegithina tiphia*	Common Iora	LC
Birds	*Aegypius monachus*	Cinereous Vulture	NT
Birds	*Aerodramus brevirostris*	Himalayan Swiftlet	LC
Birds	*Aethopyga ignicauda*	Fire-tailed Sunbird	LC
Birds	*Aethopyga nipalensis*	Green-tailed Sunbird	LC
Birds	*Aethopyga saturata*	Black-throated Sunbird	LC
Birds	*Aethopyga siparaja*	Crimson Sunbird	LC
Birds	*Alauda gulgula*	Oriental Skylark	LC
Birds	*Alaudala raytal*	Sand Lark	LC
Birds	*Alcedo atthis*	Common Kingfisher	LC
Birds	*Alcedo meninting*	Blue-eared Kingfisher	LC
Birds	*Alcippe nipalensis*	Nepal Fulvetta	LC
Birds	*Alectoris chukar*	Chukar	LC
Birds	*Amandava amandava*	Red Avadavat	LC
Birds	*Amaurornis phoenicurus*	White-breasted Waterhen	LC
Birds	*Anas acuta*	Northern Pintail	LC
Birds	*Anas crecca*	Common Teal	LC
Birds	*Anas platyrhynchos*	Mallard	LC
Birds	*Anas poecilorhyncha*	Indian Spot-billed Duck	LC
Birds	*Anastomus oscitans*	Asian Openbill	LC
Birds	*Anhinga melanogaster*	Oriental Darter	NT
Birds	*Anser anser*	Greylag Goose	LC
Birds	*Anthipes monileger*	White-gorgeted Flycatcher	LC
Birds	*Anthracoceros albirostris*	Oriental Pied Hornbill	LC
Birds	*Anthropoides virgo*	Demoiselle Crane	LC
Birds	*Anthus godlewskii*	Blyth's Pipit	LC
Birds	*Anthus hodgsoni*	Olive-backed Pipit	LC
Birds	*Anthus richardi*	Richard's Pipit	LC
Birds	*Anthus roseatus*	Rosy Pipit	LC
Birds	*Anthus rubescens*	Buff-bellied Pipit	LC
Birds	*Anthus rufulus*	Paddyfield Pipit	LC
Birds	*Anthus similis*	Long-billed Pipit	LC

Birds	*Anthus sylvanus*	Upland Pipit	LC
Birds	*Antigone antigone*	Sarus Crane	VU
Birds	*Apus nipalensis*	House Swift	LC
Birds	*Apus pacificus*	Pacific Swift	LC
Birds	*Aquila chrysaetos*	Golden Eagle	LC
Birds	*Aquila fasciata*	Bonelli's Eagle	LC
Birds	*Aquila heliaca*	Eastern Imperial Eagle	VU
Birds	*Aquila nipalensis*	Steppe Eagle	EN
Birds	*Aquila rapax*	Tawny Eagle	LC
Birds	*Arachnothera magna*	Streaked Spiderhunter	LC
Birds	*Arborophila rufogularis*	Rufous-throated Partridge	LC
Birds	*Arborophila torqueola*	Hill Partridge	LC
Birds	*Ardea alba*	Great White Egret	LC
Birds	*Ardea cinerea*	Grey Heron	LC
Birds	*Ardea intermedia*	Intermediate Egret	LC
Birds	*Ardea purpurea*	Purple Heron	LC
Birds	*Ardeola grayii*	Indian Pond-heron	LC
Birds	*Artamus fuscus*	Ashy Woodswallow	LC
Birds	*Arundinax aedon*	Thick-billed Warbler	LC
Birds	*Asio flammeus*	Short-eared Owl	LC
Birds	*Asio otus*	Northern Long-eared Owl	LC
Birds	*Athene brama*	Spotted Owlet	LC
Birds	*Athene noctua*	Little Owl	LC
Birds	*Aviceda leuphotes*	Black Baza	LC
Birds	*Aythya baeri*	Baer's Pochard	CR
Birds	*Aythya ferina*	Common Pochard	VU
Birds	*Aythya fuligula*	Tufted Duck	LC
Birds	*Aythya nyroca*	Ferruginous Duck	NT
Birds	*Botaurus stellaris*	Eurasian Bittern	LC
Birds	*Brachypteryx cruralis*	Himalayan Shortwing	LC
Birds	*Brachypteryx montana*	Javan Shortwing	LC
Birds	*Bubo bengalensis*	Rock Eagle-owl	LC
Birds	*Bubo coromandus*	Dusky Eagle-owl	LC
Birds	*Bubo nipalensis*	Spot-bellied Eagle-owl	LC
Birds	*Bubulcus ibis*	Cattle Egret	LC
Birds	*Buceros bicornis*	Great Hornbill	NT
Birds	*Burhinus indicus*	Indian Thick-knee	LC
Birds	*Butastur teesa*	White-eyed Buzzard	LC
Birds	*Buteo hemilasius*	Upland Buzzard	LC
Birds	*Buteo japonicus*	Japanese Buzzard	LC

Birds	*Buteo refectus*	Himalayan Buzzard	LC
Birds	*Buteo rufinus*	Long-legged Buzzard	LC
Birds	*Butorides striata*	Green-backed Heron	LC
Birds	*Cacomantis passerinus*	Grey-bellied Cuckoo	LC
Birds	*Cacomantis sonneratii*	Banded Bay Cuckoo	LC
Birds	*Calandrella acutirostris*	Hume's Lark	LC
Birds	*Callacanthis burtoni*	Spectacled Finch	LC
Birds	*Calliope calliope*	Siberian Rubythroat	LC
Birds	*Caprimulgus affinis*	Savanna Nightjar	LC
Birds	*Caprimulgus asiaticus*	Indian Nightjar	LC
Birds	*Caprimulgus jotaka*	Grey Nightjar	LC
Birds	*Caprimulgus macrurus*	Large-tailed Nightjar	LC
Birds	*Carduelis caniceps*	Eastern Goldfinch	LC
Birds	*Carpodacus erythrinus*	Common Rosefinch	LC
Birds	*Carpodacus rodopeplus*	Spot-winged Rosefinch	LC
Birds	*Carpodacus sipahi*	Scarlet Finch	LC
Birds	*Carpodacus subhimachalus*	Crimson-browed Finch	LC
Birds	*Carpodacus vinaceus*	Vinaceous Rosefinch	LC
Birds	*Cecropis daurica*	Red-rumped Swallow	LC
Birds	*Centropus bengalensis*	Lesser Coucal	LC
Birds	*Centropus sinensis*	Greater Coucal	LC
Birds	*Cephalopyrus flammiceps*	Fire-capped Tit	LC
Birds	*Certhia discolor*	Sikkim Treecreeper	LC
Birds	*Ceryle rudis*	Pied Kingfisher	LC
Birds	*Cettia brunnifrons*	Grey-sided Bush-warbler	LC
Birds	*Cettia castaneocoronata*	Chestnut-headed Tesia	LC
Birds	*Cettia major*	Chestnut-crowned Bush-warbler	LC
Birds	*Chaetornis striata*	Bristled Grassbird	VU
Birds	*Chalcophaps indica*	Grey-capped Emerald Dove	LC
Birds	*Charadrius alexandrinus*	Kentish Plover	LC
Birds	*Charadrius dubius*	Little Ringed Plover	LC
Birds	*Charadrius placidus*	Long-billed Plover	LC
Birds	*Chelidorhynx hypoxanthus*	Yellow-bellied Fairy-fantail	LC
Birds	*Chloris spinoides*	Yellow-breasted Greenfinch	LC
Birds	*Chloropsis aurifrons*	Golden-fronted Leafbird	LC
Birds	*Chloropsis hardwickii*	Orange-bellied Leafbird	LC
Birds	*Chrysococcyx maculatus*	Asian Emerald Cuckoo	LC
Birds	*Chrysocolaptes guttacristatus*	Greater Flameback	LC
Birds	*Chrysomma altirostre*	Jerdon's Babbler	VU
Birds	*Chrysomma sinense*	Yellow-eyed Babbler	LC

Birds	*Chrysophlegma flavinucha*	Greater Yellownape	LC
Birds	*Ciconia ciconia*	White Stork	LC
Birds	*Ciconia episcopus*	Asian Woollyneck	VU
Birds	*Ciconia nigra*	Black Stork	LC
Birds	*Cinclus cinclus*	White-throated Dipper	LC
Birds	*Cinclus pallasii*	Brown Dipper	LC
Birds	*Cinnyris asiaticus*	Purple Sunbird	LC
Birds	*Circus aeruginosus*	Western Marsh-harrier	LC
Birds	*Circus cyaneus*	Hen Harrier	LC
Birds	*Circus melanoleucos*	Pied Harrier	LC
Birds	*Circus pygargus*	Montagu's Harrier	LC
Birds	*Cissa chinensis*	Common Green Magpie	LC
Birds	*Cisticola exilis*	Golden-headed Cisticola	LC
Birds	*Cisticola juncidis*	Zitting Cisticola	LC
Birds	*Clamator coromandus*	Chestnut-winged Cuckoo	LC
Birds	*Clamator jacobinus*	Jacobin Cuckoo	LC
Birds	*Clanga hastata*	Indian Spotted Eagle	VU
Birds	*Cochoa purpurea*	Purple Cochoa	LC
Birds	*Columba hodgsonii*	Speckled Woodpigeon	LC
Birds	*Columba livia*	Rock Dove	LC
Birds	*Columba palumbus*	Common Woodpigeon	LC
Birds	*Columba pulchricollis*	Ashy Woodpigeon	LC
Birds	*Copsychus saularis*	Oriental Magpie-robin	LC
Birds	*Coracias affinis*	Indochinese Roller	LC
Birds	*Coracias benghalensis*	Indian Roller	LC
Birds	*Coracina macei*	Indian Cuckooshrike	LC
Birds	*Corvus macrorhynchos*	Large-billed Crow	LC
Birds	*Corvus splendens*	House Crow	LC
Birds	*Coturnix coromandelica*	Rain Quail	LC
Birds	*Coturnix coturnix*	Common Quail	LC
Birds	*Cuculus canorus*	Common Cuckoo	LC
Birds	*Cuculus micropterus*	Indian Cuckoo	LC
Birds	*Cuculus poliocephalus*	Lesser Cuckoo	LC
Birds	*Cuculus saturatus*	Oriental Cuckoo	LC
Birds	*Culicicapa ceylonensis*	Grey-headed Canary-flycatcher	LC
Birds	*Cutia nipalensis*	Himalayan Cutia	LC
Birds	*Cyanecula svecica*	Bluethroat	LC
Birds	*Cyanoderma pyrrhops*	Black-chinned Babbler	LC
Birds	*Cyornis poliogenys*	Pale-chinned Flycatcher	LC
Birds	*Cyornis rubeculoides*	Blue-throated Blue-flycatcher	LC

Birds	*Cyornis tickelliae*	Tickell's Blue-flycatcher	LC
Birds	*Cyornis unicolor*	Pale Blue-flycatcher	LC
Birds	*Cypsiurus balasiensis*	Asian Palm-swift	LC
Birds	*Delichon dasypus*	Asian House Martin	LC
Birds	*Delichon nipalense*	Nepal House Martin	LC
Birds	*Dendrocitta formosae*	Grey Treepie	LC
Birds	*Dendrocitta vagabunda*	Rufous Treepie	LC
Birds	*Dendrocopos hyperythrus*	Rufous-bellied Woodpecker	LC
Birds	*Dendrocopos macei*	Fulvous-breasted Woodpecker	LC
Birds	*Dicaeum agile*	Thick-billed Flowerpecker	LC
Birds	*Dicaeum chrysorrheum*	Yellow-vented Flowerpecker	LC
Birds	*Dicaeum erythrorhynchos*	Pale-billed Flowerpecker	LC
Birds	*Dicaeum ignipectus*	Fire-breasted Flowerpecker	LC
Birds	*Dicaeum melanozanthum*	Yellow-bellied Flowerpecker	LC
Birds	*Dicaeum minullum*	Plain Flowerpecker	LC
Birds	*Dicrurus aeneus*	Bronzed Drongo	LC
Birds	*Dicrurus annectens*	Crow-billed Drongo	LC
Birds	*Dicrurus caerulescens*	White-bellied Drongo	LC
Birds	*Dicrurus hottentottus*	Hair-crested Drongo	LC
Birds	*Dicrurus leucophaeus*	Ashy Drongo	LC
Birds	*Dicrurus macrocercus*	Black Drongo	LC
Birds	*Dicrurus paradiseus*	Greater Racquet-tailed Drongo	LC
Birds	*Dicrurus remifer*	Lesser Racquet-tailed Drongo	LC
Birds	*Dinopium benghalense*	Black-rumped Flameback	LC
Birds	*Dinopium shorii*	Himalayan Flameback	LC
Birds	*Ducula badia*	Mountain Imperial-pigeon	LC
Birds	*Dumetia hyperythra*	Tawny-bellied Babbler	LC
Birds	*Egretta garzetta*	Little Egret	LC
Birds	*Elanus caeruleus*	Black-winged Kite	LC
Birds	*Emberiza aureola*	Yellow-breasted Bunting	CR
Birds	*Emberiza fucata*	Chestnut-eared Bunting	LC
Birds	*Emberiza lathami*	Crested Bunting	LC
Birds	*Enicurus immaculatus*	Black-backed Forktail	LC
Birds	*Enicurus maculatus*	Spotted Forktail	LC
Birds	*Enicurus schistaceus*	Slaty-backed Forktail	LC
Birds	*Enicurus scouleri*	Little Forktail	LC
Birds	*Ephippiorhynchus asiaticus*	Black-necked Stork	NT
Birds	*Eremopterix griseus*	Ashy-crowned Sparrow-lark	LC
Birds	*Erpornis zantholeuca*	White-bellied Erpornis	LC
Birds	*Erythrogenys erythrogenys*	Rusty-cheeked Scimitar-babbler	LC

Birds	*Esacus recurvirostris*	Great Thick-knee	NT
Birds	*Eudynamys scolopaceus*	Western Koel	LC
Birds	*Eumyias thalassinus*	Verditer Flycatcher	LC
Birds	*Euodice malabarica*	Indian Silverbill	LC
Birds	*Eurystomus orientalis*	Oriental Dollarbird	LC
Birds	*Falco amurensis*	Amur Falcon	LC
Birds	*Falco cherrug*	Saker Falcon	EN
Birds	*Falco chicquera*	Red-headed Falcon	NT
Birds	*Falco jugger*	Laggar Falcon	NT
Birds	*Falco naumanni*	Lesser Kestrel	LC
Birds	*Falco peregrinus*	Peregrine Falcon	LC
Birds	*Falco severus*	Oriental Hobby	LC
Birds	*Falco subbuteo*	Eurasian Hobby	LC
Birds	*Falco tinnunculus*	Common Kestrel	LC
Birds	*Ficedula albicilla*	Red-throated Flycatcher	LC
Birds	*Ficedula erithacus*	Slaty-backed Flycatcher	LC
Birds	*Ficedula hodgsoni*	Pygmy Blue-flycatcher	LC
Birds	*Ficedula hyperythra*	Snowy-browed Flycatcher	LC
Birds	*Ficedula parva*	Red-breasted Flycatcher	LC
Birds	*Ficedula ruficauda*	Rusty-tailed Flycatcher	LC
Birds	*Ficedula superciliaris*	Ultramarine Flycatcher	LC
Birds	*Ficedula tricolor*	Slaty-blue Flycatcher	LC
Birds	*Ficedula westermanni*	Little Pied Flycatcher	LC
Birds	*Francolinus francolinus*	Black Francolin	LC
Birds	*Francolinus gularis*	Swamp Francolin	VU
Birds	*Fringilla coelebs*	Common Chaffinch	LC
Birds	*Fringilla montifringilla*	Brambling	LC
Birds	*Fulica atra*	Common Coot	LC
Birds	*Fulvetta vinipectus*	White-browed Fulvetta	LC
Birds	*Gallicrex cinerea*	Watercock	LC
Birds	*Gallinago gallinago*	Common Snipe	LC
Birds	*Gallinago solitaria*	Solitary Snipe	LC
Birds	*Gallinago stenura*	Pintail Snipe	LC
Birds	*Gallinula chloropus*	Common Moorhen	LC
Birds	*Gallus gallus*	Red Junglefowl	LC
Birds	*Garrulax albogularis*	White-throated Laughingthrush	LC
Birds	*Garrulax caerulatus*	Grey-sided Laughingthrush	LC
Birds	*Garrulax leucolophus*	White-crested Laughingthrush	LC
Birds	*Garrulax monileger*	Lesser Necklaced Laughingthrush	LC
Birds	*Garrulax ocellatus*	Spotted Laughingthrush	LC

Birds	*Garrulax pectoralis*	Greater Necklaced Laughingthrush	LC
Birds	*Garrulax rufogularis*	Rufous-chinned Laughingthrush	LC
Birds	*Garrulus bispecularis*	Plain-crowned Jay	LC
Birds	*Garrulus lanceolatus*	Black-headed Jay	LC
Birds	*Geokichla citrina*	Orange-headed Thrush	LC
Birds	*Geokichla wardii*	Pied Thrush	LC
Birds	*Glareola lactea*	Little Pratincole	LC
Birds	*Glareola maldivarum*	Oriental Pratincole	LC
Birds	*Glaucidium brodiei*	Collared Owlet	LC
Birds	*Glaucidium radiatum*	Jungle Owlet	LC
Birds	*Gracupica contra*	Asian Pied Starling	LC
Birds	*Graminicola bengalensis*	Indian Grass-babbler	LC
Birds	*Grammatoptila striata*	Striated Laughingthrush	LC
Birds	*Grandala coelicolor*	Grandala	LC
Birds	*Grus grus*	Common Crane	LC
Birds	*Gymnoris xanthocollis*	Chestnut-shouldered Bush-sparrow	LC
Birds	*Gyps bengalensis*	White-rumped Vulture	CR
Birds	*Gyps himalayensis*	Himalayan Griffon	NT
Birds	*Gyps indicus*	Indian Vulture	CR
Birds	*Gyps tenuirostris*	Slender-billed Vulture	CR
Birds	*Halcyon pileata*	Black-capped Kingfisher	LC
Birds	*Halcyon smyrnensis*	White-breasted Kingfisher	LC
Birds	*Haliaeetus albicilla*	White-tailed Sea-eagle	LC
Birds	*Haliaeetus leucoryphus*	Pallas's Fish-eagle	EN
Birds	*Haliastur indus*	Brahminy Kite	LC
Birds	*Harpactes erythrocephalus*	Red-headed Trogon	LC
Birds	*Hemiprocne coronata*	Crested Treeswift	LC
Birds	*Hemipus picatus*	Bar-winged Flycatcher-shrike	LC
Birds	*Hemitesia pallidipes*	Pale-footed Bush-warbler	LC
Birds	*Hemixos flavala*	Ashy Bulbul	LC
Birds	*Heterophasia capistrata*	Rufous Sibia	LC
Birds	*Heterophasia picaoides*	Long-tailed Sibia	LC
Birds	*Hieraaetus pennatus*	Booted Eagle	LC
Birds	*Hierococcyx sparverioides*	Large Hawk-cuckoo	LC
Birds	*Hierococcyx varius*	Common Hawk-cuckoo	LC
Birds	*Hirundapus caudacutus*	White-throated Needletail	LC
Birds	*Hirundapus cochinchinensis*	Silver-backed Needletail	LC
Birds	*Hirundo rustica*	Barn Swallow	LC
Birds	*Hirundo smithii*	Wire-tailed Swallow	LC
Birds	*Hodgsonius phaenicuroides*	White-bellied Redstart	LC

Birds	*Horornis brunnescens*	Hume's Bush-warbler	LC
Birds	*Horornis flavolivaceus*	Aberrant Bush-warbler	LC
Birds	*Houbaropsis bengalensis*	Bengal Florican	CR
Birds	*Hydrophasianus chirurgus*	Pheasant-tailed Jacana	LC
Birds	*Hydroprogne caspia*	Caspian Tern	LC
Birds	*Hypothymis azurea*	Black-naped Monarch	LC
Birds	*Hypsipetes leucocephalus*	Black Bulbul	LC
Birds	*Ibidorhyncha struthersii*	Ibisbill	LC
Birds	*Icthyophaga humilis*	Lesser Fish-eagle	NT
Birds	*Icthyophaga ichthyaetus*	Grey-headed Fish-eagle	NT
Birds	*Ictinaetus malaiensis*	Black Eagle	LC
Birds	*Iduna caligata*	Booted Warbler	LC
Birds	*Indicator xanthonotus*	Yellow-rumped Honeyguide	NT
Birds	*Ixobrychus cinnamomeus*	Cinnamon Bittern	LC
Birds	*Ixobrychus flavicollis*	Black Bittern	LC
Birds	*Ixobrychus sinensis*	Yellow Bittern	LC
Birds	*Ixos mcclellandii*	Mountain Bulbul	LC
Birds	*Jynx torquilla*	Eurasian Wryneck	LC
Birds	*Ketupa zeylonensis*	Brown Fish-owl	LC
Birds	*Kittacincla malabarica*	White-rumped Shama	LC
Birds	*Lalage melanoptera*	Black-headed Cuckooshrike	LC
Birds	*Lalage melaschistos*	Black-winged Cuckooshrike	LC
Birds	*Lanius cristatus*	Brown Shrike	LC
Birds	*Lanius excubitor*	Great Grey Shrike	LC
Birds	*Lanius schach*	Long-tailed Shrike	LC
Birds	*Lanius tephronotus*	Grey-backed Shrike	LC
Birds	*Larus brunnicephalus*	Brown-headed Gull	LC
Birds	*Larus fuscus*	Lesser Black-backed Gull	LC
Birds	*Larus ichthyaetus*	Pallas's Gull	LC
Birds	*Larus ridibundus*	Black-headed Gull	LC
Birds	*Larvivora brunnea*	Indian Blue Robin	LC
Birds	*Leiopicus mahrattensis*	Yellow-crowned Woodpecker	LC
Birds	*Leiothrix argentauris*	Silver-eared Mesia	LC
Birds	*Leiothrix lutea*	Red-billed Leiothrix	LC
Birds	*Leptoptilos dubius*	Greater Adjutant	EN
Birds	*Leptoptilos javanicus*	Lesser Adjutant	VU
Birds	*Leucosticte nemoricola*	Plain Mountain-finch	LC
Birds	*Limosa limosa*	Black-tailed Godwit	NT
Birds	*Linaria flavirostris*	Twite	LC
Birds	*Lioparus chrysotis*	Golden-breasted Fulvetta	LC

Birds	*Locustella certhiola*	Pallas's Grasshopper-warbler	LC
Birds	*Locustella lanceolata*	Lanceolated Warbler	LC
Birds	*Locustella tacsanowskia*	Chinese Grasshopper-warbler	LC
Birds	*Locustella thoracica*	Spotted Grasshopper-warbler	LC
Birds	*Lonchura punctulata*	Scaly-breasted Munia	LC
Birds	*Lonchura striata*	White-rumped Munia	LC
Birds	*Lophotriorchis kienerii*	Rufous-bellied Eagle	LC
Birds	*Lophura leucomelanos*	Kalij Pheasant	LC
Birds	*Loriculus vernalis*	Vernal Hanging-parrot	LC
Birds	*Loxia curvirostra*	Red Crossbill	LC
Birds	*Machlolophus xanthogenys*	Black-lored Tit	LC
Birds	*Macropygia unchall*	Barred Cuckoo-dove	LC
Birds	*Mareca strepera*	Gadwall	LC
Birds	*Megaceryle lugubris*	Crested Kingfisher	LC
Birds	*Megalurus palustris*	Striated Grassbird	LC
Birds	*Melanochlora sultanea*	Sultan Tit	LC
Birds	*Mergus merganser*	Goosander	LC
Birds	*Merops leschenaulti*	Chestnut-headed Bee-eater	LC
Birds	*Merops orientalis*	Asian Green Bee-eater	LC
Birds	*Merops philippinus*	Blue-tailed Bee-eater	LC
Birds	*Microhierax caerulescens*	Collared Falconet	LC
Birds	*Micropternus brachyurus*	Rufous Woodpecker	LC
Birds	*Milvus migrans*	Black Kite	LC
Birds	*Minla ignotincta*	Red-tailed Minla	LC
Birds	*Mirafra assamica*	Bengal Bushlark	LC
Birds	*Mixornis gularis*	Pin-striped Tit-babbler	LC
Birds	*Monticola cinclorhyncha*	Blue-capped Rock-thrush	LC
Birds	*Monticola rufiventris*	Chestnut-bellied Rock-thrush	LC
Birds	*Monticola solitarius*	Blue Rock-thrush	LC
Birds	*Montifringilla nivalis*	White-winged Snowfinch	LC
Birds	*Motacilla alba*	White Wagtail	LC
Birds	*Motacilla cinerea*	Grey Wagtail	LC
Birds	*Motacilla citreola*	Citrine Wagtail	LC
Birds	*Motacilla flava*	Western Yellow Wagtail	LC
Birds	*Motacilla maderaspatensis*	White-browed Wagtail	LC
Birds	*Muscicapa dauurica*	Asian Brown Flycatcher	LC
Birds	*Muscicapa ferruginea*	Ferruginous Flycatcher	LC
Birds	*Mycerobas affinis*	Collared Grosbeak	LC
Birds	*Mycerobas carnipes*	White-winged Grosbeak	LC
Birds	*Mycerobas melanozanthos*	Spot-winged Grosbeak	LC

Birds	*Mycteria leucocephala*	Painted Stork	NT
Birds	*Myiomela leucura*	White-tailed Blue Robin	LC
Birds	*Myophonus caeruleus*	Blue Whistling-thrush	LC
Birds	*Myzornis pyrrhoura*	Fire-tailed Myzornis	LC
Birds	*Neophron percnopterus*	Egyptian Vulture	EN
Birds	*Nettapus coromandelianus*	Cotton Pygmy-goose	LC
Birds	*Niltava grandis*	Large Niltava	LC
Birds	*Niltava macgrigoriae*	Small Niltava	LC
Birds	*Niltava sundara*	Rufous-bellied Niltava	LC
Birds	*Ninox scutulata*	Brown Boobook	LC
Birds	*Nisaetus cirrhatus*	Changeable Hawk-eagle	LC
Birds	*Nisaetus nipalensis*	Mountain Hawk-eagle	LC
Birds	*Numenius arquata*	Eurasian Curlew	NT
Birds	*Nycticorax nycticorax*	Black-crowned Night-heron	LC
Birds	*Nyctyornis athertoni*	Blue-bearded Bee-eater	LC
Birds	*Oriolus kundoo*	Indian Golden Oriole	LC
Birds	*Oriolus tenuirostris*	Slender-billed Oriole	LC
Birds	*Oriolus traillii*	Maroon Oriole	LC
Birds	*Oriolus xanthornus*	Black-hooded Oriole	LC
Birds	*Orthotomus sutorius*	Common Tailorbird	LC
Birds	*Otus bakkamoena*	Indian Scops-owl	LC
Birds	*Otus lettia*	Collared Scops-owl	LC
Birds	*Otus spilocephalus*	Mountain Scops-owl	LC
Birds	*Otus sunia*	Oriental Scops-owl	LC
Birds	*Pandion haliaetus*	Osprey	LC
Birds	*Parus major*	Great Tit	LC
Birds	*Parus monticolus*	Green-backed Tit	LC
Birds	*Passer cinnamomeus*	Russet Sparrow	LC
Birds	*Passer domesticus*	House Sparrow	LC
Birds	*Passer montanus*	Eurasian Tree Sparrow	LC
Birds	*Pavo cristatus*	Indian Peafowl	LC
Birds	*Pelargopsis capensis*	Stork-billed Kingfisher	LC
Birds	*Pelecanus philippensis*	Spot-billed Pelican	NT
Birds	*Pellorneum ruficeps*	Puff-throated Babbler	LC
Birds	*Pericrocotus brevirostris*	Short-billed Minivet	LC
Birds	*Pericrocotus cinnamomeus*	Small Minivet	LC
Birds	*Pericrocotus ethologus*	Long-tailed Minivet	LC
Birds	*Pericrocotus flammeus*	Scarlet Minivet	LC
Birds	*Pericrocotus roseus*	Rosy Minivet	LC
Birds	*Pericrocotus solaris*	Grey-chinned Minivet	LC

Birds	*Periparus ater*	Coal Tit	LC
Birds	*Pernis ptilorhynchus*	Oriental Honey-buzzard	LC
Birds	*Petrochelidon fluvicola*	Streak-throated Swallow	LC
Birds	*Phaenicophaeus tristis*	Green-billed Malkoha	LC
Birds	*Phalacrocorax carbo*	Great Cormorant	LC
Birds	*Phoenicurus coeruleocephala*	Blue-capped Redstart	LC
Birds	*Phoenicurus frontalis*	Blue-fronted Redstart	LC
Birds	*Phoenicurus fuliginosus*	Plumbeous Water-redstart	LC
Birds	*Phoenicurus hodgsoni*	Hodgson's Redstart	LC
Birds	*Phoenicurus leucocephalus*	White-capped Water-redstart	LC
Birds	*Phoenicurus ochruros*	Black Redstart	LC
Birds	*Phylloscopus affinis*	Tickell's Leaf-warbler	LC
Birds	*Phylloscopus burkii*	Green-crowned Warbler	LC
Birds	*Phylloscopus castaniceps*	Chestnut-crowned Warbler	LC
Birds	*Phylloscopus chloronotus*	Lemon-rumped Leaf-warbler	LC
Birds	*Phylloscopus fuligiventer*	Smoky Warbler	LC
Birds	*Phylloscopus fuscatus*	Dusky Warbler	LC
Birds	*Phylloscopus griseolus*	Sulphur-bellied Warbler	LC
Birds	*Phylloscopus humei*	Hume's Leaf-warbler	LC
Birds	*Phylloscopus inornatus*	Yellow-browed Warbler	LC
Birds	*Phylloscopus magnirostris*	Large-billed Leaf-warbler	LC
Birds	*Phylloscopus occipitalis*	Western Crowned Leaf-warbler	LC
Birds	*Phylloscopus poliogenys*	Grey-cheeked Warbler	LC
Birds	*Phylloscopus reguloides*	Blyth's Leaf-warbler	LC
Birds	*Phylloscopus tristis*	Siberian Chiffchaff	LC
Birds	*Phylloscopus trochiloides*	Greenish Warbler	LC
Birds	*Phylloscopus whistleri*	Whistler's Warbler	LC
Birds	*Phylloscopus xanthoschistos*	Grey-hooded Warbler	LC
Birds	*Picoides canicapillus*	Grey-capped Woodpecker	LC
Birds	*Picoides nanus*	Indian Pygmy Woodpecker	LC
Birds	*Picumnus innominatus*	Speckled Piculet	LC
Birds	*Picus chlorolophus*	Lesser Yellownape	LC
Birds	*Picus guerini*	Black-naped Woodpecker	LC
Birds	*Picus squamatus*	Scaly-bellied Woodpecker	LC
Birds	*Picus xanthopygaeus*	Streak-throated Woodpecker	LC
Birds	*Pitta brachyura*	Indian Pitta	LC
Birds	*Pitta sordida*	Western Hooded Pitta	LC
Birds	*Plegadis falcinellus*	Glossy Ibis	LC
Birds	*Ploceus benghalensis*	Black-breasted Weaver	LC
Birds	*Ploceus manyar*	Streaked Weaver	LC

Birds	*Ploceus philippinus*	Baya Weaver	LC
Birds	*Pnoepyga albiventer*	Scaly-breasted Cupwing	LC
Birds	*Pnoepyga pusilla*	Pygmy Cupwing	LC
Birds	*Pomatorhinus ruficollis*	Streak-breasted Scimitar-babbler	LC
Birds	*Pomatorhinus schisticeps*	White-browed Scimitar-babbler	LC
Birds	*Pomatorhinus superciliaris*	Slender-billed Scimitar-babbler	LC
Birds	*Porphyrio porphyrio*	Purple Swamphen	LC
Birds	*Prinia cinereocapilla*	Grey-crowned Prinia	VU
Birds	*Prinia crinigera*	Striated Prinia	LC
Birds	*Prinia flaviventris*	Yellow-bellied Prinia	LC
Birds	*Prinia gracilis*	Graceful Prinia	LC
Birds	*Prinia hodgsonii*	Grey-breasted Prinia	LC
Birds	*Prinia inornata*	Plain Prinia	LC
Birds	*Prinia socialis*	Ashy Prinia	LC
Birds	*Procarduelis nipalensis*	Dark-breasted Rosefinch	LC
Birds	*Prunella strophiata*	Rufous-breasted Accentor	LC
Birds	*Psarisomus dalhousiae*	Long-tailed Broadbill	LC
Birds	*Pseudibis papillosa*	Red-naped Ibis	LC
Birds	*Psilopogon asiaticus*	Blue-throated Barbet	LC
Birds	*Psilopogon franklinii*	Golden-throated Barbet	LC
Birds	*Psilopogon haemacephalus*	Coppersmith Barbet	LC
Birds	*Psilopogon lineatus*	Lineated Barbet	LC
Birds	*Psilopogon virens*	Great Barbet	LC
Birds	*Psilopogon zeylanicus*	Brown-headed Barbet	LC
Birds	*Psittacula alexandri*	Red-breasted Parakeet	NT
Birds	*Psittacula cyanocephala*	Plum-headed Parakeet	LC
Birds	*Psittacula eupatria*	Alexandrine Parakeet	NT
Birds	*Psittacula himalayana*	Slaty-headed Parakeet	LC
Birds	*Psittacula krameri*	Rose-ringed Parakeet	LC
Birds	*Psittacula roseata*	Blossom-headed Parakeet	NT
Birds	*Pteruthius aeralatus*	White-browed Shrike-babbler	LC
Birds	*Pteruthius melanotis*	Black-eared Shrike-babbler	LC
Birds	*Pteruthius rufiventer*	Black-headed Shrike-babbler	LC
Birds	*Ptyonoprogne rupestris*	Eurasian Crag Martin	LC
Birds	*Pycnonotus cafer*	Red-vented Bulbul	LC
Birds	*Pycnonotus flaviventris*	Black-crested Bulbul	LC
Birds	*Pycnonotus jocosus*	Red-whiskered Bulbul	LC
Birds	*Pycnonotus striatus*	Striated Bulbul	LC
Birds	*Pyrrhoplectes epauletta*	Gold-naped Finch	LC
Birds	*Pyrrhula erythrocephala*	Red-headed Bullfinch	LC

Birds	*Pyrrhula nipalensis*	Brown Bullfinch	LC
Birds	*Rallina eurizonoides*	Slaty-legged Crake	LC
Birds	*Rallus indicus*	Eastern Water Rail	LC
Birds	*Rhipidura albicollis*	White-throated Fantail	LC
Birds	*Rhipidura aureola*	White-browed Fantail	LC
Birds	*Riparia chinensis*	Asian Plain Martin	LC
Birds	*Riparia diluta*	Pale Sand Martin	LC
Birds	*Rostratula benghalensis*	Greater Painted-snipe	LC
Birds	*Sarcogyps calvus*	Red-headed Vulture	CR
Birds	*Saroglossa spilopterus*	Spot-winged Starling	LC
Birds	*Sasia ochracea*	White-browed Piculet	LC
Birds	*Saxicola caprata*	Pied Bushchat	LC
Birds	*Saxicola ferreus*	Grey Bushchat	LC
Birds	*Saxicola insignis*	White-throated Bushchat	VU
Birds	*Saxicola leucurus*	White-tailed Stonechat	LC
Birds	*Saxicola torquatus*	Common Stonechat	LC
Birds	*Saxicoloides fulicatus*	Indian Robin	LC
Birds	*Scolopax rusticola*	Eurasian Woodcock	LC
Birds	*Sibia nipalensis*	Hoary-throated Barwing	LC
Birds	*Sitta cinnamoventris*	Chestnut-bellied Nuthatch	LC
Birds	*Sitta frontalis*	Velvet-fronted Nuthatch	LC
Birds	*Sitta himalayensis*	White-tailed Nuthatch	LC
Birds	*Spatula clypeata*	Northern Shoveler	LC
Birds	*Spatula querquedula*	Garganey	LC
Birds	*Spilopelia senegalensis*	Laughing Dove	LC
Birds	*Spilopelia suratensis*	Western Spotted Dove	LC
Birds	*Spilornis cheela*	Crested Serpent-eagle	LC
Birds	*Spinus thibetanus*	Tibetan Siskin	LC
Birds	*Stachyris nigriceps*	Grey-throated Babbler	LC
Birds	*Sterna acuticauda*	Black-bellied Tern	EN
Birds	*Sterna aurantia*	River Tern	NT
Birds	*Streptopelia decaocto*	Eurasian Collared-dove	LC
Birds	*Streptopelia orientalis*	Oriental Turtle-dove	LC
Birds	*Strix leptogrammica*	Brown Wood-owl	LC
Birds	*Sturnia malabarica*	Chestnut-tailed Starling	LC
Birds	*Sturnia pagodarum*	Brahminy Starling	LC
Birds	*Surniculus dicruroides*	Fork-tailed Drongo-cuckoo	LC
Birds	*Suthora nipalensis*	Black-throated Parrotbill	LC
Birds	*Sylviparus modestus*	Yellow-browed Tit	LC
Birds	*Synoicus chinensis*	Asian Blue Quail	LC

Birds	*Sypheotides indicus*	Lesser Florican	EN
Birds	*Taccocua leschenaultii*	Sirkeer Malkoha	LC
Birds	*Tachybaptus ruficollis*	Little Grebe	LC
Birds	*Tadorna ferruginea*	Ruddy Shelduck	LC
Birds	*Tarsiger chrysaeus*	Golden Bush-robin	LC
Birds	*Tarsiger cyanurus*	Orange-flanked Bush-robin	LC
Birds	*Tarsiger hyperythrus*	Rufous-breasted Bush-robin	LC
Birds	*Tarsiger rufilatus*	Himalayan Bush-robin	LC
Birds	*Tephrodornis pondicerianus*	Common Woodshrike	LC
Birds	*Tephrodornis virgatus*	Large Woodshrike	LC
Birds	*Terpsiphone paradisi*	Indian Paradise-flycatcher	LC
Birds	*Tesia cyaniventer*	Grey-bellied Tesia	LC
Birds	*Threskiornis melanocephalus*	Black-headed Ibis	NT
Birds	*Tichodroma muraria*	Wallcreeper	LC
Birds	*Tickellia hodgsoni*	Broad-billed Warbler	LC
Birds	*Timalia pileata*	Chestnut-capped Babbler	LC
Birds	*Treron apicauda*	Pin-tailed Green-pigeon	LC
Birds	*Treron bicinctus*	Orange-breasted Green-pigeon	LC
Birds	*Treron curvirostra*	Thick-billed Green-pigeon	LC
Birds	*Treron phayrei*	Ashy-headed Green-pigeon	NT
Birds	*Treron phoenicopterus*	Yellow-footed Green-pigeon	LC
Birds	*Treron sphenurus*	Wedge-tailed Green-pigeon	LC
Birds	*Tringa glareola*	Wood Sandpiper	LC
Birds	*Tringa nebularia*	Common Greenshank	LC
Birds	*Tringa stagnatilis*	Marsh Sandpiper	LC
Birds	*Tringa totanus*	Common Redshank	LC
Birds	*Trochalopteron affine*	Black-faced Laughingthrush	LC
Birds	*Trochalopteron erythrocephalum*	Chestnut-crowned Laughingthrush	LC
Birds	*Trochalopteron lineatum*	Streaked Laughingthrush	LC
Birds	*Trochalopteron squamatum*	Blue-winged Laughingthrush	LC
Birds	*Trochalopteron subunicolor*	Scaly Laughingthrush	LC
Birds	*Trochalopteron variegatum*	Variegated Laughingthrush	LC
Birds	*Troglodytes troglodytes*	Northern Wren	LC
Birds	*Turdoides striata*	Jungle Babbler	LC
Birds	*Turdus albocinctus*	White-collared Blackbird	LC
Birds	*Turdus atrogularis*	Black-throated Thrush	LC
Birds	*Turdus boulboul*	Grey-winged Blackbird	LC
Birds	*Turdus maximus*	Tibetan Blackbird	LC
Birds	*Turdus rubrocanus*	Chestnut Thrush	LC
Birds	*Turdus ruficollis*	Rufous-throated Thrush	LC

Birds	*Turdus unicolor*	Tickell's Thrush	LC
Birds	*Turnix suscitator*	Barred Buttonquail	LC
Birds	*Turnix sylvaticus*	Common Buttonquail	LC
Birds	*Turnix tanki*	Yellow-legged Buttonquail	LC
Birds	*Tyto alba*	Common Barn-owl	LC
Birds	*Tyto longimembris*	Eastern Grass-owl	LC
Birds	*Upupa epops*	Common Hoopoe	LC
Birds	*Urocissa erythroryncha*	Red-billed Blue Magpie	LC
Birds	*Urocissa flavirostris*	Yellow-billed Blue Magpie	LC
Birds	*Vanellus cinereus*	Grey-headed Lapwing	LC
Birds	*Vanellus duvaucelii*	River Lapwing	NT
Birds	*Vanellus indicus*	Red-wattled Lapwing	LC
Birds	*Vanellus malabaricus*	Yellow-wattled Lapwing	LC
Birds	*Vanellus vanellus*	Northern Lapwing	NT
Birds	*Yuhina flavicollis*	Whiskered Yuhina	LC
Birds	*Yuhina gularis*	Stripe-throated Yuhina	LC
Birds	*Yuhina nigrimenta*	Black-chinned Yuhina	LC
Birds	*Yuhina occipitalis*	Rufous-vented Yuhina	LC
Birds	*Zapornia akool*	Brown Crake	LC
Birds	*Zapornia fusca*	Ruddy-breasted Crake	LC
Birds	*Zapornia pusilla*	Baillon's Crake	LC
Birds	*Zoonavena sylvatica*	White-rumped Spinetail	LC
Birds	*Zoothera dauma*	Scaly Thrush	LC
Birds	*Zoothera dixoni*	Long-tailed Thrush	LC
Birds	*Zoothera major*	Amami Thrush	NT
Birds	*Zoothera marginata*	Dark-sided Thrush	LC
Birds	*Zoothera monticola*	Long-billed Thrush	LC
Birds	*Zosterops palpebrosus*	Oriental White-eye	LC
Fishes	*Acanthocobitis botia*	Striped Loach	LC
Fishes	*Amblyceps arunchalensis*		EN
Fishes	*Amblyceps mangois*		LC
Fishes	*Amblypharyngodon microlepis*	Indian Carplet	LC
Fishes	*Anguilla bengalensis*	Indian Mottled Eel	NT
Fishes	*Badis badis*		LC
Fishes	*Bagarius yarrelli*		NT
Fishes	*Balitora brucei*		NT
Fishes	*Bangana ariza*	Ariza Labeo	LC
Fishes	*Bangana dero*	Kalabans	LC
Fishes	*Chagunius chagunio*		LC
Fishes	*Channa gachua*	Dwarf Snakehead	LC

Fishes	*Channa marulius*		LC
Fishes	*Cirrhinus mrigala*	Mrigal	LC
Fishes	*Cirrhinus reba*	Reba Carp	LC
Fishes	*Esomus danrica*	Flying barb	LC
Fishes	*Garra annandalei*	Annandale garra	LC
Fishes	*Gibelion catla*	Catla	LC
Fishes	*Glossogobius giuris*	Bareye Goby	LC
Fishes	*Glyptothorax indicus*	Catfish	LC
Fishes	*Heteropneustes fossilis*	Stinging catfish	LC
Fishes	*Labeo bata*	Minor Carp	LC
Fishes	*Lepidocephalichthys menoni*		DD
Fishes	*Lepidocephalus guntea*	Peppered Loach	LC
Fishes	*Mastacembelus armatus*	Spiny eel	LC
Fishes	*Monopterus albus*	Rice swampeel	LC
Fishes	*Nandus nandus*		LC
Fishes	*Nangra assamensis*		LC
Fishes	*Nangra nangra*	Kosi Nangra	LC
Fishes	*Neoeucirrhichthys maydelli*		LC
Fishes	*Neolissochilus dukai*		DD
Fishes	*Neotropius atherinoides*		LC
Fishes	*Notopterus notopterus*		LC
Fishes	*Ompok bimaculatus*		NT
Fishes	*Ompok pabo*		NT
Fishes	*Oreichthys cosuatis*		LC
Fishes	*Parachiloglanis hodgarti*	Torrent Catfish	LC
Fishes	*Parambassis ranga*	Indian Glassy Fish	LC
Fishes	*Pseudapocryptes elongatus*		LC
Fishes	*Pseudecheneis serracula*		LC
Fishes	*Psilorhynchus gracilis*	Rainbow minnow	LC
Fishes	*Psilorhynchus nepalensis*		LC
Fishes	*Psilorhynchus pseudecheneis*	Stone Carp	LC
Fishes	*Psilorhynchus sucatio*	River stone carp	LC
Fishes	*Rasbora daniconius*	Slender Barb	LC
Fishes	*Schistura multifasciata*		LC
Fishes	*Schizothorax progastus*	Dinnawah snowtrout	LC
Fishes	*Setipinna phasa*	Gangetic Hairfin Anchovy	LC
Fishes	*Silonia silondia*	Silong Catfish	LC
Fishes	*Sisor rheophilus*		DD
Fishes	*Sperata aor*	Long-whiskered Catfish	LC
Fishes	*Tenualosa ilisha*	Hilsa	LC

Fishes	*Trichogaster chuna*		LC
Fishes	*Trichogaster fasciata*		LC
Fishes	*Trichogaster lalius*		LC
Fishes	*Wallago attu*		NT
Invertebrates	*Aciagrion hisopa*		LC
Invertebrates	*Aciagrion pallidum*		LC
Invertebrates	*Acisoma panorpoides*	Grizzled Pintail	LC
Invertebrates	*Aethriamanta brevipennis*		LC
Invertebrates	*Agriocnemis clauseni*		LC
Invertebrates	*Agriocnemis lacteola*		LC
Invertebrates	*Agriocnemis pygmaea*	Wandering Midget	LC
Invertebrates	*Amphiallagma parvum*		LC
Invertebrates	*Anaciaeschna jaspidea*		LC
Invertebrates	*Anax ephippiger*	Vagrant Emperor	LC
Invertebrates	*Anax guttatus*	Lesser Green Emperor	LC
Invertebrates	*Anax indicus*		LC
Invertebrates	*Anax nigrofasciatus*	Blue-spotted Emperor	LC
Invertebrates	*Anisopleura comes*		LC
Invertebrates	*Anisopleura subplatystyla*		LC
Invertebrates	*Archibasis oscillans*		LC
Invertebrates	*Bayadera indica*		LC
Invertebrates	*Bellamya bengalensis*		LC
Invertebrates	*Bithynia cerameopoma*		LC
Invertebrates	*Bithynia lithoglyphoides*		DD
Invertebrates	*Bithynia pulchella*		LC
Invertebrates	*Brachydiplax chalybea*		LC
Invertebrates	*Brachydiplax sobrina*		LC
Invertebrates	*Brachythemis contaminata*		LC
Invertebrates	*Bradinopyga geminata*		LC
Invertebrates	*Brotia costula*		LC
Invertebrates	*Calicnemia eximia*		LC
Invertebrates	*Calicnemia pulverulans*		LC
Invertebrates	*Caliphaea confusa*		LC
Invertebrates	*Camacinia gigantea*		LC
Invertebrates	*Camptoceras lineatum*		LC
Invertebrates	*Cephalaeschna acutifrons*		DD
Invertebrates	*Cephalaeschna viridifrons*		LC
Invertebrates	*Cercion malayanum*		LC
Invertebrates	*Ceriagrion azureum*		LC
Invertebrates	*Ceriagrion cerinorubellum*		LC

Invertebrates	*Ceriagrion coromandelianum*		LC
Invertebrates	*Ceriagrion fallax*		LC
Invertebrates	*Ceriagrion olivaceum*		LC
Invertebrates	*Clenchiella microscopica*		LC
Invertebrates	*Clithon reticularis*		LC
Invertebrates	*Coeliccia didyma*		LC
Invertebrates	*Copera marginipes*		LC
Invertebrates	*Copera vittata*		LC
Invertebrates	*Corbicula assamensis*		LC
Invertebrates	*Corbicula aurea*		DD
Invertebrates	*Corbicula striatella*		LC
Invertebrates	*Cratilla metallica*		LC
Invertebrates	*Crocothemis erythraea*	Broad Scarlet	LC
Invertebrates	*Diplacodes trivialis*		LC
Invertebrates	*Epophthalmia vittata*		LC
Invertebrates	*Erhaia banepaensis*		DD
Invertebrates	*Erhaia chandeshwariensis*		DD
Invertebrates	*Erhaia sugurensis*		DD
Invertebrates	*Euphaea ochracea*		LC
Invertebrates	*Ferrissia baconi*		LC
Invertebrates	*Ferrissia verruca*		LC
Invertebrates	*Gabbia orcula*		LC
Invertebrates	*Gabbia stenothyroides*		LC
Invertebrates	*Globitelphusa bakeri*		DD
Invertebrates	*Gynacantha subinterrupta*		LC
Invertebrates	*Gyraulus convexiusculus*		LC
Invertebrates	*Gyraulus euphraticus*		LC
Invertebrates	*Gyraulus labiatus*		LC
Invertebrates	*Himalayapotamon emphyseteum*		LC
Invertebrates	*Idionyx stevensi*		LC
Invertebrates	*Indoplanorbis exustus*		LC
Invertebrates	*Intha umbilicalis*		LC
Invertebrates	*Ischnura forcipata*		LC
Invertebrates	*Ischnura senegalensis*	Tropical Bluetail	LC
Invertebrates	*Lamellidens consobrinus*		LC
Invertebrates	*Lamellidens corrianus*		LC
Invertebrates	*Lamellidens generosus*		LC
Invertebrates	*Lamellidens jenkinsianus*		LC
Invertebrates	*Lamellidens marginalis*		LC
Invertebrates	*Lamellidens narainpirensis*		LC

Invertebrates	*Lamellidens phenchooganjensis*		LC
Invertebrates	*Lamellidens unioides*		DD
Invertebrates	*Lestes dorothea*		LC
Invertebrates	*Lestes nodalis*		LC
Invertebrates	*Lestes thoracicus*		LC
Invertebrates	*Lestes umbrinus*		DD
Invertebrates	*Lestes viridulus*		LC
Invertebrates	*Libellago lineata*		LC
Invertebrates	*Lymnaea acuminata*		LC
Invertebrates	*Lymnaea andersoniana*		LC
Invertebrates	*Lymnaea luteola*		LC
Invertebrates	*Lymnaea persica*		LC
Invertebrates	*Macrobrachium altifrons*		LC
Invertebrates	*Macrobrachium nepalense*		DD
Invertebrates	*Macromia flavocolorata*		LC
Invertebrates	*Macromia sombui*		DD
Invertebrates	*Maydeliathelphusa lugubris*		LC
Invertebrates	*Maydeliathelphusa masoniana*		LC
Invertebrates	*Mekongia crassa*		LC
Invertebrates	*Melanoides pyramis*		LC
Invertebrates	*Melanoides tuberculata*		LC
Invertebrates	*Mieniplotia scabra*		LC
Invertebrates	*Musculium goshaitanensis*		DD
Invertebrates	*Neurobasis chinensis*		LC
Invertebrates	*Novaculina gangetica*		LC
Invertebrates	*Nychogomphus duaricus*		LC
Invertebrates	*Onychargia atrocyana*		LC
Invertebrates	*Orthetrum chrysis*		LC
Invertebrates	*Orthetrum japonicum*		LC
Invertebrates	*Orthetrum luzonicum*		LC
Invertebrates	*Paludomus conica*		LC
Invertebrates	*Pantala flavescens*	Wandering Glider	LC
Invertebrates	*Paracercion melanotum*	Eastern Lilysquatter	LC
Invertebrates	*Parreysia andersoniana*		LC
Invertebrates	*Parreysia bonneaudi*		LC
Invertebrates	*Parreysia caerulea*		LC
Invertebrates	*Parreysia corrugata*		LC
Invertebrates	*Parreysia favidens*		LC
Invertebrates	*Parreysia lima*		LC
Invertebrates	*Parreysia occata*		LC

Invertebrates	*Parreysia olivaria*		LC
Invertebrates	*Parreysia pachysoma*		LC
Invertebrates	*Parreysia rajahensis*		LC
Invertebrates	*Parreysia shurtleffiana*		LC
Invertebrates	*Parreysia sikkimensis*		LC
Invertebrates	*Parreysia triembolus*		LC
Invertebrates	*Pila globosa*		LC
Invertebrates	*Pila theobaldi*		LC
Invertebrates	*Pisidium annandalei*		LC
Invertebrates	*Pisidium atkinsonianum*		LC
Invertebrates	*Pisidium casertanum*	Caserta Pea Mussel	LC
Invertebrates	*Pisidium chandanbariensis*		DD
Invertebrates	*Pisidium clarkeanum*		LC
Invertebrates	*Pisidium ellisi*		LC
Invertebrates	*Pisidium kulperi*		DD
Invertebrates	*Pisidium nevillianum*		LC
Invertebrates	*Pisidium prasongi*		LC
Invertebrates	*Pomacea lineata*		LC
Invertebrates	*Pseudagrion rubriceps*		LC
Invertebrates	*Radix auricularia*		LC
Invertebrates	*Radix brevicauda*		LC
Invertebrates	*Radix hookeri*		DD
Invertebrates	*Rhinocypha biforata*		LC
Invertebrates	*Rhyothemis variegata*		LC
Invertebrates	*Sartoriana spinigera*		LC
Invertebrates	*Scaphula deltae*		LC
Invertebrates	*Segmentina calatha*		LC
Invertebrates	*Segmentina trochoidea*		LC
Invertebrates	*Sphaerium indicum*		LC
Invertebrates	*Stenothyra monilifera*		LC
Invertebrates	*Stenothyra ornata*		LC
Invertebrates	*Sympetrum haematoneura*		LC
Invertebrates	*Sympetrum hypomelas*		LC
Invertebrates	*Tarebia granifera*		LC
Invertebrates	*Tarebia lineata*		LC
Invertebrates	*Thiara rudis*		LC
Invertebrates	*Tholymis tillarga*	Old World Twister	LC
Invertebrates	*Tramea basilaris*	Keyhole Glider	LC
Invertebrates	*Tramea limbata*	Ferruginous Glider	LC
Invertebrates	*Trichopotamon sikkimensis*		LC

Invertebrates	*Tricula godawariensis*		DD
Invertebrates	*Tricula mahadevensis*		VU
Invertebrates	*Tricula montana*		LC
Invertebrates	*Trithemis aurora*		LC
Invertebrates	*Trithemis kirbyi*	Orange-winged Dropwing	LC
Invertebrates	*Trithemis pallidinervis*	Dancing Dropwing	LC
Invertebrates	*Urothemis signata*		LC
Invertebrates	*Vestalis apicalis*		LC
Invertebrates	*Vestalis gracilis*		LC
Invertebrates	*Zygonyx iris*		LC
Invertebrates	*Zygonyx torridus*	Ringed Cascader	LC
Invertebrates	*Zyxomma petiolatum*	Long-tailed Duskdarter	LC
Mammals	*Aonyx cinereus*	Asian Small-clawed Otter	VU
Mammals	*Axis axis*	Chital	LC
Mammals	*Axis porcinus*	Hog Deer	EN
Mammals	*Bandicota bengalensis*	Lesser Bandicoot Rat	LC
Mammals	*Bandicota indica*	Greater Bandicoot Rat	LC
Mammals	*Belomys pearsonii*	Hairy-footed Flying Squirrel	DD
Mammals	*Bos gaurus*	Gaur	VU
Mammals	*Callosciurus pygerythrus*	Hoary-bellied Squirrel	LC
Mammals	*Canis aureus*	Golden Jackal	LC
Mammals	*Canis lupus*	Gray Wolf	LC
Mammals	*Cannomys badius*	Lesser Bamboo Rat	LC
Mammals	*Capricornis thar*	Himalayan Serow	NT
Mammals	*Caprolagus hispidus*	Hispid Hare	EN
Mammals	*Crocidura attenuata*	Grey Shrew	LC
Mammals	*Cuon alpinus*	Dhole	EN
Mammals	*Cynopterus sphinx*	Greater Shortnosed Fruit Bat	LC
Mammals	*Dremomys lokriah*	Orange-bellied Himalayan Squirrel	LC
Mammals	*Elephas maximus*	Asian Elephant	EN
Mammals	*Episoriculus macrurus*	Arboreal Brown-toothed Shrew	LC
Mammals	*Eptesicus serotinus*	Serotine	LC
Mammals	*Falsistrellus affinis*	Chocolate Pipistrelle	LC
Mammals	*Felis chaus*	Jungle Cat	LC
Mammals	*Funambulus pennantii*	Five-striped Palm Squirrel	LC
Mammals	*Golunda ellioti*	Indian Bush-rat	LC
Mammals	*Herpestes auropunctatus*	Small Indian Mongoose	LC
Mammals	*Herpestes edwardsii*	Indian Grey Mongoose	LC
Mammals	*Hipposideros armiger*	Great Himalayan Leaf-nosed Bat	LC
Mammals	*Hipposideros cineraceus*	Least Leaf-nosed Bat	LC

Mammals	*Hipposideros pomona*	Andersen's Leaf-nosed Bat	LC
Mammals	*Hyaena hyaena*	Striped Hyaena	NT
Mammals	*Lepus nigricollis*	Indian Hare	LC
Mammals	*Lutra lutra*	Eurasian Otter	NT
Mammals	*Lutrogale perspicillata*	Smooth-coated Otter	VU
Mammals	*Macaca assamensis*	Assam Macaque	NT
Mammals	*Macaca mulatta*	Rhesus Monkey	LC
Mammals	*Manis pentadactyla*	Chinese Pangolin	CR
Mammals	*Marmota himalayana*	Karakoram Marmot	LC
Mammals	*Martes flavigula*	Yellow-throated Marten	LC
Mammals	*Megaderma lyra*	Greater False Vampire	LC
Mammals	*Mellivora capensis*	Honey Badger	LC
Mammals	*Melursus ursinus*	Sloth Bear	VU
Mammals	*Millardia meltada*	Soft-furred Metad	LC
Mammals	*Moschiola indica*	Indian Chevrotain	LC
Mammals	*Moschus leucogaster*	Himalayan Muskdeer	EN
Mammals	*Muntiacus vaginalis*	Northern Red Muntjac	LC
Mammals	*Murina huttoni*	White-bellied Tube-nosed Bat	LC
Mammals	*Mus booduga*	Little Indian Field Mouse	LC
Mammals	*Mus cervicolor*	Fawn-colored Mouse	LC
Mammals	*Mus cookii*	Ryley's Spiny Mouse	LC
Mammals	*Mus musculus*	House Mouse	LC
Mammals	*Mus saxicola*	Brown Spiny Mouse	LC
Mammals	*Mus terricolor*	Earth-colored Mouse	LC
Mammals	*Mustela kathiah*	Yellow-bellied Weasel	LC
Mammals	*Mustela sibirica*	Siberian Weasel	LC
Mammals	*Myotis csorbai*	Csorba's Mouse-eared Myotis	DD
Mammals	*Myotis formosus*	Hodgson's Bat	LC
Mammals	*Myotis muricola*	Nepalese Whiskered Myotis	LC
Mammals	*Myotis nipalensis*	Nepal Myotis	LC
Mammals	*Myotis sicarius*	Mandelli's Mouse-eared Myotis	VU
Mammals	*Myotis siligorensis*	Himalayan Whiskered Myotis	LC
Mammals	*Naemorhedus goral*	Himalayan Goral	NT
Mammals	*Neodon sikimensis*	Sikkim Vole	LC
Mammals	*Neofelis nebulosa*	Clouded Leopard	VU
Mammals	*Nesokia indica*	Short-tailed Bandicoot Rat	LC
Mammals	*Niviventer eha*	Little Himalayan Rat	LC
Mammals	*Niviventer fulvescens*	Chestnut White-bellied Rat	LC
Mammals	*Niviventer niviventer*	Himalayan White-bellied Rat	LC
Mammals	*Paguma larvata*	Masked Palm Civet	LC

Mammals	*Panthera pardus*	Leopard	VU
Mammals	*Panthera tigris*	Tiger	EN
Mammals	*Paradoxurus hermaphroditus*	Common Palm Civet	LC
Mammals	*Pardofelis marmorata*	Marbled Cat	NT
Mammals	*Petaurista elegans*	Spotted Giant Flying Squirrel	LC
Mammals	*Petaurista magnificus*	Hodgson's Giant Flying Squirrel	LC
Mammals	*Philetor brachypterus*	Short-winged Pipistrelle	LC
Mammals	*Pipistrellus coromandra*	Coromandel Pipistrelle	LC
Mammals	*Pipistrellus javanicus*	Javan Pipistrelle	LC
Mammals	*Pipistrellus tenuis*	Least Pipistrelle	LC
Mammals	*Prionailurus bengalensis*	Leopard Cat	LC
Mammals	*Prionodon pardicolor*	Spotted Linsang	LC
Mammals	*Pteropus giganteus*	Indian Flying Fox	LC
Mammals	*Rattus andamanensis*	Indochinese Forest Rat	LC
Mammals	*Rattus nitidus*	Himalayan Field Rat	LC
Mammals	*Rattus pyctoris*	Himalayan Rat	LC
Mammals	*Rattus rattus*	House Rat	LC
Mammals	*Rattus tanezumi*	Oriental House Rat	LC
Mammals	*Rhinolophus affinis*	Intermediate Horseshoe Bat	LC
Mammals	*Rhinolophus ferrumequinum*	Greater Horseshoe Bat	LC
Mammals	*Rhinolophus lepidus*	Blyth's Horseshoe Bat	LC
Mammals	*Rhinolophus luctus*	Great Woolly Horsehoe Bat	LC
Mammals	*Rhinolophus macrotis*	Big-eared Horseshoe Bat	LC
Mammals	*Rhinolophus pearsonii*	Pearson's Horseshoe Bat	LC
Mammals	*Rhinolophus pusillus*	Least Horseshoe Bat	LC
Mammals	*Rhinolophus sinicus*	Chinese Horseshoe Bat	LC
Mammals	*Rhinolophus subbadius*	Little Nepalese Horseshoe Bat	LC
Mammals	*Rusa unicolor*	Sambar	VU
Mammals	*Scotophilus heathii*	Greater Asiatic Yellow House Bat	LC
Mammals	*Scotozous dormeri*	Dormer's Pipistrelle	LC
Mammals	*Semnopithecus hector*	Tarai Gray Langur	NT
Mammals	*Semnopithecus schistaceus*	Nepal Gray Langur	LC
Mammals	*Suncus murinus*	House Shrew	LC
Mammals	*Sus scrofa*	Wild Boar	LC
Mammals	*Taphozous longimanus*	Long-winged Tomb Bat	LC
Mammals	*Tatera indica*	Indian Gerbil	LC
Mammals	*Ursus thibetanus*	Asiatic Black Bear	VU
Mammals	*Vandeleuria oleracea*	Asiatic Long-tailed Climbing Mouse	LC
Mammals	*Viverra zibetha*	Large Indian Civet	LC
Mammals	*Viverricula indica*	Small Indian Civet	LC

Mammals	*Vulpes bengalensis*	Bengal Fox	LC
Mammals	*Vulpes vulpes*	Red Fox	LC
Plants	*Anacyclus pyrethrum*	Atlas Daisy	VU
Plants	*Medicago sativa*	Alfalfa	LC
Plants	*Pistacia khinjuk*		LC
Reptiles	*Atretium schistosum*	Olive Keelback Water Snake	LC
Reptiles	*Batagur dhongoka*	Three-striped Roofed Turtle	EN
Reptiles	*Batagur kachuga*	Red-crowned Roofed Turtle	CR
Reptiles	*Boiga trigonata*	Indian Gamma Snake	LC
Reptiles	*Chitra indica*	Indian Narrow-headed Softshell Tu	EN
Reptiles	*Crocodylus palustris*	Mugger	VU
Reptiles	*Elachistodon westermanni*	Indian Egg-eater	LC
Reptiles	*Eutropis carinata*	Keeled Indian Mabuya	LC
Reptiles	*Gavialis gangeticus*	Gharial	CR
Reptiles	*Geoclemys hamiltonii*	Spotted Pond Turtle	VU
Reptiles	*Herpetoreas sieboldii*	Sikkim Keelback	DD
Reptiles	*Japalura tricarinata*	Three Keeled Mountain Lizard	LC
Reptiles	*Lissemys punctata*	Indian Flapshell Turtle	LR/lc
Reptiles	*Lycodon jara*	Yellow-speckled Wolfsnake	LC
Reptiles	*Melanochelys tricarinata*	Tricarinate Hill Turtle	VU
Reptiles	*Melanochelys trijuga*	Indian Black Turtle	LR/nt
Reptiles	*Morenia petersi*	Indian Eyed Turtle	VU
Reptiles	*Nilssonia gangetica*	Indian Softshell Turtle	VU
Reptiles	*Nilssonia hurum*	Indian Peacock Softshell Turtle	VU
Reptiles	*Ophiophagus hannah*	King Cobra	VU
Reptiles	*Ovophis monticola*	Chinese Mountain Pit Viper	LC
Reptiles	*Pangshura smithii*	Brown Roofed Turtle	LR/nt
Reptiles	*Pangshura tecta*	Indian Roofed Turtle	LR/lc
Reptiles	*Pangshura tentoria*	Indian Tent Turtle	LR/lc
Reptiles	*Protobothrops mucrosquamatus*	Brown Spotted Pitviper	LC
Reptiles	*Psammophis condanarus*	Indo-chinese Sand Snake	LC
Reptiles	*Pseudoxenodon macrops*	Large-eyed False Cobra	LC
Reptiles	*Sibynophis collaris*	Collared Black-headed Snake	LC
Reptiles	*Sitana ponticeriana*	Fan Throated Lizard	LC
Reptiles	*Trachischium guentheri*	Gunther's Oriental Worm Snake	LC
Reptiles	*Varanus bengalensis*	Common Indian Monitor	LC

About IBAT

The Integrated Biodiversity Assessment Tool (IBAT) provides key decision-makers with access to critical information on biodiversity priority sites to inform risk management and decision-making processes that address potential biodiversity impacts. Developed through a partnership of BirdLife International, Conservation International, International Union for Conservation of Nature (IUCN) and United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), the vision of IBAT is that decisions affecting critical natural habitats are informed by the best scientific information and in turn decision makers will support the quest to collect and enhance the underlying datasets and maintain that scientific information.

Appendix 4
Minutes of Meeting

Minutes 1

आज मिति २०७८।०२।०२ गते कटहरिया साना शहरी खानेपानी तथा सरसफाई उपभोक्ता संस्थाका अध्यक्ष श्री छोटेलाल मिश्र ज्युको अध्यक्षता बैठक बसि निम्न निर्णयहरु गरियो

उपस्थिति

१ छोटेलाल मिश्र (अध्यक्ष)
२ जामुन ठाकुर (उप-अध्यक्ष)
३ योगेन्द्र साह (सचिव)
४ रामबतेश साह (को-अध्यक्ष)
५. सकलाल शर्मा (सदस्य)
६. सकलाल महतो (")
७. जयन्ती देवी खेंडा (")
८. फाल्गु देवी पटेल (")
९. अहंगबहादुर देवी (")
प्रस्ताव १०. विद्यानन्द यादव

१०. राजदेव मुखिया
११ नुरुन्नत खातुन
१२ मशुधन अंसारी
१३. चन्दन कुमार
१४ [illegible]
१५ अरुणलाल
१६ विनोद साह

१. सतहि ढलको सम्बन्धमा ।

निर्णय

प्रस्ताव नं. १ माथि छलफल गर्दा कटहरिया खानेपानी उपभोक्ता तथा सरसफाई संस्था र त्यहाँका उपभोक्ताहरुले आयोजनाको शुरुवात देखि नै सतहि ढलको माग गर्दै आएको र हाल पनि उक्त माग कायम नै रहेको र उक्त सतहि ढलको निर्माणबाट कुनै सामाजिक तथा वातावरणीय प्रभाव नपर्ने कुरा समेत सम्बन्धि निकायलाई जानकारी गराउने सर्वसम्मतबाट निर्णय गरियो ।

English Translation for the Minutes of Meeting-1

Today dated 16th May, 2018, a public meeting with the beneficiaries of the service area of the Katahriya Water Supply & Sanitation Project and the concerned WUSC has been organized under the chairmanship of Mr. Chhotelal Mishra, Chairperson of Katahariya WUSC. The following mentioned decision has been made from the discussion regarding Storm Drain Project in the presence of the following mentioned participants:

Participants:

S. No.	Name of the Participants	Remarks
1	Mr. Chhotelal Mishra	Chairman, Katahariya WUSC
2	Mr. Jamun Thakur	Vice Chairman, Katahariya WUSC
3	Mr. Yogendra Sah	Secretary, Katahariya WUSC
4	Mr. Ram Prabesh Sah	Treasurer, Katahariya WUSC
5	Mr. Sakelal Gupta	Member, Katahariya WUSC
6	Mr. Sakelal Mahato	Member, Katahariya WUSC
7	Ms. Jayanta Devi Baitha	Member, Katahariya WUSC
8	Mr. Fula Devi Patel	Member, Katahariya WUSC
9	Mr. Junga Bahadur Chhetri	Member, Katahariya WUSC
10	Mr. Vidya Sagar Yadav	Katahariya Municipality
11	Mr. Raj Dev Mukhiya	Katahariya Municipality
12	Ms. Nurjan Khatun	Katahariya Municipality
13	Mr. Narashudhin Ansari	Katahariya Municipality
14	Mr. Chandan Kumar Kushwaha	Katahariya Municipality
15	Mr. Rakesh	Katahariya Municipality
16	Mr. Achhelal Sah	Katahariya Municipality
17	Mr. Binod Sah	Katahariya Municipality

Discussion & Decision:

Discussion: Regarding the Storm Drain Project

Decision: Regarding the discussion on Storm Drain Project, WUSC and the beneficiaries of the Katahariya Water Supply Project has been demanding for the construction of Storm Drain for the effective management of storm since the commencement of the water supply project and their demand is persistent at the present condition also. Since this storm drain project is purely for the management of storm runoff only, there will be no such effect on either social or environmental aspects. Hence, all of the participants committed to coordinate with the concerned authority for the construction of storm drain project and to support the design & construction team to sort out social & environmental issues if any.

Minutes 2

Katahariya Drainage

आज मिति २०६६।०४।१३ गतेका दिन यस कटहरीया तेस्रो खरिपानी मंच सरसफाई आयोजनाका अध्यक्ष श्री जीतेन्द्र साह ज्युको अध्यक्षतामा बैठक बस्यो।

उपस्थिति

अध्यक्ष श्री जीतेन्द्र साह
उपाध्यक्ष श्री जामुन ठाकुर
कोषाध्यक्ष श्री रुपकविता साह
सचिव श्री सर्फलाल महतो
सदस्य श्रीजीत बहादुर टोला
" श्री विद्या सागर राय यादव
" श्रीमति कुमोदिनी मंडल
" " अनिता बैठा
" श्री सर्फलाल गुप्ता
TABC WTH (CSE) विनय प्रसाद चौधरी
" " (Emps) अविनाश पंडित
" " (T.E.) निरंजन कुमार साह
" " (S.M) सिमा लुइटेल
ECN (कार्यक्रम स.) बिरेन्द्र साह
" (S.M) उर्मिला चौधरी
Ramam AS JV. (Er.) आदित्य ठाकुर
" " (Acct) मनहरी निरौला

आमन्त्रित उपस्थिति

श्री सियाराम कुशवाहा (मेयर) नगरप्रमुख
श्री फकन कुशवाहा (वडा-४) अध्यक्ष -
श्री आनन्द मोहनलाल दास (T.L) TABC -
श्री अनिल [illegible] यादव (C.M.S TABC).
श्री मेघा नन्द यादव (S.I. [illegible])
श्री [illegible]

प्रस्तावहरू

प्रस्ताव नं. (१) खानेपानी आयोजना सम्बन्धमा,
" (२) सतही नहर सम्बन्धमा,
" (३) विविध,

प्रस्ताव (१) माथि छलफल गर्दा आयोजनाको हालसम्मको प्रगति सम्बन्धमा छलफल गर्दा आयोजनाको प्रगति सन्तोष जनक भएको र समर्पण मोडमा रहेको भएकाले पानी सञ्चालन गरी[illegible] चरणमा लाग्दा लागि [illegible] निर्णय गरियो।

प्रस्ताव नं. (२) माथि छलफलगर्दा सतही नालाको ठेक्का लगाउँदै क्रमशः भिन्न क्रमागत कायम गर्नेको लागि आयोजनालाई सुझाव दिने निर्णय गरियो।

क्रमः :
(१) टेकी देखी बजार हुँदै टोलापुर सम्म,
(२) टेकी देखी कटहरिया जाने,
(३) बजारको देही नाला र बडाहुरपुर,
(४) थलिरामपुर, र
(५) हर्साहा,

English Translation for the Minutes of Meeting-2

Today dated 9th August, 2020, the meeting has been conducted under the chairmanship of Mr. Yogendra Sah, Chairman of Katahariya Water Supply & Sanitation Committee.

Participants:

1. Mr. Yogendra Sah, Chairman, Katahariya Water Supply & Sanitation Committee
2. Mr. Jamun Thakur, Vice Chairman, Katahariya Water Supply & Sanitation Committee
3. Mr. Ram Prabesh Sah, Treasurer, Katahariya Water Supply & Sanitation Committee
4. Mr. Surflal Mahato, Secretary, Katahariya Water Supply & Sanitation Committee
5. Mr. Jung Bahadur Rokka, Member, Katahariya Water Supply & Sanitation Committee
6. Mr. Vidya Sagar Ray Yadav, Member, Katahariya Water Supply & Sanitation Committee
7. Ms. Phulo Devi Patel, Member, Katahariya Water Supply & Sanitation Committee
8. Ms. Jyoti Baitha, Katahariya Water Supply & Sanitation Committee
9. Mr. Surflal Gupta, Katahariya Water Supply & Sanitation Committee
10. Mr. Binaya Prasad Chaudhary, CSE, TAEC Consult P. Ltd.
11. Mr. Abhinash Pandit, EMPS, TAEC Consult P. Ltd.
12. Mr. Birajan Kumar Sah, Jr. TAEC Consult P. Ltd.
13. Ms. Sita Luitel, S.M., TAEC Consult P. Ltd.
14. Mr. Birendra Sah, Office Assistant, ICG
15. Ms. Urmila Chaudhary, S.M., ICG
16. Mr. Adesh Thakur, Engineer, Raman AS JV\
17. Mr. Manahari Niraula, Accountant, Raman AS JV

Present Invitees:

1. Mr. Siyaram Kushwaha, Mayor, Katahariya Municipality
2. Mr. Chandan Kushwaha, Chairman of Ward no. 4
3. Mr. Ananda Mohanlal Das, Team Leader, TAEC Consult P. Ltd.
4. Mr. Anil Kumar Yadav, Contract Management Specialist, TAEC Consult P. Ltd.
5. Mr. Mahesh Prasad Yadav, Employee of Katahariya Municipality
6. Mr. Hari Nandan Chaudhary, Engineer

Proposals:

1. In regard to the water supply project
2. In regard to storm drainage project
3. Miscellaneous

Decisions:

1. In regard to the discussion done on the proposal 1, the progress of the ongoing water supply project is satisfactory and it has been decided to take initiative with all the stakeholders to precede the project towards second phase as water supply distribution has already been operated to all the service areas.
2. In regard to the discussion done on the proposal 2, it has been decided to appeal the project to follow the following mentioned points serially during the tendering process of the storm drains:
    a) From Tank via Bazaar to Tolapur
    b) From Tank to Katahariya Gaon
    c) Some parts of bazaar and Bahadurpur
    d) Balirampur and,
    e) Harsaha

Minutes 3

आज मिति २०६८-११-१५ गतेका दिन यस कटहरीया नगरपालिका निर्माणहरूको सतहि कलको डिपार्ट रिपोर्ट प्रस्तुतीकरण कार्यक्रम यस कटहरीया नगर पालिकाका नगर प्रमुख श्री सियाराम प्रसाद कुशवाहा ज्यू को अध्यक्षतामा निम्न लिखित महानुभावहरूको उपस्थीतीमा छलफल तथा निर्णयहरू गरीयो

उपस्थीती:-

(१) श्री सियाराम प्रसाद कुशवाहा नगर प्रमुख
(२) श्री श्याम कुमार सिंह नगर प्रमुख प्रशासकिय अधिकृत
(३) श्री सर्फलाल प्रसाद गुप्ता

(४) श्री चन्दन कुमार कुशवाह - वडा अध्यक्ष - ४
(५) श्री योगेन्द्र प्रसाद साह - वडा नं अध्यक्ष
(६) श्री राकेश कुमार गिरी स्वा. पा. स.स. सल्लाहकार
(७) श्री नसरुदिन अन्सारी खा.पा. स.स. सल्लाहकार
(८) श्री सर्फलाल महतो कटहरीया पा सं.स सचिव
(९) श्री राम प्रवेश साह को.पा.अध्यक्ष कं.खा.पा.उ.स
(१०) श्री नागेन्द्र - साह - स्थानिय - ५
(११) श्री छोटेलाल मिस्त्रा - स्थानीय - ५ - सल्लाहकार
(१२) श्री जयकिशोर प्रसाद शिक्षक
१३. " रामनारायण यादव
१४ श्यामला महतो कोइरी कटहरीया - २
१५ नागेन्द्र साह कटहरीया - ५
१६ राम बाबु साह कटहरीया नं.पा. ०५
(१७) बालेराम महतो कटहरीया - ५
१८. जौवाहर कुमार शाह कटहरीया
१९ जयन्ती
२० फुलहा देवी
२१ सरफलाल मडंल

२२। बिनोद साह (बिनोद)

२३ राजुकुमार श्रीवास्तव - कटहरिया एफएम - [illegible]

२४ महेश प्रसाद यादव कटहरिया उ.मा. वि. [illegible]

(२५) कैरवनाथ [illegible] कल्याणकारी प्रतिनिधि, [illegible]

विशेष उपस्थिती

(२६) श्री नारायण प्रसाद आचार्य - उप मा. प्रमुख मा. [illegible]

(२७) श्री विनोद चन्द्र देवकोटा, डिजाईन इन्जीनियर

(२८) श्री शिव अधिकारी सा.सु विज्ञ - PMGAC

प्रस्तावहरु

(१) १५% नगद नगरपालिकाले व्यहोर्ने सम्बन्धमा

(२) कार्यक्रम संचालन गर्दा सामाजिक सुरक्षण, वातावरण सुरक्षण निति अवलम्बन गर्ने सम्बन्धमा

(३) आवश्यक जग्गा जमिन उपलब्ध गराउने सम्बन्धमा

(४) फाईनल रिपोर्ट प्रस्तुतीकरण सम्बन्धमा

(५) सडकमा अनुमती लिने वा नगरपालिकाले स्वीकृत गर्दिने सम्बन्धमा ।

निर्णयहरु

(१) प्रस्ताव नं १. माथी छलफल गर्दा सतहढलको (कोईटडडा रुनाल अनुसार) काम गर्दा लागतको १५% रकम यस कटहरीया नगरपालिकाले व्यहोर्ने निर्णय गरीयो ।

(२) ढल निकासको काम गर्दा सामाजिक सुरक्षण जस्तो कुनै व्यक्ती वा संघ संस्थाको जग्गा जमिन वा निजी सम्पतीमा नपर्ने, कसैको जनजिवन वा जिवन यापन गर्ने व्यपार व्यवसायमा प्रभाव नपर्ने गरी काम गर्ने गराउनको साथै

वातावरणलाई असर प्रभाव नपर्ने गरी आवश्यक संरचना निर्माण गर्ने निर्णय गरीयो ।

(३) प्रस्ताव नं. ३ माथी छलफल गर्दा आवश्यक संरचना निर्माण गर्नु पर्ने स्थानमा नगर पालिकाले जग्गा उपलब्ध गराउनु पर्ने छ । तो आवश्यक ठाउँहरुमा यदि आवश्यक परेमा आवश्यक जग्गा नगर पालिकाले उपलब्ध गराउने निर्णय गरीयो । छलफल गर्दा हाल भैरहेका - पोखरी, खोल्सा, र पानीका स्रोतहरु मा सतही जल को पानी निकास गर्ने ठुला - ठुला कर्न जग्गा लिनु पर्ने देखीदैन ।

(४) प्रस्ताव नं. ४ माथी छलफल गर्दा, यस नगर पालिका भित्र निर्माण हुने सतहि जलको डिजाईन गरी डिजाईन कन्सल्टेन्ट ले फाईनल डिजाईन रिपोर्ट तयार गरी स्थानिय निकायमा सरोकारवाला को आगमा प्रस्तुत गरी आवश्यक राय सल्लाह तथा छलफल गरी जानकारी गराईयो । यस छलफल बाट डिजाईन लाई पूर्णता दिने र यसै डिजाईन को अनुसार कार्य गर्ने निर्णय गरीयो ।

(५) यस कटहरीया-को प्रस्ताव नं. ५ माथी छलफल गर्दा, यस कटहरीया नगरपालिका - बजार र वरीपरीका टोलहरुमा ढलको निर्माण गर्दा सडक को अधिकार क्षेत्र (ROW) भित्र निर्माण गर्नु आवश्यक भएकोले सो को लागी स्थानीय सडको लागी यस नगर पालिका ले अनुमति दिने निर्णय गरीयो ।

English Translation for the Minutes of Meeting-3

Today dated 27th February, 2020; detailed design report presentation of Katahariya Storm Drainage Project has been conducted under the chairmanship of Mr. Siya Ram Prasad Kushwaha, Mayor of Katahariya Municipality and the discussion & decisions have been made accordingly in the presence of the following mentioned participants:

Details of the Participants:

1. Mr. Siyaram Prasad Kushwaha, Mayor
2. Mr. Shyam Kumar Singh, Administrative Officer
3. Mr. Sarflal Prasad Gupta, Officer
4. Mr. Chandan Kumar Kushwaha, Ward Chairman-4
5. Mr. Yogendra Prasad Sah, Chairman, Water Supply & Sanitation Committee
6. Mr. Rakesh Kumar Giri, Advisor, Water Supply & Sanitation Committee
7. Mr. Nasuruddhin Ansari, Advisor, Water Supply & Sanitation Committee
8. Mr. Sarflal Mahato, Secretary, Water Supply & Sanitation Committee
9. Mr. Ram Prabesh Sah, Treasurer, Water Supply & Sanitation Committee
10. Mr. Nagendra Sah, Local, Ward no. 5
11. Mr. Chhotelal Mishra, Local, Ward no. 5, Advisor
12. Mr. Jay Kishore Prasad Sah, Teacher
13. Mr. Raj Narayan Sah,
14. Rayagya Mahato, Katahariya-5
15. Mr. Nagendra Sah, Katahariya-5
16. Mr. Ram Babu Sah, Katahariya-5
17. Mr. Baliram Mahato, Katahariya-5
18. Mr. Jung Bahadur Mahato, Katahariya-5
19. Ms. Jayanti
20. Ms. Fuladevi
21. Mr. Saraflal Mahato
22. Mr. Binod Sah
23. Mr. Rajkumar Shrivastav, Katahariya FM
24. Mr. Mahesh Prasad Yadav,
25. Mr. Lekhnath Niraula, Contractor Representative

Special Participants:

1. Mr. Narayan Prasad Acharya, Deputy Project Director, PMO
2. Mr. Binod Chandra Devkota, Design Engineer
3. Mr. Shiva Adhikari, Social Safeguard Expert, PMQAC

Proposals:

1. In regard to 15% of the project cost to be borne by the municipality
2. In regard to policy support related to social safeguard and environmental safeguard aspects during project construction period
3. In regard to provision of the required land
4. In regard to Final Report presentation
5. In regard to getting approval from either DoR or municipality

Decisions:

1. Regarding the discussion on the proposal no. 1, it has been decided that during the project construction, 15% of the total project cost (approximately 8 crores 50 lakhs) will be borne by the municipality.
2. During the project construction works, it has also been decided to carry out the construction works as well as to make others proceed the works without affecting the social aspects like without interfering the land or private property of any person or organization or without affecting the trade/business of people that can be their livelihood and to construct the required project components without affecting the environment.
3. Regarding the discussion on the proposal no. 3, it has been decided that the land required for the construction of the proposed project components is to be made available by the municipality itself. Hence, it has been decided to make the required land available by the municipality if required however, the discussion concludes that there is no requirement of any separate land for the storm drainage.
4. Regarding the discussion on the proposal no. 4, the design consultant gave the local level presentation on the final design report of the proposed storm drainage project after the completion of final design, to the stakeholders followed by required reviews and discussions. It has been decided from the discussion to accomplish the design and to carry out work as per this design.
5. Regarding the discussion on the proposal no. 5, during the construction of drains in Katahariya Bazaar and surrounding neighborhoods/areas, it is required to construct the drains within ROW hence; it has been decided to grant approval at the local level by the municipality for this.

Appendix 5
Simple Checklists & Sample Survey Questionnaire

SIMPLE CHECKLISTS

A. CHECKLIST FOR PHYSICO CHEMICAL ENVIRONMENT

Checklists for Physico Chemical Environment

Parameters	Description
Topography	Terai Region, Plain area, Hence, Flat Topography
Geology (Rock and Soil Types)	→ Quartzite, Feld spathic mica schist → Alluvial Deposits (Sand, Clay, Silt, Gravels)
Erosion and Sedimentation	No
Floods	During Moncoons at Lal Bakaiya River (Flashy Floods)
Climate	Hot & Temperate, Less Rainfall in winter, Avg. rainfall : 1650 mm
Quarry Sites (If any)	No
Land Use	Agricultural land-dominant followed by residential, commercial and Forests.
Air Quality	Medium
Water Quality	Medium
Noise Level	Medium
Drainage Network	Existing Drains at few locations

B. Vegetation and Wildlife

Vegetation in the project area

SN	Local Name	Botanical Name	Location	Vegetation Type	Local Status	Local Uses		Protection Status		
							IUCN	CITES	GoN	IBAT
1.	Sal	Shorea robusta	Nearby forests	Trees	LC	Medicinal, Making Plates, cups ("Boori") Edible Seeds, fuelwood	LC	LC	LC	LC
2.	Khair	Acacia catechu	"	"	"	Medicinal Uses, Edible Seeds, Dyeing, Tanning	LC	LC	LC	LC
3.	Asan	Terminalia tomentosa	"	"	"	Furniture, Paneling	"	"	"	"
4.	Karma	Adina cordifolia	"	"	"	Medicinal Uses, Const" Works	"	"	"	"
5.	Jaamun	Syzgium cumini	"	"	"	Edible Fruits, Agroforestry	"	"	"	"
6.	Sisau	Dalbergia sissoo	"	"	"	Agroforestry, Paper Making, Furniture	"	"	"	"
7.	Seto Siris	Albizia procera	"	"	"	Edible Leaves, Agro-forestry, Medicinal, Fuelwood, Furniture	LC	LC	LC	LC
8.	Bakaino	Melia azedarach	"	"	"	Edible Fruits, Agroforestry	LC	LC	LC	LC
9.	Sagaun	Tectona grandis	"	"	"	Medicinal, Const" works, Fuel Wood	LC	LC	LC	LC
10.	Bel	Aegle marmelos	"	"	"	Fruits, Agroforestry Medicinal, Religious	LC	LC	LC	LC
11.	Bot Dhayaro	Lagerstroemia parviflora	"	"	"	Edible Gum, Carpentry, Black Dye	LC	LC	LC	LC

SN	Local Name	Botanical Name	Location	Vegetation Type	Local Status	Local Uses		Protection Status		
							IUCN	CITES	GoN	IBAT
Non-Timber Forest Products										
1.	Bans	Bambusa	Open Forest, Near Human Habitation	Grass	LC	Edible Shoots, Medicinal, Agroforestry etc.	LC	LC	LC	LC
2.	Amala	Emblica officinalis	"	Trees	"	Edible, Medicinal	LC	LC	LC	LC
3.	Harro	Terminalia chebula	"	"	"	Medicinal, Dyeing, Edible Seeds	"	"	"	"
4.	Barro	Terminalia bellirica	"	"	"	Medicinal, Religious	"	"	"	"
5.	Neem	Azadirachta indica	"	"	"	Medicinal, Edible fruits, Agroforestry	"	"	"	"
6.	Jhar Beri	Ziziphus nummularia	"	Shrubs	"	Fuel, Medicinal, Fodder, Food etc.	"	"	"	"
7.	Maygo	Magnifera indica	"	Trees	"	Edible fruits, Seeds, Medicinal etc	"	"	"	"
8.	Guava	Psidium guajava	"	"	"	Medicinal, Agroforestry, Edible fruits	"	"	"	"
9.	Simal	Bombax ceiba	"	"	"	Medicinal, Agroforestry, various other uses	"	"	"	"
10.	Pipal	Ficus religiosa	"	Trees	"	Religious, Medicinal, Dyeing, etc.	"	"	"	"

Mammals in the project area

SN	Common Name	Scientific Name	Habitat	Local Status	Crop/Livestock Raider	Protection Status			
						IUCN	CITES	GoN	IBAT
1.	Common Mongoose	Herpestes edwardsii	Nearby Forests Agricultural field	Commonly Found	No	LC	LC	LC	LC
2.	Fox	Vulpes vulpes	Nearby Forests	Occasionally found	Livestock Raider	"	"	"	"
3.	Golden Jackal	Canis aureus	"	Occasionally spotted	"	"	"	"	"
4.	Hare	Lepus nigricollis	"	Commonly Found	No	"	"	"	"
5.	Jungle Cat	Felis Chaus	"	Occasionally Spotted	Livestock Raider	"	"	"	"
6.	Jungle Rat	Bandicota indica	Nearby Forests Fields	Commonly found	Crop Raider	"	"	"	"
7.	Long winged Tomb Bat	Taphozous longimanus	Nearby Forests	"	No	"	"	"	"
8.	Rhesus Monkey	Macaca mulatta	"	Commonly Found	Crop Raider	"	"	"	"
9.	Squirrel	Funambulus sp	"	"	"	"	"	"	"

Birds Sighted in the project area

SN	Common Name	Scientific Name	Type	Habitat	Local Status	Protection Status			
						IUCN	CITES	GoN	IBAT
1.	Blossom headed parakeet	Psittacula roseata	Parrot,	Nearby Forests, Human habitations	LC	LC	LC	LC	LC
2.	Common Moor Hen	Gallinula chloropus	Water Hen	Nearby Human Settlements	LC	"	"	"	"
3.	Grey Headed Canary Fly Catcher	Culicicapa ceylonensis	Insectivore	Nearby Forests	LC	"	"	"	"
4.	Indian Cuckoo	Cuculus micropterus	Cuckoo	Nearby Forests	LC	"	"	"	"
5.	Kalij Pheasant	Lophura leucomelanus	Pheasant	"	LC	"	"	"	"
6.	Large Billed Crow	Corvus macrorhynchos	Jungle Crow	Nearby Forests, Human Settlements	LC	"	"	"	"
7.	Northern Pintail	Anas acuta	Duck	Human Settlements	LC	"	"	"	"
8.	Red Jungle Fowl	Gallus gallus	Tropical	"	LC	"	"	"	"
9.	Red whiskered bulbul	Pycnonotus jocosus	Passerine	Open areas with bushes, Gardens	LC	"	"	"	"
10.	Rose ringed parakeet	Psittacula krameri	Psittacidae	Nearby Forests, Cultivated Areas, Gardens, Parks	LC	"	"	"	"
11.	Scaly-bellied Woodpecker	Picus squamatus	Picidae Family	Nearby Forests	LC	"	"	"	"

Herpeto-fauna in the Project Area

S.N.	Local Name	Scientific Name	Habitat	Local Status	Protection Status			
					IUCN	CITES	GoN	IBAT
1.	Large eyed false cobra	Pseudoxenodon macrops	Nearby forests and occasionally in human settlements	Occasionally spotted	LC	LC	LC	LC
2.	Common krait	Bungarus caeruleus	"	"	"	"	"	"
3.	Common Lizard	Zootoca vivipara	Human Settlements	Commonly Found	"	"	"	"
4.	Common Toad	Duttaphrynus melanostictus	Shrubland near stream, vicinity of seepage in fields	Commonly Found	"	"	"	"
5.	Fan Throated Lizard	Sitana ponticeriana	Nearby Forests	Occasionally Spotted	"	"	"	"
6.	Stream Frog	Ranacyanophylectis	Nearby Streams	Commonly Found	"	"	"	"

Fish in the Project Area

S.N.	Local Name	Scientific Name	Status of Occurrence	Migratory Status/Season	Observed Location
1.	Bam	Monopterus albus	LC		Lal Bakaiya River
2.	Garahi	Channa gachua	LC		"
3.	Rohu (Mrigal)	Cirrhinus mrigala	LC		"
4.	Rohu (Minor Carp)	Labeo bata	LC		"

SAMPLE OF SURVEY QUESTINNAIRE

तेश्रो साना शहरी खानेपानी तथा सरसफाइ आयोजना
घरधुरी सर्वेक्षण वृस्तित् प्रश्नावली
(आयोजना प्रयोजनको लागिमात्र तथ्यांकको प्रयोग गरिनेछ)

नगर आयोजना: कञ्चरिया नगर आयोजना घर नं. १९

जिल्ला सीतहट नगरपालिका/गा.वि.स. कञ्चरिया वडा नं. ४ (बहादुरपुर)

अन्तरवार्ता लिनेको नाम : २०६३/०३/१७ अन्तरवार्ता मिति : २०६३/०३/१७

सुपरिवेक्षकको नाम : ..... नोड नं: 2N3 - 2N12

१. सामाजिक-आर्थिक तथा अन्य विवरण
(उपयुक्त कोठामा (√) यो चिन्ह लगाउनुस् वा आवश्यक विवरणहरु भर्नुहोस्)

१.१ अन्तरवार्ता दिनेको नाम : दिपेन्द्र राय यादव

१.२ घरमुलिको नाम ..दिपेन्द्र राय यादव.. लिङ्ग : पुरुष ☑ महिला ☐ तेश्रो लिङ्गि ☐ पेशा ☐

परिवार सदस्य: पुरुष: 2 महिला: 9 तेश्रो लिङ्गि..... जम्मा: 3 एकल महिला घरमुलि भए ☐

१.३ यस परिवारमा शारिरिक रुपमा अशक्तता भएका परिवार सदस्य संख्या: ☐

१.४ जाति/जनजातिमध्ये कुन हो? क) ब्राम्हण/क्षेत्री ☐ ख) जनजाति ☐ ग) दलित ☐ घ) अन्य ☑

परिवारको स्वरुप : एकल ☑ संयुक्त ☐

१.५ घर परिवारका सदस्यहरुको विवरण दिनुहोस्

क्र.सं.	घरपरिवारका सदस्यको नाम	उमेर	लिङ्ग	शिक्षा स्तर	पेशा
१					
२					
३					
४					
५					
६					
७					
८					
९					
१०					

नोट: पेशा : १. कृषि २. व्यापार ३. नौकरी ४. उद्योगधन्दा ५. रेमिटेन्स (वैदेशिक रोजगार)
६. ज्यालादारी ७. अन्य ८) कुनै पेशा नभएका आश्रित जस्तै: विद्यार्थी, गृहिणी, अशक्त बुढाबुढी, ५ वर्ष मुनिका बालबालिका आदि नोट गर्ने)

१.६ शिक्षा : १. निरक्षर २. साक्षर ३. प्राथमिकसम्म ४. माध्यमिकसम्म ५. एस.एल.सी. उतिर्ण
६. आई.ए. ७. बि.ए. ८. एम. ए. ९. अन्य

१.७ यस परिवारमा बसोबास गर्ने अन्य सदस्यहरुको विवरण: सहयोगी ☐ डेरावाल ☐ कुल संख्या ☐

१.८ यस नगर/शहरमा कहिले देखि बस्दै आउनु भएको छ ? ☐ वर्ष

स्वबासी ☑ बसाइ सरेको ☐ बसाई सरी आएको भए कुन जिल्लाबाट .....

१.९ बसाई सर्नुको कारण: प्राकृतिक प्रकोप ☐ व्यापार/व्यवसाय ☐ शिक्षा ☐ द्वन्द ☐ जिविकोपार्जन ☐

१.१० यो घर आफ्नै हो ? हो ☑ भाडामा बसेको ☐ अन्य ☐ भाडामा बसेको भए मासिक कति तिर्नुहुन्छ ☐

१.११ यस घरमा भान्छा कोठा बाहेक अन्य कति वटा कोठाहरू छन् ?

१ कोठा ☐ २ कोठा ☑ ३ कोठा ☐ कोठा वा सो भन्दा बढी ☐

१.१२ घरको अवलोकन गरी घरको किसिम लेख्ने । पक्की ☐ पक्की ☑ कच्ची ☐

(पक्की : छत ढलान, अर्ध पक्की : ढुङ्गा/इङ्टाको गाह्रो, टीनको छाना/ढुङ्गा/स्लेट,फिगटी/टायल बाधि, कच्ची : माटो गाह्रो र खर/टायल/खपडाले छाएको)

१.१३ यस परिवारसंग जग्गा जमीन छ ? छ ☑ छैन ☐ (छैनभने सुकुम्बासीको रूपमा गणना गर्ने)

जग्गा कति छ ? : ८ कठ्ठा

१.१४ यहाँले गाई/भैसी पाल्नु भएकोछ ? छ ☑ छैन ☐ छ भने कतिवटा ? एउटा ☐ दुईवटा वा बढी ☑

१.१५ तपाईको परिवारमा तल उल्लेखित कुन कुन सामान छन् ? (भएको सामानको संख्या लेख्ने)

क.सं.	सम्पत्ती	संख्या	कैफियत	क.सं.	सम्पत्ती	संख्या	कैफियत
१	साइकल/रिक्सा	१		९	स्टोभ/ग्याँस चुल्हो	१	
२	मोटरसाईकल			१०	रेफ्रिजेटर		
३	बैलगाडा			११	बासिङ्ग मेशिन		
४	कार/जिप			१२	वाटर फिल्टर	१	
५	मिनीबस/बस			१३	कम्प्युटर		
६	ट्रयाक्टर/ट्रक			१४	इमेल/इन्टरनेटको पहुँच	१	
७	रेडियो/क्यासेट	१		१५	अन्य भए उल्लेख गर्ने ।		
८	टेलिभिजन/भिडियोसेट	१					

१.१६ यदि मुल पेशा कृषि भए कति महिना खान पुग्छ ? ३ महिना ☐ ६ महिना ☐ ९महिना ☐ १२ महिना ☐

यदि नपुग भएमा कसरी थान्नु हुन्छ ? १. ऋ☐पार २. ☐करी ३. उ☐धारदा ४. रेमिटेन्स (वैदेशिक रोजगार) ५. ज्याला ६. अन्य

१.१७ तपाईको परिवारको औसत वार्षिक खर्च कति छ उल्लेख गर्नुहोस । ☐

क.सं.	खर्चको शिर्षक र किसिम	मासिक खर्च रु.	कैफियत
१	(क) कृषि तर्फ		
१.१	रसायनिक मल, बिउ, किटनाशक आदी खरिद गर्न		
१.२	माटोको तैयारी, रोप्ने, गोड्ने, बाली काट्ने, भित्याउने, ढुवानी र बिक्री गर्दा हुने खर्च		
१.३	अन्य भए (उल्लेख गर्नुहु)		
	(क) को जम्मा		
२	(ख) गैह्र कृषि तर्फ		
२.१	खाद्यान्न (अन्न र दैनिक उपभोग्य वस्तु)		
२.२	कपडा		
२.३	शिक्षा		
२.४	घर भाडा/घर मर्मत		
२.५	यातायात/संचार		
२.६	बिद्युत		
२.७	पानी पोत /मर्मत सम्भार		
२.८	औषधि/उपचार (पानीबाट हुने रोग)		..... वार्षिक खर्च
२.९	औषधि/उपचार (अन्य रोग)		..... वार्षिक खर्च
२.१०	अन्य चाडपर्व कर्मकाण्ड संस्कार आदि उल्लेख गर्ने		..... वार्षिक खर्च
	(ख) को जम्मा		
	क+ख को कुल जम्मा	९०,०००/-	

१.१८ तपाईको परिवारको औसत मासिक आय कति छ ? उल्लेख गर्नुहोस ।

क.सं	आयस्रोत	संलग्न परिवार		प्राप्त हुने आय (रु. मासिक)	कैफियत
		पुरुष	महिला		
१	(क) कृषि तर्फ				

१.१	कृषि उत्पादनको बिक्रीबाट आय (मकै, गहुँ, धान, तरकारी, फलफूल)				
१.२	पशुजन्य उत्पादन (दुध, दही, घ्यु, बाख्रा, कुखुरा आदि)				
	(क) को जम्मा				
२	(ख) गैह्र कृषि तर्फ				
२.१	नोकरी / जागिर				
२.२	ज्यालादारी, मजदुरी				
२.३	पेन्सन/उपदान आदी				
२.४	वैदेशीक रोजगार (रेमिटेन्स)				
२.५	पसल/व्यापार				
२.६	उद्योग				
२.७	पसल/घर भाडा				
२.८	गाडी/डुवानी व्यवसाय				
२.९	अन्य भए उल्लेख गर्ने				
	(ख) को जम्मा				
	क+ख कुल जम्मा			९५,०००/-	

१.१९ यहाँको परिवारले कुनै ऋण लिएको छ ? छ ☐ छैन ☑ (छ भने रकम रु)

२. खानेपानी तथा सरसफाइ व्यवस्थापन

२.१ तपाईको परिवारले पिउन, खाना पकाउनको लागि प्रयोग गर्ने पानीको श्रोत कुन हो ? दैनिक कति लिटर पानी खर्चनु हुन्छ ? कृपया तलको कोठामा(✓) चिन्ह लगाउनुहोस् ।

क्र.सं.	वर्षामाममा	✓	लिटर/दैनिक	सुख्खा याममा	✓	लिटर/दैनिक
१.	ईनार/कुवा	A		ईनार/कुवा	A	
२.	ट्युबेल/हयाण्डपम्प/डिप ट्युबेल	A	9000	ट्युबेल/हयाण्डपम्प/डिप ट्युबेल	A	
६.	सार्वजनिक धारा	A		सार्वजनिक धारा	A	
७.	निजी धारा	A		निजी धारा	A	
८.	मूल, खोला, नदी, पोखरी	A		मूल खोला, नदी, पोखरी	A	
९.	बिकेताकेँग पानी फिल्टर	A		बिकेताकेँग पानी फिल्टर	A	
१०.	वर्षातको पानी संकलन गरेर	A		वर्षातको पानी संकलन गरेर	A	
११.	अन्य	A		अन्य	A	

२.३ दैनिक आवश्यक पानी आपूर्ति गर्नका लागि पानी संकलनबारे निम्न विस्तृत विवरण दिनुहोस् ।

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

नोट : बलारकार्ता जिने व्यक्तिले पानीको भाँडो हेरी सोको क्षमता थाकिन यदि परिमाणउल्लेख गर्ने ।

३. निजी धारा जडान

३.१ के तपाईले घरमा पाइप धारा जडान गर्नु भएको छ ? छ ☐ छैन ☑ यदि छ भने कस्तो प्रकारको छ ?

क) घरभित्र निजी धारा ☐ ख) कम्पाउण्डभित्र निजी धार ग) सामुदायिक धारा ☐

३.२ तपाइको घरमा प्रयोग हुने पानीको गुणस्तर कस्तो छ ? १) राम्रो २) ठिकै ३) खराब

३.३ के तपाई आफ्नो घरमा धारा जोड्न चाहनु हुन्छ ? चाहन्छु ☑ चाहन्न ☐

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

क) खर्च गर्ने क्षमता नभएकोले ☐ ख) जडान शुल्क धेरै पर्ने भएकोले ☐

ग) मासिक पानी बिल धेरै आउने भएकोले ☐ घ) पानीको मात्रा पर्याप्त नभएकोले ☐

ङ) पानीको आपूर्ति नियमित नभएकोले ☐ च) यस क्षेत्रमा पाइपलाइन जडान गर्ने व्यवस्था उपलब्ध नभएकोले ☑

छ) पानीको गुणस्तर राम्रो नभएकोले ☐ ज) अन्य कारण उल्लेख गर्ने ☐ झ) थाहा छैन ☐

३.५ हाल तपाईले पानीधारा बापत महिनामा पानीको महशुल तिर्दै हुनुहुन्छ ? छ ☐ छैन ☑

सह-लगानि अवधारणा सम्बन्धी प्राथमिकता

४.१ यदि तपाईको नगरपालिका/गा.वि.स. मा विभिन्न योजना सन्चालन गर्न रकम उपलब्ध छ भने निम्नलिखित मध्ये कुन कुन २ योजनालाई पहिलो प्राथमिकता दिनुहुन्छ ?

क)	सडक बत्ती	☐	छ)	विद्युत	☐
ख)	कालोपत्रे सडक	☐	ज)	संचार	☐
ग)	विद्यालय	☐	झ)	सरसफाइ/सुविधा	☐
घ)	अस्पताल	२	ञ)	सिचाई	☐
ङ)	व्यवस्थित खानेपानी प्रणाली	१	ट)	पाटीपौवा धर्मशाला	☐
च)	पैदलयात्री सडक	☐	ठ)	अन्य	

४.२ यदि तपाईको घरमा धारा छैन र निजी धारा राख्न इच्छुक हुनुहुन्छ भने, कति रकम सह-लगानी गर्न सक्नुहुन्छ ? कृपया तल दिईएको तालिकामा निजि धारा राख्न कति रकम सम्म लगानी गर्नुहुन्छ लगानीको रकमको सीमामा ☑ चिन्ह लगाउनुहोस ।

क.सं.	लगानीको विवरण	☑ चिन्ह लगाउने	क.सं.	लगानीको विवरण	☑ चिन्ह लगाउने
१.	१५००० भन्दा माथि	☐	४.	३००१ देखि ६००० सम्म	☐
२.	९००१ देखि १५००० सम्म	☐	५.	१५०१ देखि ३००० सम्म	☐
३.	६००१ देखि ९००० सम्म	☐	६.	१५०० भन्दा कम	☑

४.३ निजी धारा जडान बापत लाग्ने शुल्क ब्याहोर्नु पर्नेछ? मन्जुर छ ☑ मन्जुर छैन ☐

४.४ नयाँ खानेपानी योजना शुरु भएमा आफ्नो घरमा धारा जडान गरी नयाँ नियमानुसार मासिक पानी महशुल नियमित बुझाउनु तयार हुनुहुन्छ? ☐

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

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

४.५ नयाँ खानेपानी वितरण प्रणालीको व्यवस्था हुँदा तपाईको परिवारबाट प्रतिबद्धता स्वरुप अग्रिम लागतको ५% रकम दिन तयार हुनु हुन्छ ? छ ☑ छैन ☐

४.६ नयाँ सरसफाई सुविधा (सामुदायिक शौचालय तथा सतही ढल) निर्माणको लागि सह लगानी स्वरुप १५% स्थानीय निकाय र उपभोक्ताले सहलगानी गर्न इच्छुक हुनुहुन्छ? छ ☑ छैन ☐

५.लैङ्गिक दृष्टिकोणबाट महिला सहभागिता

(आयोजनाको विभिन्न चरणमा महिला सहभागिता सम्बन्धि, गैरसामान्वित विपन्न वर्गको, आदिवासी जनजाति, दलित तथा पिछडिए एका वर्गको समावेशी सहभागिता सम्बन्धि जानकारी संकलन गर्न प्रत्येक घरदैलोमा सोधिने प्रश्नहरुतल प्रस्तुत गरिएको छ ।)

क) महिलाहरुको उपस्थिति र सहभागीता

५.१ आयोजनाकोबारेमा छलफल गर्न कुनै बैठक बोलाईएको थियो ?

थियो ☐ थिएन ☐ थाहा भएन

५.२ के आयोजनाको छनौट गर्न बैठकमा महिला उपभोक्ताहरुको उपस्थिती थियो ?

थियो ☐ थिएन ☐ थाहा भएन

यदि थियो भने महिला उपभोक्ताहरुको भुमिका कस्तो थियो ?

सुन्ने मात्र ☐ अन्तर्क्रियात्मक ☐ निर्णायक ☐

५.३ आयोजनाको क्रियाकलापहरुको रेखदेख गर्न के खानेपानी उपभोक्ता तथा सरसफाइ समिति/संस्था गठन भएको छ ? छ ☑ छैनभाने छैन ☐

ख) लैङ्गिकताका आधारमा कार्य विभाजन

५.४ तलको तालिकामा दिइएको कामहरूअक्सर कस्ले गर्ने गर्दछ? (√)चिन्ह लगाउनुस्

(दैनिक घण्टामा)

क्र.सं	घरायसि क्रियाकलापहरु	पुरुष	महिला	कुल समय
१	खानेपानी भर्ने, बोक्ने, भण्डारण	२	१	२
२	भान्छा तयार गर्ने, भाडाँ माझ्ने		✓	४
३	बालबालिका र वृद्धवृद्धाको स्याहार		✓	४ दैनिक
४	सुगा धुने घर सफा गर्ने		✓	३
५	खाद्यान्न भण्डारण तथा तयारी		✓	१
६	अन्य			

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

५.५ तलको तालिकामा उल्लेखित पारिवारीक विषय वा क्षेत्रहरुमा निर्णय गर्दा यहाँको घर परिवारमा महिलाको भनाई सुनुवाई हुन्छ ? उपयुक्त कोठामा (√)चिन्ह लगाउनुस्

क्र.सं	विषय वा कार्यक्षेत्रहरु	हुन्छ (√)	हुदैन (√)
१	आर्थिक सरोकारका कुराहरु		✓
२	केटाकेटीको शिक्षा दिक्षा	✓	
३	केटाकेटी र वृद्धवृद्धाको स्वास्थ्य र स्याहार	✓	
४	अचल सम्पति किनबेच (घर जग्गा)		✓
५	दैनिक क्रियाकलापहरु	✓	
६	सामाजिक विधि व्यवहार, विवाह, वर्तवन्ध, चाडपर्व तथा सामाजिक/पारिवारीक सुसम्बन्धन आदि	✓	
७	अन्य		

५.६ यहाँको परिवारमा पारिवारीक सम्पतिका निम्न विषयमा महिलाको पहुँच र स्वामित्व रहेको छ छैन तलको तालिकामा उपयुक्त कोठामा (√)चिन्ह लगाउनुस्

क्र सं	विवरण	पहुँच	स्वामित्व
१	जग्गा जमिन	✓	
२	घर तथा अन्य संरचनाहरू	✓	
३	चल सम्पति/सचित पैसा	✓	
४	दैनिक क्रियाकलापहरू	.	✓
५	अन्य		

घ) खा.पा.उ.स.स. तथा समुदायमा महिलाको स्तर (हैसियत) निम्न बुँदाहरू फोकस ग्रुप छलफलको आधारमा जानकारी लिएर टिपोट गर्नुपर्नेछ)

क्रसं	विषय	उच्च	मध्यम	निम्न
१	आत्मसम्मानबोध		✓	
२	आत्मविश्वास नेतृत्व शीप		✓	
३	दायित्वबोध र क्षमता		.	✓
४	ल्याकत, तर्क संगत, धैर्य र मेहनत			✓
५	अन्य			

६. सम विकासमा पहुँचका आधारमा सामाजिक समावेशी सहभागिता

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

६.१ आयोजनाकोबारेमा छलफल गर्ने कुनै भेला/बैठकमा समावेशी तवरले बोलाईएको थियो ?
थियो ☐ थिएन ☐ थाहा भएन

६.२ के आयोजनाको छनौट गर्न बैठकमा समावेशीताको आधारमा सहभागीहरुको उपस्थिती थियो?
थियो ☐ थिएन ☐ —

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

ख) निर्णय प्रक्रियामा समावेशी प्रकृया अपनाईएको थियो ?

६.४ आयोजना छनौट गर्न जातजातिहरुको कस्तो भूमिका कस्तो थियो ?
उच्च ☐ मध्यम ☐ निम्न ☐

६.५ साना सहरी खानेपानी आयोजना कार्यान्वयन गर्न सामाजिक समावेशी आधारमा उपभोक्ताहरुको परिचालन गर्न भएको प्रयास कस्तो थियो? राम्रो ☑ मध्यम ☐ निम्न ☐

७. स्वास्थ्य र सरसफाइ

क. खानेपानी

१ तपाईंको विचारमा पानीको गुणस्तर नराम्रो (खराब) भएमा के समस्याहरूदेखिन सक्छ ?
(एक भन्दा बढी उत्तर आउन सक्ने)

१.१) दुर्गन्ध आउने / नमिठो स्वाद ☑ १.२) दाँत बिग्रिने/रंगीने ☐

१.३) झिरामी बनाउने ☑ १.४) अन्य (उल्लेख गर्ने) .....

२. के तपाईंलाई पानी भर्ने र राख्ने भाँडो पानी भर्नु र भण्डार गर्नु पूर्व सफा गर्नुपर्छ भन्ने थाहा छ ? छ ☑ छैन ☐

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

२.१) खाली पानी मात्रले ☐ २.२)खरानी पानीले ☐ २.३) भुस/पिठो र पानीले ☐

२.४)साबुन पानीले ☑ २.५) अन्य (उल्लेख गर्नुस्) .....

३. तपाई घरमा पानी कसरी राख्नु हुन्छ ?

(एक भन्दा बढी उत्तर आउन सक्ने)

३.१) पानी भर्नु पहिले भाँडा सफा गर्ने ☑ ३.२) बासी पानी फ्याँक्ने ☐

३.३) पानी राख्ने भाँडो राम्रोसँग ढाकेर/छोपेर राख्ने ☑ ३.४) अन्य (उल्लेख गर्ने).....

४. तपाई गाग्री वा पैटोबाट पानी कसरी निकाल्नुहुन्छ ?

४.१) पानी सार्नु अघि बम्बोरा, लोटा, करुवा, मग धोएर ☐

४.२) गिलास, मग, कप गाग्रीमा डुबाएर ☐

४.३) गाग्रोबाट लोटा, बम्बोरा, करुवा, गिलासमा पानी सारेर ☑

४.४) अन्य (उल्लेख गर्ने) ..... ☐

ख. चर्पी

१. के तपाईको घरमा चर्पी छ ? छ ☑ छैन ☐ (छैनभने १.३ जाने)

१.१ यदि छ भने, कस्तो प्रकारको चर्पी छ ? ☐

१) खाल्डे चर्पी ☐

२) भेन्टिलेटेड खाल्डे चर्पी ☐

३) वाटर सिल/पोर फ्लस ☑

४) सिस्टर्न फ्लस ☐

५) अन्य ..... ☐

१.२ यदि छ भने, तपाईको घरमा चर्पी कसकसले प्रयोग गर्नुहुन्छ ? ☐

(१. सबैले, २. बच्चा बाहेक सबैले ३. वयस्क र प्रौढले मात्रै ४. बिरामी मात्रैले)

१.३ यदि छैन भने, दिसा गर्न कहाँ जानुहुन्छ ? ☐ ☐

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

१.४ के तपाईको समुदाय खुल्लदिसामुक्त क्षेत्र घोषणा भएको छ ? छ ☐ छैन ☐ थाहा छैन

ग. खानेकुराको सरसफाइ

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

१.१) पकाएको खाना छोपेर/ढाकेर राख्ने ☑ १.२) सफा हातले खाना पस्कने गर्नुहुन्छ ☑

१.३) काँचै खाइने खानेकुरा राम्रोसँग पखालेर धोएर ☑ १.४) हात गोडा सफा गरेर मात्र भान्छामा पस्ने ☐

१.५) धेरै बासी वा सडे गलेका खाना, फलफुल विसर्जन गर्ने ☑

१.६) ढाडु पन्यु, थाल/भाँडाकुँडा सफा गरेर मात्र खाना पस्कने/खाने ☑

१.७) चुल्हो चौकी पकाउने भाडा, ढकनहरूसफा राख्ने ☑

२. के तपाई खानेकुरा छोपेर/ढाकेर राख्नुहुन्छ ? राख्छु ☑ राख्दिन ☐

घ. व्यक्तिगत सरसफाइ (घरपरिवारको संख्या अनुसार कृयाकलापमा टीक चिन्ह लगाएर संख्या राख्ने । जस्तो चारजनाको परिवार भए हरेक कृयाकलापमा टीक सहित चारको संख्या आउनुपर्ने)

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

क.स.	विवरण	५ वर्ष मुनिका बालबालिका		महिला		पुरुष	
		धुने (✓)	नधुने (✗)	धुने (✓)	नधुने (✗)	धुने (✓)	नधुने (✗)
१	खाना खानु अघि			✓		✓	
२	खाना खाएपछि			✓		✓	
३	दिसा गएपछि			✓		✓	
४	फोहर मैला छोएपछि			✓		✓	

५	कामबाट फर्केपछि			✓		✓	
६	कँटाकँटीलाई दिसा पिसाब गराइ सकेपछि			✓		✓	
७	अन्य (उल्लेख गर्ने)						

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

क.सं.	विवरण	५ वर्ष मुनिका बालबालिका		महिला		पुरुष	
		धुने (✓)	नधुने (✗)	धुने (✓)	नधुने (✗)	धुने (✓)	नधुने (✗)
१.	पानी मात्रै						
२.	खरानी पानी						
३.	घुस/पिठो पानी						
४.	साबुन पानी	✓		✓		✓	
५.	अन्य (उल्लेख गर्ने)						
	जम्मा						

३. तपाई र परिवारका अन्य सदस्यले कहिले कहिले नुहाउनुहुन्छ ?
नुहाउने भए यस्तो (✓) चिन्ह लगाउनुहोस् र ननुहाउने भए यस्तो (✗) चिन्ह लगाउनुहोस ।

क.सं.	विवरण	बालबालिका	महिला	पुरुष
		(✓) (✗)	(✓) (✗)	(✓) (✗)
१.	प्रत्येक दिन			
२.	एक दिन बिराएर		✓	✓
३.	हप्तामा २ पटक	✓		
४.	हप्तामा १ पटक			
५.	२ हप्तामा १ पटक			
६.	महिनामा एक पटक			
	जम्मा			

ङ. फोहर मैला व्यवस्थापन

१. तपाईको घरबाट निस्कने ठोस फोहर मैला कहाँ विसर्जन गर्नुहुन्छ ?

१.१ घर नजिक खाल्डोमा ✓ १.२ निजी फोहर संकलनकर्तालाई दिने ☐

१.३ गा.वि.स./नगरपालिकाले व्यवस्था गरेको खाल्डो वा स्थानमा ☐ १.४ अन्य (उल्लेख गर्ने).....

२. ठोस तथा तरल फोहर वस्तुलाई अव्यवस्थित तरिकाले विसर्जन गर्नाले हुने नराम्रा असरहरूके के हुन् ? (एक भन्दा बढी उत्तर आउन सक्ने)

२.१ फोहोर वातावरणमा वृद्धि ✓ २.२ झाडखुट्टे, झिंगा, किराहरुको वृद्धि ✓

२.३ रोग सर्नेमा वृद्धि ✓ २.४ अन्य (उल्लेख गर्ने) ...

३. तपाईको घरबाट निस्कने फोहोर पानी कहाँ विसर्जन गर्नुहुन्छ ?

३.१ खाल्डोमा (Soak pit) ☐ ३.२ तरकारी बारीमा/करेसा बारीमा ✓

३.३ सार्वजनिक ढलमा ☐ ३.४ अन्य (उल्लेख गर्ने)

च. वस्तुभाउको फोहर व्यवस्थापन

१. के तपाईले वस्तुभाउ पाल्नु भएको छ ? छ ✓ छैन ☐ छैन भने पानी जन्य सरुवा रोगमा जाने)

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

क्र. सं.	वस्तुभाउको प्रकार	घरभित्रै राखे	बाहिर खुट्टे गोठमा राखे
१	गाई/भैंसी		✓
२	बंगुर/संगुर		
३	बाख्रा		

४	कुखुरा/हाँस		
५	अन्य		

२. वस्तुभाउबाट निस्कने फोहोर कहाँ र कसरी विसर्जन गर्नुहुन्छ ?

२.१ मलखाडमा ☑ २.२ आगो बाल्ने/गुईंठा बनाउने ☐

२.३ गोबर ग्यास प्लान्टमा प्रयोग गर्ने ☐ २.४ अन्य (उल्लेख गर्ने)

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

३.१ वातावरणीय फोहोरमा वृद्धि हुने ☑ ३.२ लामखुट्टे, झिंगा, किराहरुको वृद्धि हुने ☑

३.३ रोगव्याधि बढ्ने तथा सर्ने ☑ ३.४ गाँउ, छरछिमेक तथा नगर अशोभनिय देखिने ☑

३.५ अन्य (उल्लेख गर्ने) .....

छ. सेफ्टेज (फोहरलेदो) व्यवस्थापन (चर्पिबाट सेफ्टीट्यांकमा जम्मा भएको फोहरलेदो थप प्रश्नहरु सहित)

१) चर्पिबाट विसर्जित मलमुत्र व्यवस्थापन (जम्मा) कहाँ गर्ने गरेको छ ?

खाल्डो ☑ रिङ्ग खाल्डो ☐ सेफ्टी ट्यांक ☐ अन्य ☐

२) सो सेफ्टी ट्यांक/खाल्डोको क्षमता कति (ठुलो साना साइज) छ ?

३) हालसम्म कहिल्यै सफा गर्नु भएको छ ? छ ☐ छैन् ☐ छमने कति वर्षमा भरियो ? ☐

सफागर्न कति रकम तिर्नु भयो ? रु

४) सेफ्टी ट्यांकबाट निस्केको फोहर प्रशोधन पछि मलका रुपमा प्रयोग गर्न तयार हुनुहुन्छ ? छ ☐ छैन् ☐

५) सेफ्टी ट्यांकबाट निस्केको फोहर सफागर्न कतिसम्म रकम तिर्न तयार हुनुहुन्छ ? छ ☐ छैन् ☐

५.१ तिर्न तयार भए कतिसम्म तिर्नुहुन्छ ? रु २००० सम्म ☐ रु २००० माथि ☐

६.तपाईको घरबाट सेफ्टीट्यांकमा जम्मा भएको फोहर लेदो (सेफ्टेज) कसरी खाल्को गर्नुहुन्छ ?

.१ आफै सफा गर्ने ☐ २ सफागर्ने मान्छे प्रयोग गर्ने ☐ ३ व्यवस्थित कम्पनीको सेवालिने ☐ ४ अन्य

७. सेफ्टेज(फोहर लेदो) कहाँ व्यवस्थान गर्ने गरेको छ ?

१ खेतबारीमा ☐ २ खोलानाला, खोल्साखोल्सीमा ☐ ३ बनजंगल सार्वजनिक स्थानमा ☐ ४ सडक बाटो छेउछाउ ☐ ५ अनुकुल अनुसार ☐ ६ अन्य ☐

८. सेफ्टेज(फोहर लेदो) व्यवस्थान सुधार गर्न चाहनुहुन्छ ? चाहान्छु ☑ चाहन्न ☐

९. सेफ्टेज(फोहरलेदो व्यवस्थान सुधार गर्दा के गर्न चाहानु हुन्छ ?

१ सेफ्टीट्यांक बनाउने ☑ २ भएको सेफ्टीट्यांक/चर्पीको खाल्डो सुधार गर्ने ☐

३ तपाँइको चर्पिबाट ढल जोडी सामुहिक रुपमा सेप्टेज प्रशोधन प्रणाली व्यवस्थापन गरे सेवालिन तयार हुनुहुन्छ ?

४ अन्य (उल्लेख गर्ने) ☐

१०. सुधार गर्न कति रकम सम्म लगानी गर्न ईच्छा छ ? सोधेर नोट गर्ने रु ☐

ज. पानीजन्य सरुवा रोगहरु

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

१.१ दुषित पानी प्रयोग गर्दा ☑ १.२ दुषित खाना खाँदा ☑

१.३ घर तथा सार्वजनिक स्थलमा फोहर बढ्नाले ☑ १.४ मानिसको मलमूत्र जथाभावी विसर्जन गर्नाले ☑

१.५ फोहोर मैला जथाभावी फ्याँकने गर्दा ☑ १.६स्वास्थ्य शिक्षा तथा स्वस्थ बानीको अभाव ☑

१.७ सरसफाई र स्वास्थ्य सम्बन्धी ज्ञान र चेतनाको अभावले ☑ १.८ अन्य .....

२. तपाईंको परिवारमा कोही बिरामी परेमा के गर्नुहुन्छ ?(प्राथमिकता अनुसार नम्बर लेख्ने)

२.१ घरायसी उपचार गर्ने [१] २.२ धामी, झाँक्री, पुजारी कहाँ जाने [ ]

२.३ औषधि पसलमा जाने [२] २.४ स्वस्थ्य चौकि वा अस्पतालमा जाने [३]

२.५ अन्य (उल्लेख गर्ने)

३. यदि परिवारमा कसैलाई झाडापखाला लागेमा के गर्नुहुन्छ ? (प्राथमिकता अनुसार नम्बर लेख्ने)

३.१ जीवनजल खुवाउने [१] ३.२ घरायसी उपचार गर्ने [ ]

३.३ धामी, झाँक्री वा पुजारी कहाँ जाने [ ] ३.४ औषधि पसलमा जाने [२]

३.५ स्वास्थ्य चौकि वा अस्पतालमा जाने [ ] ३.६ अन्य (उल्लेख गर्ने).....

४. गत एक सालभित्रमा तँपाइका परिवारका सदस्यहरु झाडा पखाला तथा पानीजन्य अन्य सरुवा रोगहरुबाट प्रभावित थिए ? प्रभावित भएका भए कति जना थिए तलको तालिकामा सङ्ख्या नोट गर्ने ।

क्र. सं	रोग	५ वर्ष मुनिका बालबालिका	महिला	पुरुष	वार्षिक खर्च रु.
१	झाडापखाला	1	1	1	1
२	आउँ				
३	जुका				
४	टाईफाईड				
५	हैजा				
६	छाला सम्बन्धी रोग				
७	औलोरोग (मलेरिया)				
८	कमलपित्त (जण्डीस)				
९	अन्य				
	जम्मा	1	0	1	0

६. गत एक वर्षभित्र तपाईका परिवारमा झाडा पखाला तथा पानीजन्य अन्य सरुवा रोगहरुबाट कसैको मृत्यु भएको छ ? (मृत्यु अवस्था)

रोग	५ वर्ष मुनिका बालबालिका	महिला	पुरुष
झाडा पखाला			
आउँ			
पानीजन्य अन्य सरुवा रोगहरु			
जम्मा	X	X	X

७. गत एक वर्षभित्र तपाईको परिवारका सदस्यलाई झाडापखाला र पानीजन्य अन्य सरुवा रोगहरुको उपचारमा कति रकम खर्च गर्नु भयो ?

रोग	खर्च रकम (रु.मा)
झाडापखाला	1
पानीजन्य अन्य सरुवा रोगहरु	
जम्मा	X

धन्यवाद!

Appendix 6
Photographs

1. Starting Point of the Proposed Drainage Line (Harsaha)

2. Outfall at Canal

3. Outfall at Pond

4. A view of Katahariya Settlement

5. Katahariya Bazaar

6. Project Implementation Unit Office, Rautahat