

# Initial Environmental Examination

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NEP: Urban Water Supply and Sanitation (Sector)  
Project – Katahariya Stormwater Drainage  
Subproject

Package No. W-22

## **CURRENCY EQUIVALENTS**

(as of 2 July 2018)

Currency unit	-	Nepalese rupee (NRe)
\$1.00	=	NRs109.821
NRe1.00	=	\$0.0091

## **ABBREVIATIONS**

ADB	–	Asian Development Bank
DSMC	–	design, supervision and management consultant
DRTAC	–	design review and technical audit consultant
DWSS	–	Department of Water Supply and Sewerage
EARF	–	environmental assessment and review framework
EIA	–	environmental impact assessment
EMP	–	environmental management plan
EPA	–	Environment Protection Act
EPR	–	Environment Protection Rules
ESO	–	environmental safeguards officer
ESS	–	environmental safeguards specialist
ESA	–	environmental safeguard assistant
ESE	–	environmental safeguard expert
GRM	–	grievance redress mechanism
ICG	–	implementation core group
IEE	–	initial environmental examination
MOWS	–	Ministry of Water Supply
NDWQS	–	National Drinking Water Quality Standard
PMO	–	project management office
RPMO	–	regional project management office
ROW	–	right-of-way
REA	–	rapid environmental assessment
SEMP	–	site-specific environmental management plan
STWSSSP	–	Small Towns' Water Supply and Sanitation Sector Project
SPS	–	safeguard policy statement
SDG	–	Sustainable Development Goal
SSTWSSSP	–	Second Small Towns' Water Supply and Sanitation Sector Project
UWSSSP	–	Urban Water Supply and Sanitation Sector Project
TOR	–	terms of reference
VDC	–	Village Development Committee
WHO	–	World Health Organization
WSSDO	–	Water Supply and Sanitation Divisional Office
WUA	–	water users' association
WUSC	–	water users' and sanitation committee

## **WEIGHTS AND MEASURES**

amsl	-	above mean sea level
dBA	-	decibel audible
°C	-	degree Celsius
km	-	kilometer

kph	-	kilometer per hour
lps	-	liter per second
lpcd	-	liter per capita per day
m	-	meter
kph	-	kilometer per hour
m	-	meter
m <sup>3</sup>	-	cubic meter
mg/l	-	milligram per liter
mm	-	millimeter

#### **NOTE**

In this report, "\$" refers to United States dollars.

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## EXECUTIVE SUMMARY

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

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

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

**Subproject Municipality.** Katahariya municipality is one of the project towns proposed under UWSSP. A stormwater drainage subproject is being proposed that will cover selected priority areas of the town. The terrain of the subproject area is relatively flat and is still to gain momentum to grow into a dense settlement. Being flat terrain, well planned drainage system is needed to avoid flooding in the future, especially during monsoon season. Core areas of the town, such as the highway and main streets, have some existing drainage systems, but these are just a small portion of the proposed subproject area. Existing conditions of these drainage systems show that they are not properly maintained, and the configurations also show that their design and construction were not properly planned. So, in anticipation of population growth and urbanization in the coming years, there is an urgent need to have a proper and planned drainage system in the town.

**Subproject Scope.** The subproject is demand-driven by municipality and WUA, and selected based on transparent criteria, including population growth, poverty index, existing WSS infrastructure, formed WUA, community willingness for cost sharing and long-term O&M contract. The drainage system will be composed of 14.40 kilometer (km) of drain lines and associated components such as manholes, culverts, rain water inlets, slab covers, and outfalls.

Environmental assessment has been conducted for the Katahariya storm water drainage system subproject, which was selected based on (i) preliminary design drawn from the Katahariya town masterplan, and (ii) most likely environmentally sensitive components. The environmental assessment used ADB's rapid environmental assessment (REA) checklist (Appendix 1) and a "no mitigation measures scenario" checklist developed for UWSSP (Appendix 2). The environmental assessment of the drainage system subproject shows it is not likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. Potential impacts are unlikely to affect areas far beyond the sites or facilities subject to physical works. These impacts

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

Therefore, the Katahariya storm water drainage subproject is classified as Category B for environment per ADB Safeguard Policy Statement (SPS), 2009. This draft initial environmental examination (IEE) report has been prepared based on preliminary design, and following requirements of ADB SPS and Government of Nepal Environment Protection Rules where the subproject is listed under Schedule 1 requiring an IEE. However, this draft IEE will be updated based on the final detailed design of all components of the subproject. The updated IEE will be submitted to ADB for final review and disclosure.

**Description of the Environment.** The subproject components are in Katahariya Municipality. The subproject components will be constructed along right-of-way (ROW) of public roads. There are no protected areas, forests, wetlands, mangroves, or estuaries in or near the subproject locations. The municipality lies at about 90 m above mean sea level, and has a climate characterized by hot and humid summers, and cold winters. Monsoon season starts in June and ends in September, with average annual rainfall of 1,650 millimeters (mm).

**Potential environmental impacts and mitigation measures.** The subproject is unlikely to cause significant adverse impacts that are irreversible, diverse or unprecedented because: (i) the components will involve straightforward construction and operation, so impacts will be mainly localized; (ii) there are no significant sensitive environmental features in the subproject sites although careful attention needs to be paid to minimizing disruption to the community; and (iii) predicted impacts are site-specific and likely to be associated with the construction process and are produced because the process is invasive, involving excavation and earth movements.

Some impacts and their significance have been reduced by amending the designs and locations. The concepts in the design of the subproject are: (i) maximum population coverage mostly in residential areas and areas of high growth rate; (ii) locating drainage lines within ROWs; and (iii) ensuring that all planning and design interventions and decisions are made in consultation with local communities and reflecting inputs from public consultations.

During construction, impacts will likely arise from the excavation and drainage construction activities, including storage of materials and maintenance of camp sites. These impacts are temporary and common for construction activities in urban areas, and there exist well-developed methods for their effective mitigation. The subproject will adhere to the World Bank Environmental, Health and Safety Guidelines on Construction and Decommissioning Activities. Traffic management will be necessary during excavation and drainage construction works on busy roads. Earthworks will be conducted during the dry season to avoid difficult working conditions that prevail during the monsoon. The location of stockyards will be identified at least 300 m away from watercourses. Fuel and lubricant storage areas will be located away from drainage. Precautions will be taken to minimize construction wastes. Measures will be provided to prevent wastewater entering into streams, watercourses, or irrigation channels. Open burning of solid wastes generated from the workers camp will be strictly prohibited. Better solid waste management practices will be adopted such as collection, segregation, reuse and recycling activities within the construction site and workers camps.

During operation, Water Users' and Sanitation Committees (WUSC), as the operator of WSS infrastructures, will ensure to monitor and maintain the efficient functioning of the drainage system. Regular inspections of all drain inlets and the drain lines to ensure that these are not



clogged and are free from any obstructions for the continuous flow of rainwater or grey water from households. All sections will be inspected to ensure that all slab covers are in place to avoid any accidents to residents, animals and vehicles.

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

The budget for EMP and SEMP implementation includes costs for conducting ambient air quality monitoring, noise level measurements, capacity building, workforce, administrative support, public consultation and information disclosure, grievance redress mechanism implementation and actions for any unanticipated impacts encountered. The implementation costs of mitigation measures are covered separately under civil work contract. The contractor will be responsible for implementing the applicable mitigation measures given in EMP and SEMP. PMO, RPMO, and DSMCs are responsible for monitoring the EMP implementation.

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

**Monitoring and Reporting.** The PMO, RPMO, and design, supervision and management consultant (DSMC) will be responsible for environmental monitoring. RPMO with support from DSMC will submit monthly monitoring reports to PMO. PMO will consolidate the monthly reports and will send semi-annual environmental monitoring reports to ADB. ADB and PMO will post the semi-annual environmental monitoring reports on their websites.

**Conclusions and Recommendations.** Katahariya stormwater drainage subproject will bring a series of benefits to the local people. Based on the IEE findings, there are no significant impacts, and the classification of the subproject as Category B per ADB SPS is confirmed. To conform to government regulations, permits and clearances will be obtained prior to award of works contract. This draft IEE will be submitted to ADB for concurrence and disclosure.

This draft IEE will be updated based on the final detailed design of all components of the subproject. The updated IEE will be prepared by the Government through the PMO and submitted to ADB for final review and disclosure. This draft IEE reiterates the following recommendations for consideration in the final detailed design:

The design of the stormwater drainage system will ensure that only stormwater or rainwater will be flowing to the drainage canals once they become operational. The final detailed design will consider the following:

- (i) Inlets to the drainage system be positioned away from outlets of septic tanks and greywater lines of households or commercial establishments. This will avoid the situation where the drainage system will be used as discharge point of septic and household wastes that could pollute the receiving bodies of water; and
- (ii) Silt traps integrated in the design to avoid heavy siltation in the drainage system during monsoon season that could eventually affect the receiving bodies of water at the outfalls of the drainage system.

The design of the outfalls will ensure the following:

- (i) Siltation or sedimentation chambers (or similar structures) be constructed at the outfalls with sizes depending on the peak volume flow rate. This will avoid heavy siltation and pollution of the receiving body of water;
- (ii) Position the outfalls at locations enough to provide space for the construction of siltation or sedimentation chambers (or similar structures); and
- (iii) Position the outfalls and siltation or sedimentation chambers (or similar structures) at locations that will be accessible for maintenance and cleaning during the operation phase.

## I. INTRODUCTION

### A. Background

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

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

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

4. The Ministry of Water Supply (MOWS) is responsible for planning, implementation, regulation, and monitoring of WSS. The Department of Water Supply and Sewerage (DWSS) under the MOWS supports the provision of WSS facilities in municipalities where large utilities do not exist, and these are operated by WUSCs<sup>5</sup> or municipalities.<sup>6</sup> Shortage of investment funds, skilled personnel, and inadequate O&M budgets, hinders municipalities from providing adequate, cost-effective services. The Local Governance Operation Act, 2017, established municipalities as autonomous government institution with responsibility for WSS services. While municipalities' capacity is being built, the government and residents have been receptive to the decentralized, participatory, and cost-sharing service provision model by WUAs. Development support for municipal WSS has been channeled through a combination of (i) government grants through DWSS, (ii) loans by the Town Development Fund (TDF),<sup>7</sup> and (iii) contributions from municipalities

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<sup>1</sup> ADB. [Nepal: Small Towns Water Supply and Sanitation Sector Project](#) [Nepal: Second Small Towns Water Supply and Sanitation Sector Project](#); and [Nepal: Third Small Towns Water Supply and Sanitation Sector Project](#).

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

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

<sup>4</sup> Government of Nepal. 2009. *Urban Water Supply and Sanitation Policy*. Kathmandu.

<sup>5</sup> The WUSCs, formed under the Nepal Water Resource Act, 1992, are the elected executive bodies of the WUA.

<sup>6</sup> The DWSS assists in preparation of investment plans, project design, and establishing sustainable service delivery.

<sup>7</sup> The TDF is a government-owned entity established under the Town Development Fund Act, 1997. Loans from the

and beneficiaries.<sup>8</sup> The TDF also supports WUAs in institutional and financial management including the introduction of tariffs.

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

6. **Subproject Municipality.** Katahariya municipality is one of the project towns proposed under UWSSP. A stormwater drainage subproject is being proposed that will cover selected priority areas of the town. The terrain of the subproject area is relatively flat and is still to gain momentum to grow into a dense settlement. Being flat terrain, well planned drainage system is needed to avoid flooding in the future, especially during monsoon season. Core areas of the town, such as the highway and main streets, have some existing drainage systems, but these are just a small portion of the proposed subproject area. Existing conditions of these drainage systems show that they are not properly maintained, and the configurations also show that their construction were not properly planned. So, in anticipation of population growth and urbanization in the coming years, there is an urgent need to have a proper and planned drainage system in the town.

## **B. Name and Address of the Institution Preparing the Report**

### **Name of Proponent**

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

### **Address of the Proponent**

Panipokhari, Kathmandu  
Tel: 977 1 442388, 977 1 4412348  
Fax: 977 1 4413280  
E-mail: [info@stwsssp.gov.np](mailto:info@stwsssp.gov.np)  
Website: [www.sstwsssp.gov.np](http://www.sstwsssp.gov.np)

### **Consultant, Preparing the Report**

**TAEC Consult P. Ltd. Joint Venture with Integrated Consultants Nepal (P) Ltd.** is responsible in preparing this IEE report.

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government to WUAs or municipalities are generally on-lent by TDF under a subproject financing agreement.

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

### **C. Purpose of the Initial Environmental Examination**

7. All projects funded by ADB must comply with its 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. Environmental assessment has been conducted for the Katahariya town storm drainage subproject. This subproject has been assessed based on (i) preliminary design drawn from the Katahariya town masterplan, and (ii) most likely environmentally sensitive components. The environmental assessment used ADB's rapid environmental assessment (REA) checklists (Appendix 1) and a "no mitigation measures scenario" checklist developed for UWSSP (Appendix 2). The environmental assessment of the subproject shows that it is not likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. Potential impacts are unlikely to affect areas larger than the sites or facilities subject to physical works. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed with uncomplicated measures commonly used at construction sites and known to civil works contractors.

8. Therefore, the Katahariya town stormwater drainage subproject is classified as Category B for environment per ADB SPS. This draft initial environmental examination (IEE) report has been prepared based on preliminary design and following requirements of ADB SPS and Government of Nepal Environment Protection Act (EPA) and Environment Protection Rules (EPR) wherein the subproject is listed under Schedule 1 requiring an IEE.

9. This draft 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; and
- (vii) includes an environmental management plan.

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

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

12. This draft IEE will be updated based on the final detailed design of all components of the subproject. The updated IEE will be prepared by the Government through the PMO and submitted to ADB for final review and disclosure.

## II. DESCRIPTION OF THE SUBPROJECT

### A. Need for the Subproject

13. The terrain of the subproject area is relatively flat and is still to gain momentum to grow into a dense settlement. At present, the project town still has no issue on flooding due to low density and sparse settlements with many vacant lands that could absorb or contain rainwater during monsoon season. However, being flat terrain, drainage should be a concern for the future growth of the area. As the rise in dense settlement is expected in the coming years, the town is now in need of a well-planned drainage system. The main areas the town, such as the highway and main streets, have drainage systems but seems to have not been planned and constructed properly. Besides, these existing drainage systems cover only a small portion of the subproject area. The subproject area has rivers and rivulets, which could be used as drains or outlets for the proposed drainage system. Hence, proper planning for the subproject is needed.

### B. Relevance of the Subproject

14. The proposed Katahariya town storm drain subproject has been studied from the environmental point of view per EPA 1996 and EPR 1997 (as amended in 1999 and 2007). The proposed subproject is intended to provide drainage facilities in the core area of Katahariya municipality so that the risk of flood occurrence in the future will be reduced. The subproject is expected to benefit a population of about 11,057 as of 2018 and expected future population size of 18,948 by 2038, by providing a reliable and adequate drainage system in the municipality. The subproject will not involve displacement or relocation of people or households because all alignments of the drainage system will be located along sections with public right of way (ROW).

15. **Subproject selection.** The Katahariya town storm water drainage subproject is demand driven by the WUA or municipality, and selected based on transparent criteria, including population growth, poverty index, existing WSS infrastructure, formed WUA, community willingness for cost sharing and long-term O&M contract.<sup>9</sup>

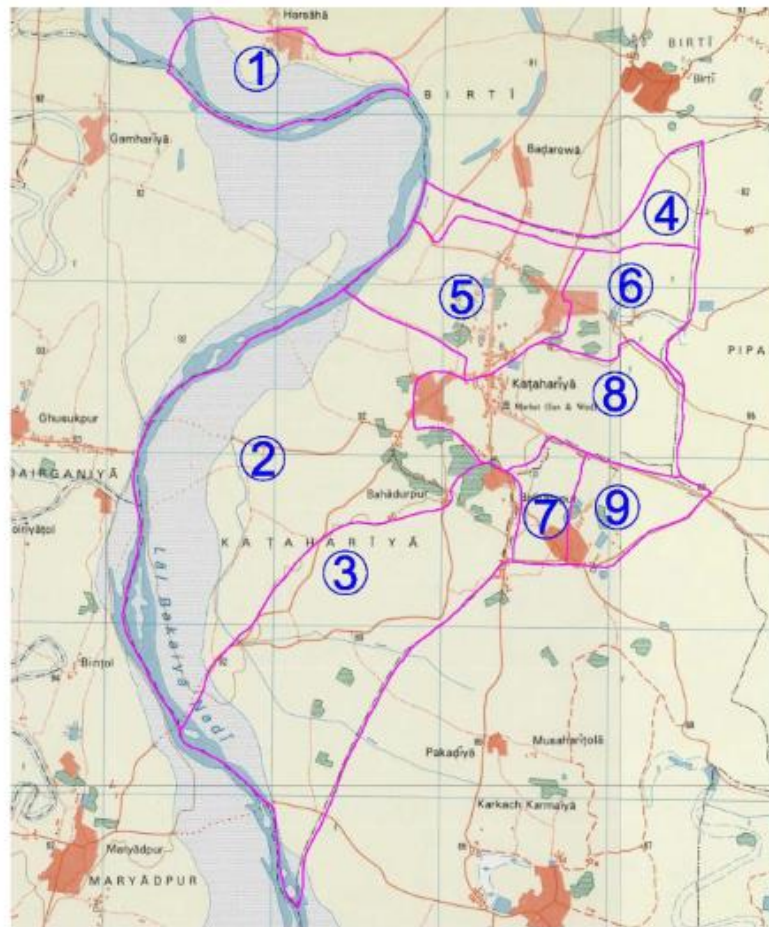
### C. Description of the Subproject Components

16. The subproject is a proposed construction of storm water drainage system in the entire wards of the former Katahariya VDC (i.e., Ward nos. 4 and 5 of current Katahariya Municipality). Figure 1 shows the locations of the different wards in the municipality. The subproject is expected to improve the sanitation infrastructure of Katahariya by providing the target communities or wards with a well-designed storm water drainage system in the area. Figure 2 shows the location of the drainage system.

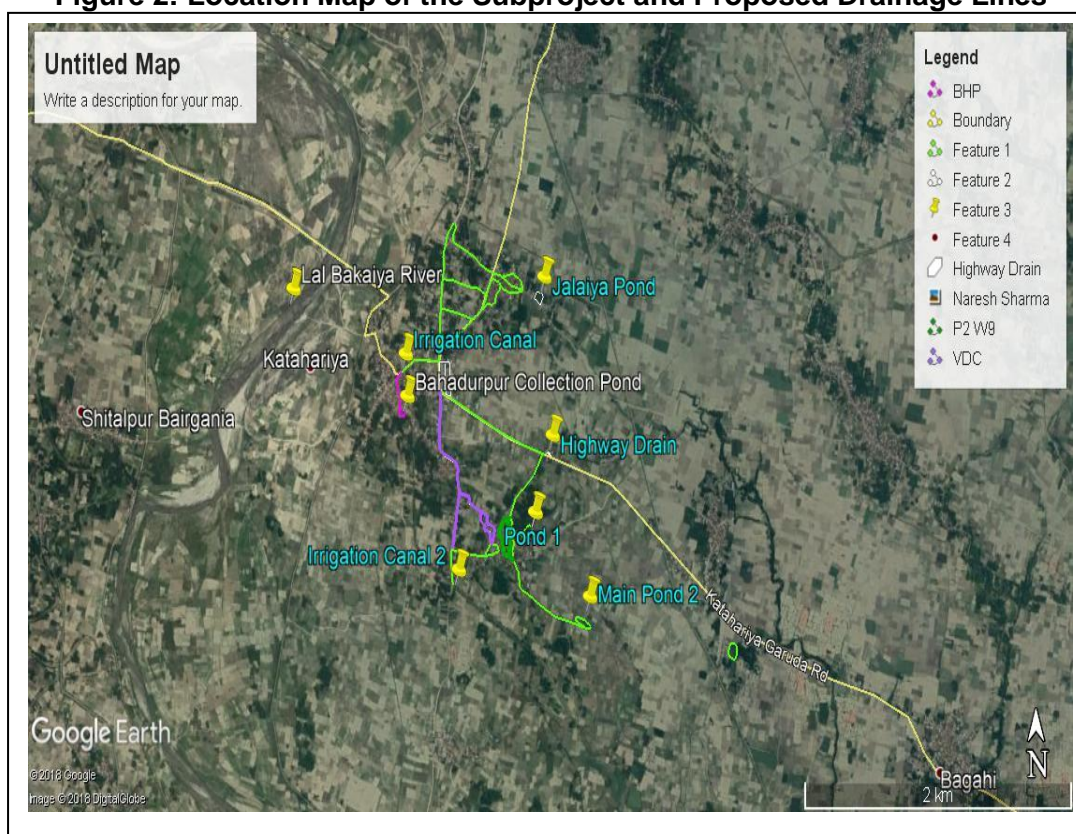
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<sup>9</sup> Subproject selection criteria are defined in the PAM. Procurement of services can only commence after the DWSS and municipality sign a management agreement with the WUSC for O&M of services for 20 years. The municipality will own the system, while WUSC will be the operator.

**Figure 1: Wards in Katahariya Municipality**





**Figure 2: Location Map of the Subproject and Proposed Drainage Lines**

Source: Google Earth.

17. **Drainage Lines.** The proposed drainage system will have various drain lines with total length of about 14.400 kilometer (km), which consists of 8.956 km of major primary drains and 5.455 km of major secondary drains. Table 1 below shows a summary of these drainage lines.

**Table 1: Summary of Drainage Lines**

Name of Street / Drainage No.	Outlets	Length (km)
<b>A. Primary Drainage Lines</b>		
1. Line No. JAL-L	Jalaiya Pond	0.860
2. Line No. JAL-R	Jalaiya Pond	0.708
3. Line No. VDC-L	Irrigation Canal	1.163
4. Line No. BAZ-R	Irrigation Canal	2.160
5. Line No. BHP	Bahadurpur Collection Pond at Ward no. 6 of former VDC	0.270
6. Line No. BZ/HW-R	Highway Drain	0.880
7. Line No. BZ/HW-L	Highway Drain	1.750
8. Line No. P1-W9	Pond at Ward no.9 of former VDC	0.330
9. Line No. P2-W9	Pond at Ward no.9 of former VDC	0.835
<b>Total of Primary Drainage Lines</b>		<b>8.956</b>
<b>B. Secondary Drainage Lines</b>		
1. Line No. JAL-L and JAL-R	Jalaiya Pond	0.480
2. Line No. VDC-L	Irrigation Canal	1.175
3. Line No. BAZ-R	Irrigation Canal	0.385



4. Line No. P2-W9	Pond at Ward no.9 of former VDC	0.535
5. Line No. BZ/HW-R	Highway Drain	0.305
6. Line No. BZ/HW-L	Highway Drain	2.575
<b>Total of Secondary Drainage Lines</b>		<b>5.455</b>
<b>Total Length of Drainage Lines (A + B)</b>		<b>14.400</b>

18. **Description of Proposed Drainage Structures.** The stormwater drain lines will consist of different types of conveyance sections and structures. Selection of the type of sections and structures to be built was based on the most cost effective design. Per analysis, the unit cost of stormwater drainage sections and drain structures was found to be sensitive with respect to the depth of cutting, discharge capacities and location. As a result, various sections and structures have been designed to have single drain lines only. Also on this basis, the drainage system will be built using the following design options:

- (i) **Brick Section Storm Water Drain.** This section has been proposed for open channel flow where soffit level (top level of drain wall) of drain matches (more or less) with original ground profile. This section consists of brickwork in cement mortar (1:4 ratios). The inner surface has been firstly rendered with cement sand mortar in 1:4 ratios and further rendered by cement punning. Stability analysis of all these adopted sections has been carried out. Concrete cope has been provided in both sides of brick wall of the drain sections. These concrete copes have been proposed to hold reinforced cement concrete (RCC) cover slab so that the raised cover slab would also act as a footpath for pedestrian use. Weep Holes provision at a distance of 3 m center to center has been provided for this type of drain section on both sides in staggered manner. However, in case of deeper drain, this section has been found more expensive than the rectangular RCC channel section. This type of section requires larger cross sectional area than other equivalent RCC sections. Therefore, for the narrow road, this section would not be suitable even for smaller depth of cut.
- (ii) **RCC Channel Section Storm Water Drain.** This section also proposed for open channel flow where soffit level (top level of drain wall) of drains matches (more or less) with original ground profile and deeper drain (deeper depth of cut). This section has been constructed by M-20 grade of concrete with reinforcement. The stability and other structure analysis have been carried while adopting this section. Copes on both sides of the wall have been provided in order to hold RCC cover slabs. These RCC channel sections have been found most economical in medium range of depth of cut.
- (iii) **RCC Box Section Storm Water Drain.** This section also proposed for open channel flow where soffit level (top level of drain slab) of drain do not matches with original ground profile, and very deep cutting (deeper depth of cut) along with large sectional area are required for flow. This section has been constructed by M-20 grade of concrete with reinforcement. The stability and other structure analysis have been carried while adopting this section in different loading condition. The sections economical for larger discharge and cut-and-cover sections are required. As this section acts as a box RCC frame, Cover slab are not required. Manhole Cast iron cover has been provided for the maintenance proposes at equal interval of 15 m. Manhole cover has been provided in close spacing because of safety consideration during maintenance.
- (iv) **Rain Inlets.** Three types of stormwater rain inlet have been adopted. All these three types has been provided at 25 m c/c in the proposed stormwater drainage lines including rehabilitation works. For rectangular brick or RCC section open channel drainage lines. Type 'A' rain inlet has been provided as per its

appropriateness. This type of inlet would be attached on side with one of the drain sidewalls. The sidewalls, which would be square in shape, would be raised by brickwork in 1:4 cement-sand mortars on PCC base (M-15 grade). The inner surface has been firstly rendered with cement sand mortar in 1:4 ratio and further rendered by cement punning. Concrete cope has been provided in all sides of brick walls of the sections to hold iron grate, which acts as a trash bar rack. Similarly, Type 'B' rain inlet has been adopted for closed drain lines (pipe and box RCC type). Grade M-20 has been used for all sections of the inlet. RCC section has been selected because most of the inlets would be placed on midsection of the road, which would be susceptible for heavy vehicular load. Concrete cope has been provided in all sides of brick walls of the sections to hold iron grate, which acts as a trash bar rack.

- (v) **Cover Slab and Drain Culvert.** Entire length of open channel rectangular section for stormwater drainage has been provided with cover slab. These cover slab have been designed for medium (up to 5 ton) vehicular load that would occur occasionally. RCC grade of M-20 has been used with reinforcement steel bar of (Fe- 500 grade). Road slab culvert of corresponding drain section type (rectangular or trapezoidal) has been provided for the road crossing for heavy vehicular traffic. The sidewalls of the culvert have been designed as gravity wall of brickwork (1:4) and top slab with RCC of grade M-20. Concrete seat of M-15 grade have been proposed on top of brick sidewalls in order to avoid abrasion between road slab and brick sidewalls. These concrete seats have been provided with minimum temperature reinforcement to avoid possible chipping affect. Thin layer of tarfelt has been provided between road slab and concrete seat to maintain support of the loading as a simply support.

19. **Major Outfalls.** The proposed stormwater drainage system is expected to drain out stormwater from an area of about 95.48 hectares. The expected volume flowrate is about 5.32 cumecs. The summary of the proposed lines is shown in Table 2.

**Table 2:Summary of Major Outlet with Service Area and Discharge Volume**

Name of Drain Line	Name of Outlet	Area Served (hectares)	Outlet Discharge (cumecs)
1. Line No. JAL-L	Jalaiya-L	6.20	0.350
2. Line No. JAL-R	Jalaiya-R	4.20	0.260
3. Line No. VDC-L	Irrigation Canal-L	21.53	1.83
4. Line No. BAZ-R	Irrigation Canal-R	27.76	1.06
5. Line No. BAZ-L	Outlet Highway-L	16.43	0.69
6. Line No. BZ/HW-R	Outlet Highway-R	10.81	0.61
7. Line No. P2-W9	Outlet Pond-1	1.71	0.13
8. Line No. P2-W9	Outlet Pond-2	6.84	0.39

## D. Subproject Area Description

20. The Katahariya town storm drain subproject has been proposed for Ward Nos. 1 to 9 of former Katahariya VDC (now Ward Nos. 4 and 5 of Katahariya Municipality by virtue of the new Nepal constitution), which lies in Rautahat District, Narayani Zone 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. The proposed project area belongs to former Katahariya VDC which was bounded by Lal- Bakaiya River in the west and southwest, Birti VDC in the north, Birti and Pipra Pokhariya in East and Karkach Karmaiya VDC in the south. Ward No. 1 of former Katahariya VDC is isolated to other ward of former Katahariya VDC. However, presently, Katahariya VDC has been changed into Katahariya municipality. Hence, the judiciary boundary of the municipality has been changed during the last election incorporating the areas of adjoining VDC.

21. The subproject area is along Sapaimai Road – a road stretching between Gaur to Kalaiya via Garuda of Hulaki Road. The subproject 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 subproject 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.

## III. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

### A. ADB Safeguard Policy Statement

22. ADB Safeguard Policy Statement (SPS) requires borrowers to meet a set of requirements (Safeguards Requirements 1) when delivering environmental safeguards for projects supported by ADB. The objectives are to ensure the environmental soundness and sustainability of projects, and to support the integration of environmental considerations into the project decision-making process. Hence, UWSSP is required to comply with these requirements. Summary of the step by step process is discussed below in this section. Detailed discussions are provided in the ADB SPS.<sup>10</sup>

23. **Screening and categorization.** Subprojects are to be screened for their expected environmental impacts, and are assigned to a specific category.<sup>11</sup> Categorization is to be based on the most environmental sensitive component. However, for subproject(s) with component(s) that can trigger Category A or with potentially significant adverse impacts that are diverse,

<sup>10</sup> ADB 2009. [Safeguard Policy Statement](#). Manila.

<sup>11</sup> A project's category is determined by the category of its most environmentally sensitive component, including direct, indirect, cumulative, and induced impacts in the project's area of influence. Each proposed project is scrutinized as to its type, location, scale, and sensitivity and the magnitude of its potential environmental impacts. Projects are assigned to one of the following four categories: (i) **Category A.** A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment is required. (ii) **Category B.** A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination is required. (iii) **Category C.** A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed. (iv) **Category FI.** A proposed project is classified as category FI if it involves investment of ADB funds to or through a financial intermediary.

irreversible, or unprecedented, PMO shall examine alternatives to the subproject's location, design, technology, and components that would avoid, and, if avoidance is not possible, minimize adverse environmental impacts and risks, and to meet Category B categorization. The rationale for selecting the subproject location, design, technology, and components will be properly documented, including, cost-benefit analysis, taking environmental costs and benefits of the various alternatives considered into account. The "no action" alternative will be also considered.

**24. Environmental Assessment.** Environmental assessment shall include description of environmental and social baseline to provide an understanding of current conditions forming the benchmark against which subproject impacts are assessed. Environmental impacts and risks will be analyzed for all relevant stages of the project cycle, including design and planning stage, construction, operations, decommissioning, and post-closure activities such as rehabilitation or restoration. The structure and composition of the typical IEE report is provided in Appendix 4 of the environmental assessment and review framework of UWSSP.

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

**26. Public Disclosure.** The MOWS, through PMO, shall submit the following documents to ADB for disclosure on ADB website so affected people, other stakeholders, and the public can provide meaningful inputs into the subproject design and implementation:<sup>12</sup>

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

**27. Consultation and Participation.** The PMO and RPMOs shall carry out meaningful consultation<sup>13</sup> with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. The consultation process and its results are to be documented and reflected in the environmental assessment report.

**28. Grievance Redress Mechanism.** The MOWS, through PMO, shall establish a mechanism to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the subproject's environmental performance. The grievance mechanism shall

<sup>12</sup> Per ADB SPS, 2009, prior to disclosure on ADB website, ADB reviews the "borrower's/client's social and environmental assessment and plans to ensure that safeguard measures are in place to avoid, wherever possible, and minimize, mitigate, and compensate for adverse social and environmental impacts in compliance with ADB's safeguard policy principles and Safeguard Requirements 1-4."

<sup>13</sup> Per ADB SPS, 2009, meaningful consultation means a process that (i) begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle; (ii) provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

be scaled to the risks and adverse impacts of the subproject. As of the ADB loan processing for UWSSP, a Grievance Redress Mechanism has been established and discussed in detail in Section VI below.

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

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

31. **Pollution Prevention and Control Technologies.** During the design, construction, and operation of the subproject the PMO and RPMOs shall apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environment, Health and Safety Guidelines.<sup>14</sup> These standards contain performance levels and measures that are normally acceptable and applicable to the subproject. When the Government of Nepal regulations differ from these levels and measures, the executing agency shall achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific subproject circumstances, the executing agency will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

32. **Occupational Health and Safety.** The PMO<sup>15</sup> shall ensure that workers<sup>16</sup> are provided with a safe and healthy working environment, taking into account risks inherent to the sector and specific classes of hazards in the subproject work areas, including physical, chemical, biological, and radiological hazards. PMO shall ensure to take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work by (i) identifying and minimizing, so far as reasonably practicable, the causes of potential hazards to workers; (ii) providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; (iii) providing appropriate equipment to minimize risks and requiring and enforcing its use; (iv) training workers and providing them with appropriate incentives to use and comply with health and safety procedures and protective equipment; (v) documenting and reporting occupational accidents, diseases, and incidents; and (vi) having emergency prevention, preparedness, and response arrangements in place.

33. The PMO shall ensure to apply preventive and protective measures consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environment, Health and Safety Guidelines (footnote 14).

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<sup>14</sup> World Bank Group. IFC. [Environmental, Health, and Safety Guidelines](#).

<sup>15</sup> In case where responsibility is delegated to subproject contractors during construction phase, PMO shall ensure that the responsibilities on occupational health and safety as described herein are included in the contract documents.

<sup>16</sup> Including nonemployee workers engaged by the borrower/client through contractors or other intermediaries to work on project sites or perform work directly related to the project's core functions.

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

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

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

37. **Bidding and Contract Documents.** IEEs and EMPs are to be included in bidding and contract documents and verified by the RPMOs. The PMO and RPMOs shall also ensure that bidding and contract documents include specific provisions requiring contractors to (i) comply with all other conditions required by ADB,<sup>17</sup> and (ii) to submit to RPMO, for review and approval, a site-specific environmental management plan (SEMP), including (a) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (b) specific mitigation measures following the approved EMP; (c) monitoring program as per SEMP; and (d) budget for SEMP implementation. No works can commence prior to approval of SEMP. A copy of the EMP or approved SEMP will be kept on site during the construction period at all times. Non-compliance with, or any deviation from, the conditions set out in the EMP or SEMP constitutes a failure in compliance and shall require corrective actions.

38. **Conditions for Award of Contract and Commencement of Work.** PMO shall not award any Works contract for the subproject until (i) relevant provisions from the EMP are incorporated into the Works contract; (ii) the IEE is updated to reflect subproject's final detailed design and PMO has obtained ADB's clearance of such updated IEE; and (iii) MOWS-approved IEE (i.e., IEE in compliance with EPR, 1997) and other necessary permits from relevant government agencies have been obtained. For "design, build, and operate" type contracts, PMO shall ensure no works for a subproject which involves environmental impacts shall commence until (i) relevant provisions from the EMP are incorporated into the Works contract; and (ii) the IEE is updated to reflect subproject's detailed design and PMO has obtained ADB's clearance of such IEE.

## **B. Government Environmental Impact Assessment Law**

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<sup>17</sup> Contractors to comply with (i) all applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity, or caste; and (c) elimination of forced labor; and with (ii) the requirement to disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and local communities surrounding the project sites.

39. The Interim Constitution of Nepal 2007 defines the right to live in clean environment as one of the fundamental rights of its citizens (Article 16). It prescribes for the State to give priority to the protection of the environment and prevention of its further damage due to physical development activities (Clause 5 of Article 35). Proceeding from, and conformable to, the Constitution, the Government of Nepal has passed a series of environmental laws, policies and implementing regulations and standards.

40. **Environmental Protection Act (EPA), 1997.** This Act requires a proponent to undertake IEE or environmental impact assessment (EIA) of a proposed project, and have the IEE or EIA Report approved by the concerned sector agency (CSA)<sup>18</sup> or Ministry of Science, Technology and Environment (MOSTE)<sup>19</sup>, respectively, prior to implementation.

41. **Environmental Protection Rules (EPR), 1997, and its amendments in 1999 and 2007.** The Rules define the implementing rules and regulations of EPA, particularly the processes of undertaking IEE or EIA for proposed projects. 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 of EPR 1997 (as amended in 1999 and 2007) list down the projects of activities that require IEE and EIA, respectively. Table 3 presents the required environmental assessment for activities/works under the subproject.

**Table 3: Required Environment Assessment for Sanitation under Government of Nepal EPR**

S.N.	Schedule 1: Activities Requiring IEE Only	Schedule 2: Activities Requiring EIA	Applicability to Drainage Subproject
1	Operation of sewerage scheme providing services to population between 5,000 and 400,000	Operation of sewerage scheme providing services to population of more than 400,000	IEE is required.  PMO to follow the steps in EPR in order to comply with the national requirement for IEE.

42. **Compliance of the subproject with EPR 1997 (as amended in 1999 and 2007).** The subproject falls under Schedule 1 activities and therefore requires an IEE. In compliance with this requirement, the PMO needs to prepare an IEE report following the procedures in the EPR and submit the report for approval to MOWS, which is the CSA (footnote 16) for the subproject. PMO needs to obtain an approved IEE from MOWS prior to award of any contracts under the subproject. PMO may opt to use one IEE report for compliance with ADB and government's environmental clearance requirements, provided that the IEE report complies with both ADB SPS and EPR 1997 requirements.

43. **Status of securing MOWS-approved IEE.** PMO is currently in the process of securing MOWS-approved IEE in compliance with the EPR. PMO will ensure that the MOWS-approved IEE will be secured prior to the award of any contract under the subproject. A copy of the approval

<sup>18</sup> The CSAs are responsible for the: (i) review of applications for EIA scoping and approval of IEE schedules of work and TORs, (ii) review of submitted IEE or EIA Reports, (iii) approval of IEE Reports, (iv) forward of reviewed EIA Reports together with its review opinions and suggestions to MOSTE, and (v) monitoring and evaluation of project implementation impacts.

<sup>19</sup> MOSTE is responsible for the: (i) approval of EIA schedules of work and TORs, (ii) approval of EIA Reports, and (iii) conduct of environmental audit of completed project after two years of operation.

document from MOWS will be attached in the updated version of this IEE that will be submitted to ADB for final review and disclosure.

### C. Other Relevant National Laws, Policies and Guidelines.

44. Table 4 below summarizes all other relevant national laws, policies and guidelines that will be complied with under the subproject. As the subproject will avoid subproject components with potential triggers for Category A classification per ADB SPS, all laws, policies and guidelines governing these types of projects are already excluded in the table.

**Table 4: Other Relevant National Laws, Policies, and Guidelines of Nepal**

<b>Policy/Law/ Guideline</b>	<b>Year *</b>	<b>Relevant Provisions</b>	<b>Remarks</b>
Labor Act	1992	Chapter 5 stipulates health and safety provisions at work places, keeping work premises clean and safe, e.g., (i) with provisions for solid waste, sewage and hazardous substance management; (ii) instituting measures to prevent dust, fumes and other impure materials that would adversely affect health; (iii) with supply of potable water and water for emergency situations; (iv) with arrangements for the use of protective devices and wears; (v) with fire safety arrangements; and (vi) measures for protection from hazardous machines/equipment and from physical injury or harm from lifting of heavy weights.	EMP provides measures to mitigate workers' health and safety hazards. It includes the application of international best practices and standards set in the WB EHS guidelines on occupational health and safety.
National Environmental Policy and Action Plan (NEPAP)	1993	Of its five objectives, the most relevant to UWSSP are to: (i) mitigate adverse environmental impacts of projects; and (ii) safeguard national & cultural heritage and preserve bio-diversity, within and outside protected areas.	EMP implementation is the overall measure to mitigate adverse impacts. Heritage sites and protected areas shall be avoided.
Local Self-Governance Act	1999	The Act gives Local Government the functions, duties and powers to, among others: (i) conserve and protect their local environment and natural resources; (ii) plan, implement and/or operate and maintain local water supply projects; (iii) implement or arrange for implementation local sanitation/sewerage and drainage projects; (iv) protect cultural heritage and religious sites; and/or (v) monitor project activities within their jurisdictions.	The drainage subproject will comply with all local government rules and regulations, and will be subject to inspection and other monitoring activities of the Local Government to ensure compliance with the Act.
National Urban Policy	2007	Policy gives importance to environment conservation while carrying out urban development works and natural resource use; thus, supporting the required environmental	The drainage subproject will ensure compliance with the policy. The EMP provides all



<b>Policy/Law/ Guideline</b>	<b>Year *</b>	<b>Relevant Provisions</b>	<b>Remarks</b>
		conservation and protection in donor-assisted development projects.	necessary measures to ensure the conservation and protection of the environment at all stages of subproject implementation.
National Urban Water Supply and Sanitation Sector Policy	2008	The Policy requires the IEE or EIA of proposed WSS projects in accordance with the EPA and EPR. Such assessments are to: (i) incorporate consultations with key stakeholders, including end-point users; and (ii) specify measures to mitigate environmental impacts prior to and during construction and during operation, as well as corrective measures.	The drainage subproject will comply with the conduct of IEE in compliance with both ADB and EPA/EPR requirements, which include the conduct of meaningful consultations. The EMP includes all necessary measures to mitigate environmental impacts at all stages of subproject implementation.
Solid Waste Management Act	2011	Article 4 provides that the management of hazardous, medical, chemical or industrial waste rests upon the generators of such wastes. Management shall be as prescribed in the Act. Article 5 provides that individuals and entities have the duty to reduce the amount of solid waste generated while carrying out work or business.	The drainage subproject to manage generated solid wastes accordingly.  EMP provides all measures necessary to mitigate the impact of materials handling and solid waste generation at all stages of subproject implementation.

\* (Year) - Year last amended.

45. Following requirements of ADB SPS, PMO and RPMOs shall apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in the World Bank's EHS Guidelines (footnote 14). When the Government of Nepal regulations differ from these levels and measures, the executing agency shall achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific subproject circumstances, the executing agency will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

46. International Guidelines are presented, where applicable, to show comparison and will be useful if evaluation of quality monitoring results include checking of how subproject's environmental performance fare with international standards.

**Table 5: Ambient Air Quality Standards**

Parameter	Averaging Period*	Nepal's Ambient Air Quality Standard, 2003** ( $\mu\text{g}/\text{m}^3$ )	WHO Air Quality Guidelines ( $\mu\text{g}/\text{m}^3$ )		Standard values to be followed by the subproject <sup>^^^</sup> ( $\mu\text{g}/\text{m}^3$ )
			Global Update <sup>^</sup> 2005	Second Edition <sup>^^</sup> 2000	
TSP	Annual	-	-	-	-
	24-hour	230	-	-	230
PM <sub>10</sub>	Annual	-	20	-	20
	24-hour	120	50	-	50
PM <sub>25</sub>	1-year	-	10	-	10
	24-hour	-	25	-	25
SO <sub>2</sub>	Annual	50	-	-	50
	24-hour	70	20	-	20
	10-minute	-	500	-	500
NO <sub>2</sub>	1-year	40	40	-	40
	24-hour	80	-	-	80
	1-hour	-	200	-	200
CO	8-hour	10,000	-	10,000	10,000
	15-minute	100,000	-	100,000	100,000
Pb	1-year	0.5	-	0.5	0.5
Benzene	1-year	20	-	-	20

\* Due to short term duration of civil works, the shortest period will be more practical to use.

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

<sup>^</sup> Source: Environmental, Health and Safety General Guidelines, 2007. International Finance Corporation, World Bank Group.

<sup>^^</sup> Source: Air Quality Guidelines for Europe, Second Edition, 2000; WHO Regional Office for Europe, Copenhagen

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

**Table 6: Noise Level Standards**

Receptor/ Source	National Noise Standard Guidelines, 2012* (dB)		WHO Guidelines Value For Noise Levels Measured Out of Doors** (One Hour LA <sub>q</sub> in dBA)		Standard values to be followed by subproject (footnote 18) (in dB)	
	Day	Night	07:00 – 22:00	22:00 – 07:00	Day	Night
Industrial area	75	70	70	70	70	70
Commercial area	65	55	70	70	65	55
Rural residential area	45	40	55	45	45	40
Urban residential area	55	50	55	45	55	45
Mixed residential area	63	55	55	45	55	45
Quiet area	50	40	-	-	50	40
Water Pump	65		-		65	
Diesel generator	90		-		90	

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

\*\*Guidelines for Community Noise, WHO, 1999. Source: Environmental, Health and Safety General Guidelines, 2007. International Finance Corporation, World Bank Group.

#### D. International Environmental Agreements.

47. Table 4 below lists the relevant international environmental agreements that Nepal is party to, and their relevance to various subprojects under UWSSP.

**Table 7: International Environmental Agreements Relevant to Subproject**

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

<b>International Environmental Agreement</b>	<b>Year *</b>	<b>Relevant Provisions</b>	<b>Remarks</b>
Wastes and Their Disposal			EMPs as measure to avoid or minimize the generation and disposal of hazardous wastes.

#### **IV. ANALYSIS OF ALTERNATIVES**

##### **A. With- and Without-Subproject Alternatives**

48. Stormwater drainage system in the proposed town has become necessary due to flat topography and expected 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 and 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:

- (i) Similarly, the existing drains of the project town are observed to be constructed without proper planning & design;
- (ii) There is also no such development plan prepared for this project town until date;
- (iii) There is also no coordination between responsible authorities in the construction of drains; and
- (iv) 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.

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

50. **With subproject' alternative:** With the subproject, 1,057 populations as of 2018 will have proper and effective management of storm water drainage, and the local people will not have to suffer from floods during monsoon. Also, good hygiene and sanitation practices will be promoted and there will be reduced health and safety risks. 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 town. Improved drainage facilities will create an enabling environment for local economic development and improved social services that communities within the sphere of influence of the town will benefit from; thus, contributing to the overall local economic development of the District. Ultimately, this will contribute to the delivery of Nepal's commitment to UN SDG 6.

##### **B. Alternatives Relative to Planning and Design**

51. There are no such alternatives proposed in the design of stormwater drain components.

## **V. DESCRIPTION OF THE ENVIRONMENT**

### **A. Physical Environment and Resources**

#### **1. Landforms and Topography**

52. The proposed subproject will be located in Katahariya Municipality, which is situated in Rautahat district in Narayani Zone of the Province 2 of Nepal. It lies between 26°58'03" N to 26°59'59" N latitude to 85°13'30" E to 85°14'52" E. It is at an altitude of 89-92 m above mean sea level.

53. The proposed subproject area belongs to former Katahariya VDC which was bounded by Lal-Bakaiya River in the west and southwest, Birti VDC in the north, Birti and Pipra Pokhariya in East and Karkach Karmaiya VDC in the south. Ward No. 1 of former Katahariya VDC is isolated to other ward of former Katahariya VDC. However, presently, Katahariya VDC has been changed into Katahariya municipality. Hence, the judiciary boundary of the municipality has been changed during last election incorporating the areas of adjoining VDC.

#### **2. Geology and Soils**

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

#### **3. Climate**

55. The climate prevailing in the subproject area is characterized by hot and humid summers, and cold winters. The climate swings from cold to hot, with the temperature ranging between about 3.4°C in winter to a maximum of 40.8°C in summer. The climate is heavily influenced by the monsoon (June-September) with an average annual rainfall of about 1,650 millimeter (mm).

#### **4. Air Quality**

56. There are few industries in the subproject 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.

#### **5. Acoustic Environment**

57. The sources of noise in the subproject area are from the construction activities, vehicle movements, and industrial activities. Katahariya town is an emerging town and noise level may be more evident or elevated in the years to come. At present, anthropogenic noise is confined in few clustered settlements and market places only in the day time.

### **B. Ecological Resources**

## 1. Natural Resource Management

58. In Katahariya Municipality, traditional agricultural practices are followed with a crop rotation of two crops per year (i.e., rice and wheat). There are two major crops with high production (wheat and rice) at present. Hence, there are various irrigation canals within the subproject town. Two of them are used as the outlet for the proposed stormwater drain lines. The subproject will provide benefit to the farmers to utilize stormwater as source of water for agricultural purposes.

59. The main sources of energy of the subproject town are electricity, kerosene, wood and dry branches and leaves.

60. The only river that flows nearby the settlement area is 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 resources 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. Due to this problem, this river is not proposed as outlet for the storm drain.

## 2. Flora

61. There are no protected areas, forests or pasture land in the subproject town. The forest areas in nearby towns have floral species such as *Shorea robusta*, *Terminalia* spp., *Adina cordifolia*, *Lagerstomia parviflora*, *Bombax ceiba*, *Albizia* spp., *Eugenia jambolana*. The riverine forests are dominated by *Acacia catechu* and *Dalbergia sissoo*; *Bombax ceiba*. Patches of vegetation on private lands are predominantly *Bombax ceiba*, and *Dalbergia sissoo*. Some of the medicinal and useful plants found in the VDC are Neem, Tulasi, ginger, parijat, sarpagandha, etc. People depend on nearby forests to meet their needs of timber, wood, agriculture implements, fuel wood, fodder, animal beddings, fruits, food items, forage for grazing, medicines and other services. The subproject will not cause impact to these resources.

## 3. Fauna

62. The subproject area does not have forest. Some of the mammals reportedly present in the nearby forests are listed in Table 8.

**Table 8: Mammals in the Project Area**

S. No.	Scientific Name	English Name	Local Name	Status
1	<i>Vulpes bengalensis</i>	Bengal Fox	Fyauro	LC
2	<i>Canis aureus</i>	Golden Jackal	Syaal	LC
3	<i>Bandicota Indica</i>	Greater Bandicoot Rat	Jungli Musa	LC
4	<i>Felis Chaus/Prionailurus bengalensis</i>	Jungle Cat	Ban Dadhe	LC
5	<i>Lepus nigrcollis</i>	Indian Hare	Kharayo	LC

S. No.	Scientific Name	English Name	Local Name	Status
6	<i>Felis viverrina</i>	Fishing Cat	Malaha Biralo	Not Available in IBAT
7	<i>Funambulus Pennantii</i>	Five Stripped Palm Squirrel	Paanch Dharke Lokharke	LC
8	<i>Petaurista elegans</i>	Spotted Giant Flying Squirrel	Rajpankhi Lokharke	LC
9	<i>Cynopterus sphinx</i>	Greater Shortnosed Fruit Bat	Nepte Chamera	LC
10	<i>Herpestes edwardsi</i>	Common Indian Grey Mongoose	Nyauri Musa	LC
11	<i>Macaca mulatta</i>	Rhesus Monkey	Rato Badar	LC

Source: IEE Field Visit, 2016 and Proximity Report by IBAT, 2018.

63. Some of the birds reported in the forest areas are listed in Table 9:

**Table 9: List of Birds in the Project Area**

S. No.	Scientific Name	English Name	Local Name	Status
1	<i>Bubulcus ibis</i>	Cattle Egret	Bakulla	LC
2	<i>Ciconia nigra</i>	Black Stork	Kalo Saras	LC
3	<i>Ciconia ciconia</i>	White Stork	Seto Saras	LC
4	<i>Corvus splendens</i>	House Crow	Kaag	LC
5	<i>Corvus macrorhynchos</i>	Large Billed Crow	Kalo Kaag	LC
6	<i>Cuculus micropterus</i>	Indian Cuckoo	Kafal Pakyo	LC
7	<i>Eudynamis scolopacea</i>	Western Koel	Koili	LC
8	<i>Gallus gallus</i>	Red Jungle Fowl	Luinche	LC
9	<i>Lophura leucomelans</i>	Kalij Pheasant	Kalij	LC
10	<i>Passer domesticus</i>	House Sparrow	Bhangera	LC
11	<i>Picus squamatus</i>	Scaly-bellied Woodpecker	Thulokatle Kathfor	LC
12	<i>Streptopelia senegalensis</i>	Laughing Dove	Dhukur	Not Available in IBAT
13	<i>Tyto alba</i>	Barn owl	Gotho Latokoshero	LC

Source: IEE Field Visit, 2016 and Proximity Report by IBAT, 2018.

64. The commonly found reptiles and amphibians observed in the subproject area are shown in Table 10.

**Table 10: List of Reptiles and Amphibians Found in the Project Area**

S. No.	Scientific Name	English Name	Local Name	Status
1	<i>Bungarus caeruleus</i>	Common Karait		Not Available in IBAT
2	<i>Naja naja</i>	Cobra	Naag	Not Available in IBAT
3	<i>Calotes versicular</i>	Garden Lizard	Chheparo	Not Available in IBAT
4	<i>Hemidactylus brookii</i>	Common Lizard	Mausuli	Not Available in IBAT
5	<i>Bufo melanostictus</i>	Common toad	Bhyaguta	Not Available in IBAT
6	<i>Rana cyanophylectis</i>	Stream frog	Bhyaguta	Not Available in IBAT

Source: IEE Field Visit, 2016 and Proximity Report by IBAT, 2018.

#### 4. Aquatic Life

65. Similarly, common fishes found in the subproject area are given in Table 11.

**Table 11: List of Fishes Found in the Project Area**

S. No.	Scientific Name	English Name	Local Name	Status
1	<i>Cirrhinus sps.</i>	Mrigal	Rawa	LC
2	<i>Labeo bata</i>	Minor Carp	Rohu	LC
3	<i>Amphipnos cuchia</i> ( <i>Monopterus albus</i> )	Rice Swampeel	Andha bam	LC
4	<i>Mastacembelus armatus</i>	Spiny eel	Bam	LC
5	<i>Channa punctatus</i>	Dwarf Snakehead	Garhi	LC

Source: IEE Field Visit, 2016 and Proximity Report by IBAT, 2018.

#### 5. Protected Area

66. With reference to the list of protected areas of Nepal as specified by IUCN given below, it is observed that the subproject town is not within or near any of the protected areas mentioned below. Hence, the proposed subproject does not have any threats to such ecologically sensitive areas.

**Table 12: List of Protected Areas in Nepal**

S. No.	Type of Protected Areas	Name of the protected areas
1	National Parks	Chitwan National Park
		Sagarmatha National Park
		Langtang National Park
		Rara National Park
		Khaptad National Park
		Shey Phoksundo National Park
		Bardiya National Park
		Makalu Barun National Park
		Shivapuri Nagarjun National Park
		Banke National Park
		Shuklaphanta National Park
		Parsa National Park



2	Wildlife Reserves	Koshi Tappu Wildlife Reserve
3	Conservation Areas	Annapurna Conservation Area
		Kanchenjunga Conservation Area
		Manaslu Conservation Area
		Blackbuck Conservation Area
		Api Nampa Conservation Area
4	Hunting Reserves	Gaurishankar Conservation Area
5	Ramsar Sites	Dhorpatan Hunting Reserves
		Bishazari Tal
		Ghodaghodi Tal
		Gokyo Lake Complex
		Gosainkunda
		Jagadishpur Reservoir
		Koshi Tappu Wildlife Reserve
		Mai Pokhari
		Phoksundo Lake
		Rara Lake
		Lake Cluster of Pokhara Valley

## C. Socioeconomic and Cultural Environment

### 1. Settlement pattern

67. The spatial distribution pattern of settlements in Katahariya municipality is found to be scattered in the agricultural village areas and agglomerated in the accessible commercial areas, tended to be clustered in the inner core areas with Gravel and dirt road access. There is a dense linear settlement in the main Katahariya Bazaar. The rural area of the municipality is gradually shifting towards the urban area with emerging market along the main roads and settlements.

### 2. Population and Household

68. The total population of the municipality per 2011 census was about 9,960 living in 1,564 households. The average annual growth rate of the Katahariya municipality during 1991-2001 is 2.67 and 2001-2011 is 3.13. The ward-wise population of the subproject area of the former Katahariya VDC according to the census, 2001 and 2011 has been presented below.

**Table 13: Population of the Concern Ward of Project Town**

Ward	W. Area (ha)	Census 2001			Census 2011			Growth Rate (2001-11) %
		House- holds	Pop.	P. Densities (persons per ha)	House- holds	Pop.	P. Densities (persons per ha)	
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
4	33.99	48	303	8.9	59	384	11.3	2.4
5	78.07	127	711	9.1	198	1,141	14.6	4.84
6	44.73	94	632	14.1	123	709	15.9	1.16
7	22.16	148	968	43.7	189	1,226	55.3	2.39
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: Nepal Central Bureau of Statistics 2001 and 2011.

69. The above tables show that average annual population growth rate of the subproject area increased from 3.13%. The ward 7 and 9 of the former VDC are densely populated wards in the subproject area. However, these wards are not urban in character. The population densities of these wards are higher because of the comparatively higher population in the very small ward area. The population densities of these wards are in order of 40 persons per hectare and higher. The main market area is situated in ward no 5, 6 and 8 of the VDC. The population densities in these wards are in the range of 16 to 20 persons per hectare.

70. The overall population density of the subproject area increased from 8.9 persons per hectare in 2001 to 12.2 persons per hectare in 2011. 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.

71. A socioeconomic survey was conducted at the proposed service area in 2016. It shows that the total population of the service area is 10,481. The following table shows the coverage of the population, including beneficiary households in the subproject area.

**Table 14: Beneficiaries households**

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

Source: Socio-economic survey 2016.

72. Ward Nos. 1 to 9 are the wards of former Katahariya VDC, which are now covered by Ward Nos. 4 and 5 of Katahariya Municipality by virtue of the new Nepal constitution.

### 3. Ethnicity and caste

73. The composition of the community by caste or ethnicity is homogeneous in nature and mainly dominated by Madhesi caste groups with about 84.6%, and followed by the hill caste groups with about 15.4%.

74. **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 Brahman and only 3.3% are Terai Dalits (Chamar, Ram, Pashwan, etc.).

**Table 15: Composition of Beneficiaries Households of Terai Caste Group**

<b>Cast/Ethnic Composition</b>	<b>Total</b>	<b>%</b>
Madhesi (Sah, Das, Sonal, Mahato, Koiri, Teli, Yadav, Kalwar, etc.)	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.

75. **Hill Caste Group.** Similarly, the study shows that about 15.4% of the 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% fall under Dalit caste groups within the service area. Details of information are presented in the Table 16.

**Table 16: Composition of Beneficiaries Households of Hill Caste Group**

<b>Cast/Ethnic Composition</b>	<b>Total</b>	<b>%</b>
Brahman/Chhetri	144	8.8
Janajati	84	5.13
Dalit	23	1.40
Total	251	15.4

Source: Socio-economic survey 2016.

### D. Education and Health Education

76. According to the institutional data obtained from the social survey, 10 educational institutions, including one higher secondary level school and five schools with primary to secondary level were recorded in the service area. About 2,494 people are involved in these institutions (including students, staffs, and teachers). The survey revealed that about 52% (846) of household heads within the subproject area are illiterate.

77. The details of education level are presented in the Table 17 below.

**Table 17: Education Level of Head of Beneficiaries Households**

Education of HHs. Head	Ward									Grand Total	%
	1	2	3	4	5	6	7	8	9		
Illiterate	10	115	146	91	84	63	117	103	117	846	51.7
Literate	82	63	23	4	51	21	27	126	109	506	30.9
Primary	0	0	1	3	6	10	0	16	11	47	2.9
Secondary	0	11	1	0	0	0	2	0	3	17	1.0
SLC	0	10	2	0	9	12	4	1	7	45	2.8
Intermediate	0	0	15	2	17	26	50	0	24	134	8.2
Bachelor	0	19	00	1	14	1	4	1	0	40	2.5
Grand Total	92	218	188	101	181	133	204	247	271	1635	100

Source: Socio-economic survey 2016.

**1. Health**

78. The survey revealed that cases of water-borne diseases such as diarrhea, dysentery, stomach ache, skin disease, etc. are prevalent in the subproject area, especially during summer. There are four medical centers in the VDC 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. However, Garuda municipality, which is merely 8 kilometers far from Katahariya, has 10 medical centers with relatively modern healthcare services.

**E. Economic Activities**

79. **Occupation.** Majority of the population (about 53.52%) is engaged in agriculture, and about 26.12% of the population depends on commercial business. Table 18 below shows the complete result of survey in 2016 on the type of occupations of the households in the subproject area.

**Table 18: Type of Occupation of Beneficiaries Households**

Occupation of Family	Ward									Grand Total	%
	1	2	3	4	5	6	7	8	9		
Agriculture	92	149	59	48	105	75	119	108	120	875	53.52
Business	0	12	81	14	44	38	58	97	83	427	26.12
Industry	0	0	31	10	13	9	14	3	36	116	7.09
Remittance	0	0	12	9	16	7	6	22	14	86	5.27
Labor	0	57	4	12	2	2	3	14	9	103	6.30
Others	0	0	1	8	1	2	4	3	9	28	1.71
Grand Total	92	218	188	101	181	133	204	247	271	1635	100

Source: Socio-economic survey 2016.

80. **Food Sufficiency.** Although the main source of income of the service area is agriculture, where 53.52% of households depend upon it, only about 19.6 % of household have food sufficiency throughout the year. A large proportion, about 70% of households have shortages from 3-9 months.

81. **Income Level.** About 45.02% of households has a monthly income ranges more than NRs10,876-NRs20,000 whereas 37.86% of households have monthly income less than

NRs10,875. Similarly, about 15.54% of households have a monthly income of NRs20,001 to NRs50,000 and 1.59% of households have more than NRs50,000 income per month.

**Table 19: Income Level of Head of Beneficiaries Households**

Income Range	Ward									Grand Total	%
	1	2	3	4	5	6	7	8	9		
<7500	3	6	27	65	34	6	62	54	71	328	20.06
7500-10875	4	13	22	12	85	9	57	42	47	291	17.80
10876-20000	37	181	96	22	49	77	63	103	108	736	45.02
20001-50000	46	18	43	2	11	35	20	44	35	254	15.54
>50000	2	0	0	0	2	6	2	4	10	26	1.59
Total	92	218	188	101	181	133	204	247	271	1635	100

Source: Socio-economic survey by the IEE team in 2016.

82. **Expenditure level.** About 32% of households are spending less than NRs7,500 per month. Similarly, 27.5% of households are spending about NRs7,500 to NRs10,876. As per the survey, about 31.4% of households are spending more than NRs10,876-NRs20,000 per month. Similarly, 9.5% of households expense more than NRs20,000 per month.

83. **Poverty Conditions.** The survey revealed that main sources of household income of the service area are agriculture, business, industry, remittance and wage labor. As per the Project Implementation Guidelines, income level less than NRs7500.00 per month of a family is considered as a poor household. The survey revealed that about 20% (328 households) are poor within the service area.

## **F. Existing Situation of Drainage System**

### **1. Drainage Facilities**

84. The terrain of the subproject area is relatively flat and is still to gain momentum to grow into a dense settlement. Being flat terrain, drainage should be a concern. But being relatively rural and with low density and sparse settlements with a lot of vacant land in between, monsoon water does not inundate the project area. Main parts of the Town, along the highway and main streets, do have provision of drainage system but seems to be not planned properly and covers only a small portion of the subproject area. The subproject area possesses a lot of rivers and rivulets which could be used to drain the water out of the subproject area but needs to be planned properly. Due to flat terrain, drainage might be a more serious problem for the subproject area once urbanization starts taking strides. With the rise in dense settlement, inundation and drainage will be a big concern.

85. The service areas only have drain in limited area of Ward No. 5 of Katahariya bazaar (former Katahariya VDC). In other some area most of the surface drains have been constructed in a piece-meal fashion without help of proper engineering design or adherence to a drainage master plan by local habitants. The drains were designed and constructed only for temporary relief purposes in the localized area. Few of these drains are stretches few meters in length and are functioning well.

### **2. Wastewater Management Practices**

86. There is no sewerage system in the subproject area. Wastewater from individuals is discharging excess water to the adjacent roadside drains. Hence, this indicate the possibility of pollution of storm water drains.

### 3. Existing Institutional Situation

87. **Existing institutions involved in the sanitation field.** The main institutions involved in water supply and sanitation sector in the subproject area are Katahariya Municipality; Water Supply and Sanitation Division Office (WSSDO), Gaur, Rauthat; Katahariya water users' and sanitation committee; and other WUSC Committees and some non-governmental organizations (NGOs). WSSDO, Rautahat has been actively supporting most of the WUSCs to manage the existing water supply and sanitation facilities and carry out different WASH activities in the subproject area. It has been providing both financial and technical support for large-scale maintenance activities when needed.

88. **Water Supply and Sanitation User's Association.** The Katahariya Water Supply and Sanitation Committee consist of nine members representing from various clusters within the service area. The executive committee consists of seven male and three female members, and a female member is positioned in the key executive post of WUSC. The WUSC was registered in Water Resource Committee, Rautahat in 14th August 2014 as per the Water Resource Act-1992 and Water Resource Rule 1993 and 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 the tabular form:



**Table 20: Members of Katahariya Water Users' Sanitation Committee**




S.N.	Name	Position
1	Mr. Chote 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

**G. Site-Specific Environmental Conditions**

89. Table 21 below summarizes the site-specific conditions of the subproject component locations/sites/alignments.

**Table 21: Site-Specific Environmental Conditions**

Site	Description	Photograph
Jalaiya Pond	It is a natural water body. It is located in ward no. 4 & 5 of the present Katahariya Municipality.	
Line JAL L & Line JAL R	It is the ending point of the drainage lines JAL- L (left side of Jalaiya Road) & JAL- R (Right Side) that starts from OHT site to Jalaiya Road.	

Site	Description	Photograph
Starting Point of JAL-L & JAL-R	It is located in ward no.5. There also exists existing drain which is also seen clearly in this picture. The existing drains include 245m of line JAL-L and 255m of line JAL-R.	
Main Bazaar (Market) Area of Katahariya	It is located in the ward 5 of present Katahariya Municipality.	
(Previous VDC office, now WARD no. 6 Office Building)	It is located in ward no. 6. It is the starting Point of Drainage Line VDC-L. It is also the market area of Katahariya Municipality.	



## VI. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

### A. Beneficial Impacts

90. Availability of adequate sanitary facility is an important communal need in order to maintain good hygiene in the community and healthy living of the people. The development of sanitation facilities will have numerous beneficial impacts to individuals and communities. Improved sanitation needs will significantly improve the quality of life of the area. Some of the major beneficial impacts of the subproject are described below along with suggestions for achieving optimal benefits. Table 22 summarizes these impacts.

91. **Employment Generation.** The subproject will generate direct employment opportunities e.g. skilled and non-skilled work for the local people. Construction activities in drainage-related works will require these skills. The earnings will positively affect the local economy, thereby reducing the chances of seasonal migration of the local people. To obtain such benefits, priority will be given to employing local laborers. The impact is thus direct in nature, local in extent, medium in magnitude and short term in duration.

92. **Skills Enhancement.** The construction of the subproject will not only provide direct employment opportunities but also ensure the transfer of skills and technical proficiency to the local workforce. The subproject activities on drainage construction will generate transferable skills. In future, these skills will be useful for locals to generate income as well as implement when the need arises. To obtain or augment such benefits, proper work plans and codes of conduct should be implemented during the construction. The impact is thus indirect in nature, local in extent, medium in magnitude and long-term in duration.

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

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

95. **Increased Economic Opportunity.** After the completion of the subproject, there might be increased rural-town migration due to better facilities and opportunities. The increased economic level may increase the value of the land, thereby uplifting the economic status of the local people. These benefits can be maximized by ensuring regular maintenance of the drainage system components and by promoting land development activities in the area. The impact is thus indirect in nature, local in extent, medium in magnitude and long-term in duration.

96. **Women Empowerment.** Women and girls are mainly responsible for household activities. Improved sanitation will contribute towards better health and hygiene of women, girls and the entire household members. The beneficial impacts to women and girls can be augmented by

conducting health and awareness programs to the local community. The impact is thus indirect in nature, local in extent, low in magnitude and long-term in duration.

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

98. To sustain the positive outcomes, effective operation, and maintenance guided by an O&M manual is essential. Continuing hands-on training of WUSC in EMP implementation, particularly the regular inspection and maintenance of the drainage system, is necessary.

**Table 22: Summary of Impact Matrix of Beneficial Issues of Subproject**

Beneficial Impacts	Impact Rating				
	Nature	Magnitude	Extent	Duration	Rating
<b>Construction Phase</b>					
Employment Generation	D	M (20)	L (20)	ST (5)	Significant (45)
Skill Enhancement	ID	M (20)	L (20)	LT (20)	Significant (60)
Local Trade and Business	D	M (20)	L (20)	LT (20)	Significant (60)
<b>Operation Phase</b>					
Improved Health and Hygiene	D	H (60)	L (20)	LT (20)	Very Significant (100)
Increased Economic Opportunity	ID	M (20)	L (20)	LT (20)	Significant (60)

**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. Assessment of Adverse Environmental Impacts**

99. The nature of Katahariya stormwater drainage subproject and scope of the civil works will generate impacts, issues and concerns prior to construction, during construction and during operation. The potential impacts, issues and concerns from the subproject using ADB REA Checklist for drainage projects (Appendix 1) and “no mitigation measures scenario” checklist developed for UWSSP (Appendix 2) are presented in Table 23 below.

**Table 23: Stormwater Drainage Subproject Potential Environmental Impacts, Issues and Concerns (No Mitigation Measures Scenario)**

Design	Construction	Operation and Maintenance
<ul style="list-style-type: none"> <li>environmental pollution due to inadequate sludge disposal or industrial waste discharges illegally disposed in drainage system</li> <li>environmental pollution due to siltation along the drainage lines and eventually affecting the</li> </ul>	<ul style="list-style-type: none"> <li>interference with other utilities and blocking of access to buildings</li> <li>dislocation or involuntary resettlement of people</li> <li>noise and vibration due to blasting and other civil works</li> <li>risks and vulnerabilities related to occupational</li> </ul>	<ul style="list-style-type: none"> <li>risks and vulnerabilities related to community health and safety due to physical, chemical, and biological hazards</li> <li>discharge of hazardous materials into drains</li> <li>positive impacts - employment to local people; improved flooding conditions</li> </ul>

Design	Construction	Operation and Maintenance
<p>quality of receiving surface water.</p> <ul style="list-style-type: none"> <li>• discharge of hazardous materials into the drains</li> <li>• permanent or temporary change in land use or topography including increases in intensity of land use</li> </ul>	<p>health and safety due to physical, chemical, and biological hazards</p> <ul style="list-style-type: none"> <li>• road blocking and temporary flooding due to land excavation during the rainy season</li> <li>• noise and dust</li> <li>• traffic disturbances due to construction material transport and wastes</li> <li>• temporary silt runoff</li> <li>• population increase that causes increased burden on social infrastructure (such as sanitation system)</li> <li>• social conflicts between construction workers from other areas and community workers</li> <li>• 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</li> <li>• 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</li> <li>• clearance of existing land, vegetation or building</li> <li>• pre-construction investigations (boreholes, soil testing, etc)</li> <li>• construction works</li> <li>• demolition works</li> <li>• temporary sites used for construction works or housing of construction workers</li> <li>• cut and fill or excavations</li> <li>• working in stream crossings</li> <li>• use of resources (materials, water, energy, etc.)</li> <li>• changes in occurrence of disease or affect disease vectors (e.g. insect or water-</li> </ul>	<p>which will enhance people's well-being, and boost economic conditions of municipalities</p>

Design	Construction	Operation and Maintenance
	borne disease) due to worker's camp <ul style="list-style-type: none"> <li>• solid wastes such as spoils, overburden, etc.</li> <li>• solid wastes from worker's camp</li> <li>• emission from burning of waste in open air (e.g. worker's camp, slash materials, construction debris)</li> </ul>	

100. **Location and Design.** The impacts, issues, concerns and mitigation measures during the preliminary design phase are given in Table 24. As the subproject locations and/or sites are screened during selection process, environmental impacts due to location are not anticipated in Katahariya stormwater drainage subproject. The environmental assessments of the subproject show that it is not likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. Potential impacts are unlikely to affect areas far beyond the sites subject to physical works. These impacts are site-specific and few if any of them are irreversible.

101. Planning principles, subproject selection criteria as indicated in the project administration manual of UWSSP, and other design considerations have been reviewed and incorporated into the site planning and preliminary design process wherever possible; thus, environmental impacts as being due to the stormwater drainage subproject design or location were not significant. Mitigation measures have been developed to reduce all negative impacts to acceptable levels. These were discussed with specialists responsible for the engineering aspects, and as a result significant measures have already been included in the subproject designs. Recommendations are provided in this draft IEE that will be considered in the final detailed design stage.

102. In most cases mitigation measures can be designed with uncomplicated measures commonly used at construction sites and known to civil works contractors. Once the subproject is completed, the drainage system will be functional with routine maintenance, which shall not affect the environment.

### 1. Impacts and Mitigation Measures during Design Phase

103. The impacts, issues, concerns and mitigation measures during the design phase are illustrated in Table 24.

**Table 24: Impacts and Mitigation Measures during Design Phase**

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsibility
<b>Detailed design</b>			
Incorporation of sloped areas and drainage protection measures in the project design	Soil erosion and slope instability.  Siltation of drainage and bodies of water	<ul style="list-style-type: none"> <li>• Incorporate measures and sites for handling excessive spoil materials</li> <li>• Provide silt traps in all drainage inlets.</li> </ul>	Project management office (PMO), regional project management office (RPMO) and design, supervision and management consultant (DSMC)

<b>Project Activity</b>	<b>Potential Environmental Impacts</b>	<b>Proposed Mitigation Measures</b>	<b>Responsibility</b>
	Hazards (accidents of falling into open drainage canals) to residents, passers by and animals.	<ul style="list-style-type: none"> <li>• Provide cover to all drainage constructed.</li> </ul>	
Designs of inlet and inflow controls for the drainage.	Discharge of sewage/septic wastes and grey water from households will pollute receiving bodies of water.	<ul style="list-style-type: none"> <li>• The inlet design to ensure that only storm or rainwater flows into the drainage system.</li> <li>• Prevent households from connecting outlets of septic tanks and grey water to the drainage lines.</li> </ul>	PMO, RPMO and DSMC
Design of outfalls at the receiving bodies of water	Accumulation of wastes and silt at the outfall sections resulting to pollution or degradation of the quality of surface water.	<ul style="list-style-type: none"> <li>• Provide siltation or sedimentation chambers (or similar structures) at the outfalls of the drainage system to prevent solid wastes or silts from flowing directly to the receiving body of water.</li> <li>• Position the outfall enough to have space for the provision of siltation or sedimentation ponds (or similar structures), including accessibility during maintenance phase.</li> </ul>	PMO, RPMO and DSMC
Manual preparation	Health and safety of community and workers	<ul style="list-style-type: none"> <li>• Prepare training manuals in Nepali with sketches on community health and safety and potential occupational health and safety during construction, and community health and safety during the operation phase.</li> </ul>	PMO, RPMO and DSMC
Construction activities	<p>Disruption of vendors' business</p> <p>False claims from people; water quality changes due to construction.</p> <p>Interference with other utilities during construction</p>	<ul style="list-style-type: none"> <li>• Prepare Resettlement Plan and implement the plan after notifying people</li> <li>• Provide compensation to the affected people</li> <li>• Baseline Photographs of the construction areas</li> <li>• As much as possible, place drainage alignments away from utilities during design.</li> <li>• Provide budget for restoration/replacement of damaged utilities</li> <li>• Avoid placing drainage alignment near heritage buildings</li> <li>• Photograph all sites within heritage areas to enable before and after comparison (note: all roads are to be reinstated to</li> </ul>	PMO, RPMO and DSMC /Contractor

<b>Project Activity</b>	<b>Potential Environmental Impacts</b>	<b>Proposed Mitigation Measures</b>	<b>Responsibility</b>
		original character especially in heritage areas) <ul style="list-style-type: none"> <li>• Ensure compliance with any Department of Archaeology (DOA) rules during design including preparation of Archaeological Impact Assessment, or other agreed document by DOA if required.</li> </ul>	
Road dismantling activities	Disturbance and hazards to pedestrians and road users.	Obtaining letter of approvals and agreements from Department of Roads and Municipality for temporary acquisition of land as well as dismantling of the road.	PMO, RPMO and DSMC/Contractor
Excavation works	Traffic congestion	Preparation of Traffic Management Plan (see Appendix 3 for sample)	Municipality's Traffic Police Division, PMO, RPMO and DSMC

104. The design of the stormwater drainage system will ensure that only stormwater or rainwater will be flowing to the drainage canals once they become operational. The final detailed design will ensure that the following:

- (i) Inlets to the drainage system be positioned away from outlets of septic tanks and greywater lines of households or commercial establishments. This will avoid the situation where the drainage system will be used as discharge point of septic and household wastes that could pollute the receiving bodies of water; and
- (ii) Silt traps are integrated in the design to avoid heavy siltation in the drainage system during monsoon season that could eventually affect the receiving bodies of water at the outfalls of the drainage system.

105. The design of the outfalls will ensure the following:

- (i) Siltation or sedimentation chambers (or similar structures) be constructed at the outfalls with sizes depending on the peak volume flow. This will avoid heavy siltation and pollution of the receiving body of water;
- (ii) Position the outfalls at locations enough to provide space for the construction of siltation or sedimentation chambers (or similar structures); and
- (iii) Position the outfalls and siltation or sedimentation chambers (or similar structures) at locations that will be accessible for maintenance and cleaning during the operation phase.

## **2. Impacts during Construction Phase**

106. All construction activities will be confined to the sites of proposed drainage alignments, and the interference with the public and community around is minimal. There will be temporary negative impacts, arising mainly from construction dust and noise, hauling of construction material, waste and equipment on local roads (traffic, dust, safety, etc.), mining of construction material, occupation health and safety aspects. Impacts mainly arise from the construction dust and noise; from the disturbance of residents, businesses, traffic by the construction work, safety risk to workers, public and nearby buildings due to trench excavations especially in narrow roads, dust, access impediment to houses and businesses, disposal of construction waste, etc. These

are all general impacts of construction in urban areas, and there are well developed methods of mitigation that are suggested in the EMP.

107. **Non-Compliance with Environmental Legislation.** This issue will arise when there is a lack of awareness among subproject staff and management of environmental safeguard requirements, compliance with the requirements, conditions specified in the IEE Report, approval status, and consent.

108. Mitigation measures include (i) capacity strengthening of the PMO Environmental Officers and their counterpart at the town project level, and (ii) ensuring that necessary permit and registration are obtained.

109. **Erosion and land surface disturbance.** Excavation and digging of trenches during construction has the potential to cause erosion and cave-ins thereby causing soil erosion, silt runoff and unsettling of street surfaces. Unorganized disposal of the excavated earth can disturb the street surface and decrease the aesthetic and economic values of the area. The activity will be a discomfort to the road users and inhabitants. Quarrying activities operated to supply the aggregate demand of the Subproject may disturb land that could cause further erosion and landslides. The impact is thus direct in nature, local in extent, high in magnitude and short term in duration.

110. Mitigation measures include: during construction, precautionary measures will be taken; proper backfilling trenches will be done. Temporary access, diversions, and signboards for pedestrians will be provided. The exposed soil will be stabilized and revegetated to prevent further soil erosion. The contractor must coordinate with District Development Committee and the concerned Ministry on restrictions in quarrying and the legitimacy of extraction operations of identified sources. The contractor must secure permits for quarrying aggregates and implement a restoration plan, which should be part of EMP.

111. **Impacts on Air Quality.** Dust will be generated from inadequately managed or haphazard: (i) earthworks such as clearing, grubbing, excavations, and drilling; (ii) demolition works; (iii) stockpiling of natural aggregates, excavated materials and spoils; (iv) transport, loading and unloading of natural aggregates; (v) movement of construction-associated vehicles; (vi) on-site rock crushing and concrete mixing; and (vii) burning of firewood for cooking and heating in work and labor camps. The impacts are thus indirect in nature, local to regional in extent, medium in magnitude and short term in duration.

112. Mitigation measures include:

- (i) confining earthworks according to excavation segmentation plan that should be part of site-specific environmental management plan (SEMP);
- (ii) watering of dry exposed surfaces and stockpiles of aggregates at least twice daily, or as necessary;
- (iii) if re-surfacing of disturbed roads cannot be done immediately, spreading of crushed gravel over backfilled surfaces;
- (iv) during demolition or dismantling of portions of road pavements, watering of exterior surfaces, unpaved ground in the immediate vicinity and demolition debris;
- (v) place signage at active work sites in populated areas;
- (vi) requiring trucks delivering aggregates and cement to have tarpaulin cover;
- (vii) limiting speed of construction vehicles on access roads and work sites to a maximum of 30 kilometer per hour (km/h);

- (viii) prohibit burning firewood in work and labor camps (promote liquified petroleum gas for cooking purposes and electric heater for heating purposes);
- (ix) use of vehicles complying with names, 2069 enforcement, and green sticker standards; and
- (x) prohibit open burning of solid waste.

113. **Noise.** Noise-emitting construction activities include earthworks, concrete mixing, demolition works, movement and operation of construction vehicles and equipment, and loading and unloading of coarse aggregates. The significance of noise impact will be higher in areas where noise-sensitive institutions such as health care and educational facilities are situated. The impact is thus direct in nature, local in extent, medium in magnitude and short term in duration.

114. Mitigation measures include:

- (i) using equipment that emits the least noise, well-maintained and with efficient mufflers;
- (ii) restricting noisy activities to daytime and avoid using noisy equipment at night work;
- (iii) limit engine idling to a maximum of one minute;
- (iv) spread out the schedule of material, spoil and waste transport; and
- (v) minimizing drop heights when loading and unloading coarse aggregates.

115. **Impacts on Water Resources.** Construction materials such as sand, gravel and cement may be stored at the sites. Excavation works for the drainage system may also produce significant volume of excavated soils that will be temporarily piled along the road sides. If poorly managed, these materials and soil sediments may flow down the drains or road sides and may eventually cause siltation of nearby receiving bodies of water. Poor sanitation at camp sites may also produce liquid and solid wastes that may pollute receiving bodies of water in the area. Polluted water bodies will be harmful to aquatic life and people that depend upon such contaminated sources. The impact is thus direct in nature, local to regional in extent, medium in magnitude and short term in duration.

116. Mitigation measures include:

- (i) excess spoils will be disposed per the Spoil Management Plan attached in Appendix 4;
- (ii) locating temporary storage areas on flat grounds and away from main surface drainage routes;
- (iii) shielding temporary storage areas with sandbags; and
- (iv) providing adequate water supply and sanitation facilities at work sites.

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

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



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

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

120. **Impacts on the quality of groundwater resource.** The construction of the drainage system will not have impact to groundwater resource.

121. **Impacts on flora and fauna.** Haphazard site clearing, parking, and movement of construction vehicles and equipment stockpiling, will result in disturbance to the land in the subproject area. However, the subproject area does not include any forest, so the impacts to flora and fauna will be minimal. The impact is thus direct in nature, local in extent, low in magnitude and short term in duration.

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

123. **Impacts on physical, cultural resources.** The subproject will not encroach into, or be near physical, and cultural resources.

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

125. Mitigation measures include:

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

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

127. Mitigation measures include:

- (i) contractor's implementation of SEMP;

- (ii) contractor's implementation of community health and safety plan following international best practices on community health and safety such as those in Section 4.3 of World Bank Environmental Health and Safety (EHS) Guidelines on Construction and Decommissioning Activities.<sup>20</sup> As a minimum and whichever is applicable, the community health and safety plan shall ensure the following:
  - (a) implement risk management strategies to protect the community from physical, chemical, or other hazards associated with sites under construction and decommissioning;
  - (b) restricting access to the site, through a combination of institutional and administrative controls, with a focus on high risk structures or areas depending on site-specific situations, including fencing, signage, and communication of risks to the local community;
  - (c) removing hazardous conditions on construction sites that cannot be controlled affectively with site access restrictions, such as covering openings to small confined spaces, ensuring means of escape for larger openings such as trenches or excavations, or locked storage of hazardous materials; and
  - (d) implement measure to prevent proliferation of vectors of diseases at work sites;
- (iii) adequate space and lighting, temporary fences, reflectorized barriers and signages at active work sites;
- (iv) contractor's preparedness in emergency response;
- (v) adequate dissemination of GRM and contractor's observance and implementation of GRM; and
- (vi) upon availability, local people should be given an opportunity for work in the subproject activities.

128. **Workers' Health and Safety Hazards.** Workers will be exposed to the crosscutting threats of the impacts above during construction. Inadequate supply of safe and potable water and inadequate sanitation facilities; poor sanitation practices on site; poor housing conditions; the handling and operation of construction equipment; handling of hazardous substances; exposure to extreme weather and non-observance of health and safety measures pose additional threats to the health and safety of construction workers. Construction workers may be potentially exposed to communicable and transmittable diseases in the community and the workforce. The impact is thus indirect in nature, local in extent, medium in magnitude and short term in duration.

129. Mitigation measures include implementation of international best practices on occupational health and safety such as those in Section 4.2 of World Bank EHS Guidelines on Construction and Decommissioning Activities (footnote 20). As minimum and whichever are applicable, the occupational health and safety plan shall ensure the following:

- (i) Communication and Training
  - (a) Training of all workers on occupational health and safety prior to construction works;
  - (b) Conduct of orientation to visitors on health and safety procedures at work sites;
  - (c) Signages strategically installed to identify all areas at work sites, including hazard or danger areas;

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<sup>20</sup> World Bank Group. IFC. 2007. *Environmental Health and Safety Guidelines – Construction and Decommissioning*.

- (d) Proper labeling of equipment and containers at construction and storage sites; and
  - (e) Suitable arrangements to cater for emergencies, including: first aid equipment; personnel trained to administer first aid; communication with, and transport to, the nearest hospital with an accident / emergency department; monitoring equipment; rescue equipment; firefighting equipment; and communication with nearest fire brigade station;
- (ii) Physical Hazards
- (a) Use of personal protective equipment by all workers such as earplugs, safety shoes, hard hats, masks, goggles, etc. as applicable, and ensure these are used properly;
  - (b) Avoidance of slips and falls through good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from foot paths, cleaning up excessive waste debris and liquid spills regularly, locating electrical cords and ropes in common areas and marked corridors, and use of slip retardant footwear;
  - (c) Use of bracing or trench shoring on deep excavation works;
  - (d) Adequate lighting in dark working areas and areas with night works;
  - (e) Rotating and moving equipment inspected and tested prior to use during construction works. These shall be parked at designated areas and operated by qualified and trained operators only;
  - (f) Specific site traffic rules and routes in place and known to all personnel, workers, drivers, and equipment operators; and
  - (g) Use of air pollution source equipment and vehicles that are well maintained and with valid permits.
- (iii) General Facility Design and Operation
- (a) Regular checking of integrity of workplace structures to avoid collapse or failure;
  - (b) Ensuring workplace can withstand severe weather conditions;
  - (c) Fire precautions and firefighting equipment installed;
  - (d) First aid stations and kits are available. Trained personnel should be available at all times who can provide first aid measures to victims of accidents;
  - (e) Secured storage areas for chemicals and other hazardous and flammable substances are installed and ensure access is limited to authorized personnel only;
  - (f) Worker camps and work sites provided with housekeeping facilities, such as separate toilets for male and female workers, drinking water supply, wash and bathing water, rest areas, and other lavatory and worker welfare facilities; and
  - (g) Maintain records and make reports concerning health, safety and welfare of persons, and damage to property. Take remedial action to prevent a recurrence of any accidents that may occur.

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

131. Mitigation measures include conduct engineering investigations of built structures and implement the necessary corrective actions immediately after any major seismic event.

### 3. Impacts, Issues, Concerns and Mitigation Measures during Operation

132. **Pollution of receiving bodies of water and nuisance due to siltation and accumulation of wastes in the drains.** Discharge of wastewater and solid waste from households and roadsides may clog the drains in the medium or longer term. This may result to accumulation of putrescible organic materials causing odor nuisance to the community and pollution to the receiving bodies of water in the area. This may also attract vectors of communicable diseases such as pests and rodents in the drainage system that could affect public health.

133. Mitigation measures include the municipality's: (i) strict instruction or directive to households and commercial establishments not to discharge septic wastes and grey water into the drainage system; (ii) strict promotion and enforcement of good waste management practices at household level; and (iii) regular monitoring and cleaning of the silt traps, drains, and siltation or sedimentation chambers (or similar structures) at the outfalls, to prevent entry or accumulation of silt and solid wastes inside these drains and siltation chambers.

134. **Community hazards due to destroyed or removed drainage cover.** The design of the drainage system suggests that no drainage will be constructed without cover. Once constructed, there is a possibility that the covers may be damaged or removed in the medium or long term. The situation exposes the drainage as hazard to people, animals and vehicles in the area, especially at night.

135. Mitigation measure is for the municipality to conduct regular inspection of the drainage alignments and ensure that all drainage covers are intact. In case of damage or loss of drainage cover, the municipality shall provide replacement of this cover to avoid occurrence of accidents.

136. The summary of above-mentioned adverse impacts (construction & operation phase) of the subproject is shown in Table 25. The scoring is based on National EIA Guidelines, 1993.

**Table 25: Summary of Impact Matrix of Adverse Issues**

Adverse Issues	Impact Rating				
	Nature	Magnitude	Extent	Duration	Rating
<b>Construction Phase</b>					
Non-Compliance with Relevant Environmental legislation	ID	L (10)	L (20)	ST (5)	Insignificant (35)
Erosion and Land Surface disturbance	D	M (20)	L (20)	ST (5)	Insignificant (45)
Impacts on Air Quality	ID	M (20)	S (10)	ST (5)	Insignificant (35)
Noise	D	M (20)	L (20)	ST (5)	Insignificant (45)
Impacts on Water Resources	D	M (20)	S (10)	ST (5)	Insignificant (35)
Impacts on River Morphology and Hydrology	D	M (20)	L (20)	ST (5)	Insignificant (45)
Impacts on Flora and Fauna	D	L (10)	L (20)	ST (5)	Insignificant (35)

Adverse Issues	Impact Rating				
	Nature	Magnitude	Extent	Duration	Rating
Impacts on Physical Cultural Resources	No impacts				
Impacts on the Socio-economic Environment and Resources	ID	M (20)	L (20)	ST (5)	Insignificant (45)
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)
Impacts on the sustainability of works	D	M (20)	L (20)	ST (5)	Insignificant (45)
<b>Operation Phase</b>					
Pollution in Storm Drain	D	M (20)	L (20)	LT (20)	Significant (60)
Blocking & Choking of Drains	D	M (20)	L (20)	LT (20)	Significant (60)
Impact on Recipient Water Bodies	D	M (20)	L (20)	LT (20)	Significant (60)

Note: Scoring is done by PMO/Third Small Towns Water Supply and Sanitation Project 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

137. Hence, this scoring show that the adverse impacts during construction phase is insignificant while the impacts during operation are significant. However, regardless of this scoring, the impacts during construction and operations phases can be mitigated with measures as discussed in this section and summarized in the EMP. The impacts during operation phase can be mitigated with the strict regular monitoring of operation and maintenance activities by the municipality.

## C. Indirect, Induced and Cumulative Impacts

### 1. Indirect and Induced Impacts during Construction

138. The volume of the vehicle that will be operated for the simultaneous construction at subproject component sites may create traffic jams on narrow access roads and hinder the mobility of people, goods, and services, particularly in the bazaar areas. A greater number of people may be exposed to safety hazards from the constricted road space. Apart from the applicable mitigation measures, proper coordination with relevant ward authorities, social service institutions and businesses would further mitigate indirect and induced the impacts.

139. Presently, the urban population of Katahariya on a per kilometer length of urban road is low. The pattern of drainage flow in peri-urban area of the town might change in the course of densification. This is the main problem of emerging towns if there is no proper land use planning. Hence, as a mitigation measure, the proposed storm water drains will be constructed on the priority basis (i.e., the proposed subproject will be implemented in phase-wise manner).

## 2. Cumulative Impacts during Construction

140. There are no known ongoing or proposed developments in Katahariya, except for the proposed subproject under UWSSP, which include the Katahariya storm water drainage subproject. Hence, cumulative impacts will arise mainly from the construction of this proposed drainage subproject and other proposed subprojects under UWSSP. The daily activities of construction workers residing temporarily at the subproject area may also contribute to the cumulative impacts.

141. However, such cumulative impacts will be “moderate” in magnitude during the peak of construction phase. Gradually as the construction approaches completion, the magnitude of cumulative impacts will lessen to “low” magnitude. The sensitivity of the resources, natural and artificial, within the main areas of influence has been taken into account, together with the types of works involved and their intensities.

## VII. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

142. Stakeholder consultation and participation was an essential process in subproject preparation. The process of engaging stakeholders and affected people involved key informant interviews, on-site discussions with WUSC, and random field interviews of stakeholders. Table 26 lists the persons consulted during the IEE preparation.

**Table 26: Lists of People Consulted During IEE Study**

S.N.	Name	Designation
1	Mr.Chotelal Mishra	Chair
2	Mr. Jamun Thakur	Vice- Chair
3	Mr.Jogendra Sha	Secretary
4	Mr. Ram Prabash	Treasurer
5	Mr. Sarflal Gupta	Member
6	Mr. Sarflal Mahato	Member
7	Mr. JangaBahadur Rooka	Member
8	Mrs. Phulo Devi Patel	Member
9	Mrs. Jayanti Devi Baitha	Member
10	Mrs .Laxmi Giri	Member
11	Mr. Sanjaya Mishra	Journalist
12	Mr. Prakash Man Shrestha	Journalist
13	Mrs. Sita Luitel	Social mobilizer

143. **Consultation conducted.** A public meeting was organized on 16 May 2018 in the Katahariya municipality, which was chaired by the chairperson of Katahariya WUSC for the discussion of the environmental impacts due to the construction of Katahariya Storm Water Drainage Subproject. The minutes of consultation meeting is attached as Appendix 5.

144. **Concerns raised by the stakeholders.** The consultation outcome reveals positive feedback from the stakeholders. The following were the sentiments gathered during the consultation:

- (i) WUSC and other local stakeholders has been demanding for the construction of stormwater drain for the effective management of storm water. This storm water drain subproject will complement the proposed water supply subproject, which is also under UWSSP;

- (ii) Since this storm drain subproject is purely for the management of storm runoff only, it will have no effect on either social or environmental aspects; and
- (iii) The participants will support the design and construction team of the subproject to address social and environmental issues that may arise, if any.

145. The subproject envisages that meaningful consultations (footnote 13) will be undertaken during the subproject implementation period and concerned stakeholders will be invited and encouraged to participate. PMO and Implementation Core Group (ICG) will maintain rapport with WUSC and municipality. PMO, ICG, Contractors, and WUSC will be open to the public to discuss concerning the progress of the projects, adverse impacts, mitigation measures and environmental monitoring and grievances. The stakeholder consultations in future will be as follows.

- (i) During construction, if there is a change in design, alignment, and location, PMO and ICG will hold at least one public consultation to solicit perceived impacts, issues, concerns and recommendations from affected communities;
- (ii) Before construction, PMO and ICG will conduct an information, education and communication (IEC) campaign among the affected communities about the upcoming construction, its anticipated impacts, the grievance redress mechanism, contact details and location of PMO and ICG, and status of compliance with the government's environmental safeguard requirements. Billboards about the subproject, implementation schedule and contact details of the executing agency, PMO-ES, ICG- Environmental Safeguard Assistant (ESA) and contractors will be set up at strategic locations. The grievance redress mechanism procedure and details will be posted at the offices of ICG, WUSC, and municipality;
- (iii) During construction, regular random interviews will be conducted by ICG-ESA every month to monitor environmental concerns of subproject communities;
- (iv) During operation, periodic random interviews will be conducted by ICG and WUSC to monitor the environmental concerns of subproject communities; and
- (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.

146. The Government of Nepal-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. All IEE reports and environmental monitoring reports will be disclosed on the ADB's and UWSSP websites.

## **VIII. GRIEVANCE REDRESS MECHANISM**

147. A project-specific GRM will be established to receive, evaluate and facilitate resolution of affected persons' concerns, complaints, and grievances related to social, environmental and other concerns on the project. The GRM will aim to provide a time-bound and transparent mechanism to resolve such concerns. Grievances may be channelled through letters, emails, text messages (SMS), verbal narration, grievance boxes and registers. Suggested template for grievance redress form is in Appendix 6.

148. A common GRM will be in place for social, environmental or any other grievances related to the project. The GRM will provide an accessible forum for receiving and facilitating resolution of affected persons' grievances related to the project. Project will publish the sample grievance registration form on its website, and publish it in local language and/or indigenous people dialect, at the hoarding board of each of the participating WUA or municipalities' office. Every grievance

shall be registered with careful documentation of process adopted for each of the grievance handled, as explained below. The environmental and social safeguards officer (ESO/SSO) at the project management office (PMO) will have the overall responsibility for timely grievance redress on environmental and social safeguards issues. The Social Safeguards Officer at the Regional Project Management Office (RPMO) will be the focal person for facilitating the grievance redress at the local level.

149. A municipal-level public awareness campaign will be conducted on a regular basis as per the communication strategy of the project to ensure awareness on the project and its GRM. The social and environmental safeguards experts of the project management and quality assurance consultant (PMQAC) and regional design, supervision and management consultants (RDSMCs) will support the WUA or municipalities in conducting municipality-wide awareness campaigns, which will ensure that all stakeholders including poor and vulnerable are aware of the GRM and project's entitlements.

150. 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,<sup>21</sup> 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 affected persons, civil society and eminent citizens can be invited as observers in GRC meetings.

151. The functions of the local GRC are as follows: (i) provide support to affected persons on problems arising from environmental or social disruption; asset acquisition (if necessary); and eligibility for entitlements, compensation and assistance; (ii) record grievances of affected persons, categorize and prioritize them and provide solutions within 15 days of receipt of complaint by WUA or local bodies; and (iii) ensure feedback to the aggrieved parties about developments regarding their grievances and decisions of the GRC. The GRM procedure is depicted in Figure 3, and is outlined below in detail, with each step having time-bound schedules and responsible persons to address grievances and indicating appropriate persons whose advice is to be sought at each stage, as required. If affected persons are not satisfied with the response they can elevate it to the next level:

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

<sup>21</sup> If the complaints are related with Indigenous Peoples/Dalits/other vulnerable groups, specific NGO/CBO that actively involved in development of these communities shall be involved.



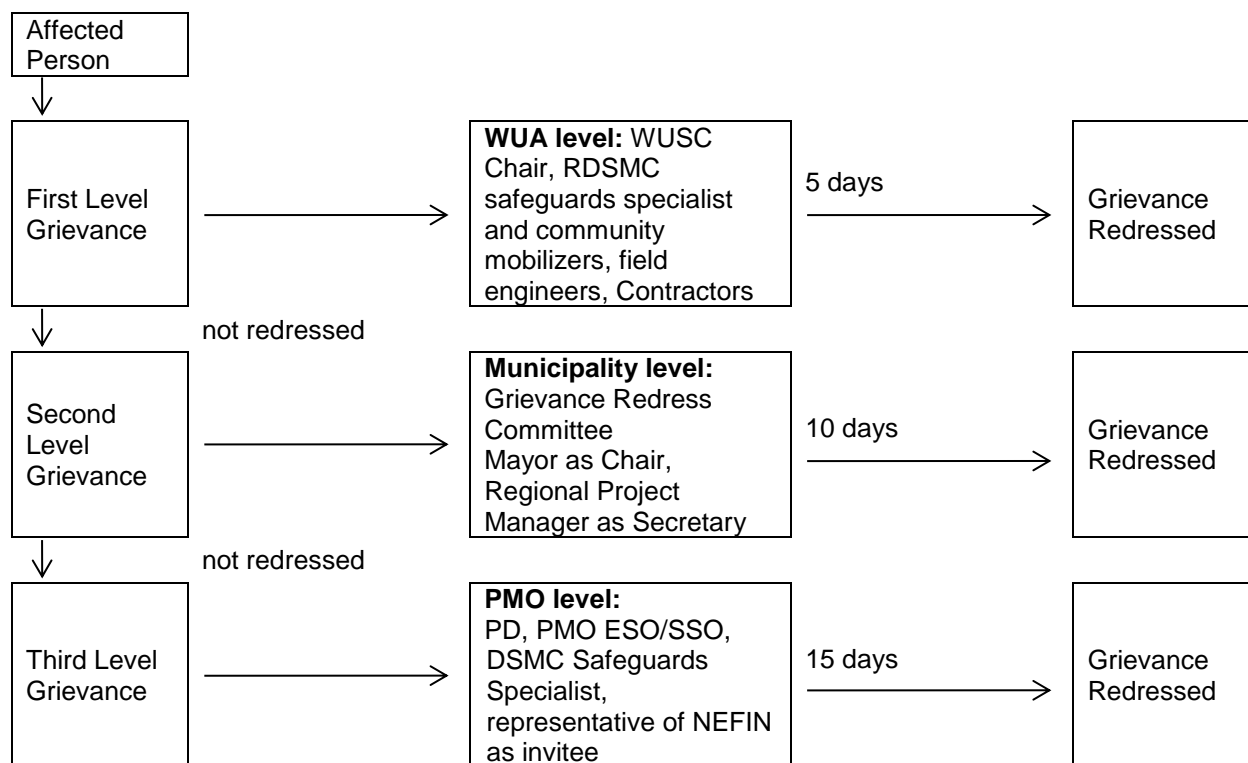
name of the person, (ii) date of complaint received, (iii) nature of complaint, (iv) location and (v) how the complaint was resolved as well as to provide feedback to the complainant. If the complaint remains unresolved at the local level within 5 days, the WUA will forward the complaint to the municipality level GRM.

- (ii) **Second Level of GRM (Municipality level):** The complainant will be notified by the WUA that the grievance is forwarded to the Municipality-level GRC. The Municipality-level GRC will be called for a meeting, called and chaired by the Mayor. The GRC will recommend corrective measures at the field level and assign clear responsibilities for implementing its decision within 10 days of receipt of complaint by WUA. If the grievance remains unresolved within 10 days of receipt of complaint by WUA, the matter will be referred to the third level. The RPMO Engineer will be responsible for processing and placing all papers before the GRC, recording decisions, issuing minutes of the meetings, providing feedback to complainants and taking follow up actions so that formal orders are issued and decisions are carried out.
- (iii) **Third Level of GRM (PMO Level):** Any unresolved or major issues at Municipality level will be referred to the PMO for final solution. A representative of the Nepal Foundation for Indigenous Nationalities (NEFIN) will be invited to attend any meetings related to resolution of Indigenous Peoples grievances. Decision has to be made within 15 days of receipt of complaint from the Municipality-level GRC. The Project Director will sign off on all grievances received by the PMO. The concerned Deputy Project Director (DPD) and environmental and social safeguards officers (ESO and SSO) of PMO will be involved with support from the PMQAC's social/environment safeguards experts. The SSO will be responsible to convey the final decision to the complainant.

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

153. 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.

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

**Figure 3: Grievance Redress Process**

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

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

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

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

**Table 27: Suggested Format for Record Keeping of Grievances**

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

## **IX. ENVIRONMENTAL MANAGEMENT PLAN**

### **A. Institutional Arrangement**

158. The Ministry of Water Supply (MOWS) will be the Executing Agency, working through the Department Water Supply and Sewerage (DWSS), which will establish a Project Management Office (PMO) for the project<sup>22</sup> headed by a Project Director. The DWSS will also establish two Regional PMOs (RPMOs).

159. The PMO will be responsible for overall project planning, management, implementation, monitoring and reporting for the subproject. The PMO will also be responsible for screening the proposed subprojects in accordance with the subproject selection criteria for the project,<sup>23</sup> assisting the municipalities in conducting feasibility studies,<sup>24</sup> reporting to and being point of liaison with ADB on the project; quality control of detailed design and construction supervision; procurement of civil works contractors; support for capacity building; and overseeing safeguard compliance. The PMO will liaise with WUSCs or municipalities (Katahariya Municipality for this Katahariya storm water drain subproject) to sign the management agreement prior to the award of contract for each subproject. The PMO will also engage all consultants under the project.

160. The RPMOs will be established using the existing infrastructure in (i) Itahari, Sunsari, for the eastern region, (ii) in Nepalgunj, Banke, for the western region, and (iii) PMO (Kathmandu) will act as RPMO for central region projects. The RPMOs will report to the PMO and be supported and monitored by PMO to implement the projects in the field and manage contractors and consultants. The RPMOs will manage the detailed design and construction supervision with support from DSMC that PMO would engage (DSMCs for eastern, western, and central region each). Each of the DSMCs will be based at the respective RPMO. For each subproject, a dedicated implementation core group will be established in the field, at each WUA's office,<sup>25</sup>

<sup>22</sup> DWSS will continue the existing PMO established and operational for the Third Small Towns Water Supply and Sanitation Sector project.

<sup>23</sup> Subproject selection criteria (covering all aspects of a proposed subproject other than the specific subproject selection criteria for environment as discussed in this EARF) is attached as Appendix 1 of the PAM.

<sup>24</sup> TDF will assist the municipalities in conducting financial appraisal of the subprojects and advice DWSS on its outcomes prior to the start of detailed design process.

<sup>25</sup> The implementation core group, as a minimum, comprises of (i) an Engineer, a Social mobilizer, and an EMP monitor,

headed by a qualified engineer from the RPMO to conduct day-to-day project management, planning and construction supervision. The TDF will coordinate with RPMOs, WUSCs and municipalities at least on monthly basis.

161. The WUSC, on behalf of the WUA<sup>26</sup> or the municipality<sup>27</sup> will be responsible for operation and maintenance (O&M) of the water supply and sanitation facilities constructed (which includes the stormwater drainage system), operating under a management agreement with DWSS. WUSCs consist of nine executive members,<sup>28</sup> at least three of whom are women. The project will fund the WUA's minimum prescribed staffing and other resource requirement, as outlined in the management agreement with DWSS for sustainable operations of the system during the project period. For the subprojects yet to be selected and where WUA does not exist initially, or when the municipality doesn't have the capacity and chooses to delegate the operation to user's representatives, an interim user committee (IUC) will be first established in the feasibility stage by representing potential consumers. The IUC will work with the RPMO and DSMC in undertaking a feasibility study, confirm the technical proposals and the boundaries of the service areas. WUAs will be developed from IUCs at the detailed design stage.

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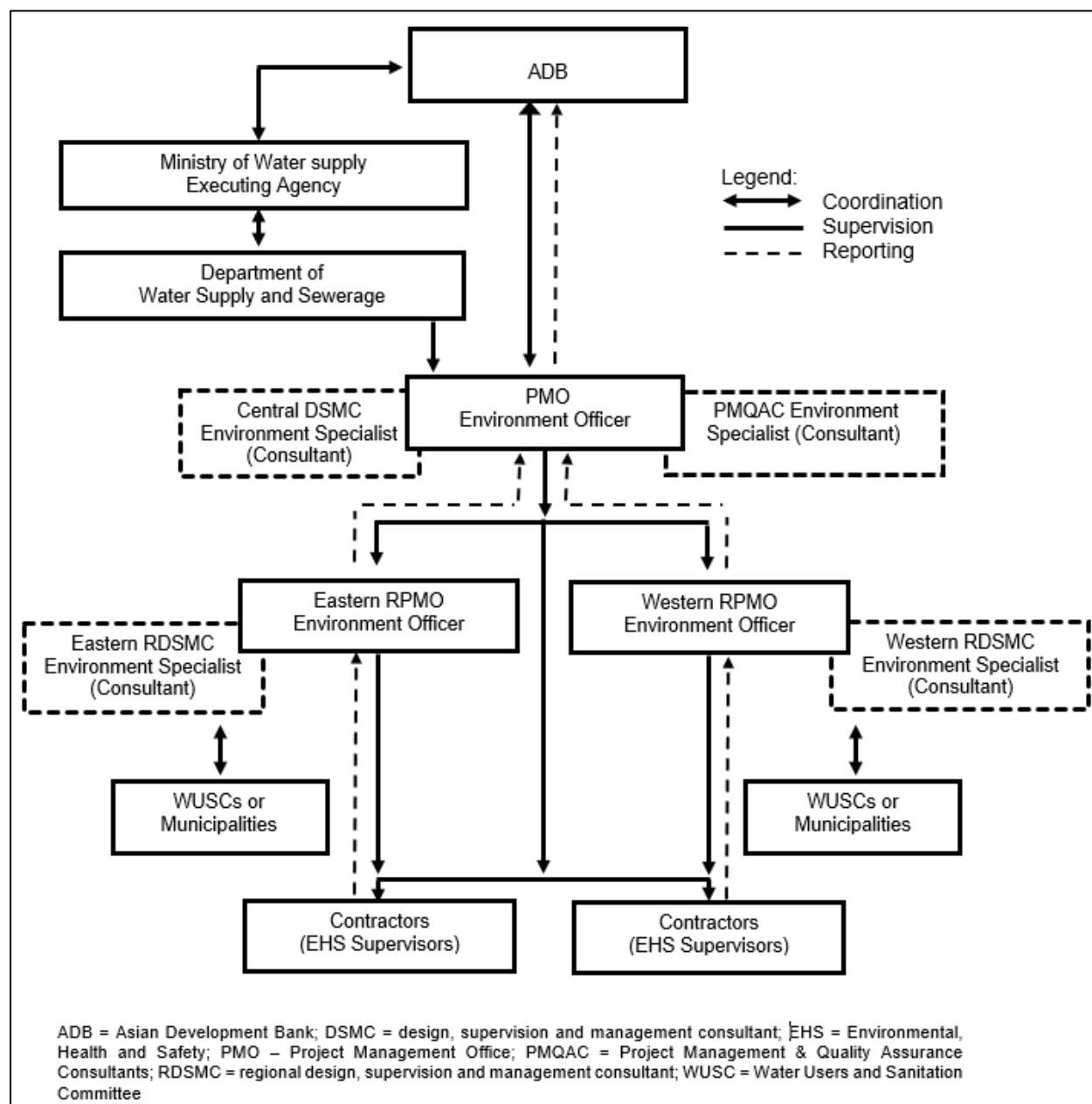
RPMO; (ii) an Administration Staff, a Finance Staff, and an Engineer or Junior Engineer, WUSC.

<sup>26</sup> WUAs are registered with the district water resources committee as a user association under the Water Resources Act (1992).

<sup>27</sup> As the project is a demand based open access project, the WUAs or the municipalities can apply for funding a proposed subproject that meets the subproject selection criteria.

<sup>28</sup> WUSCs will be formulated by ensuring proportional representation of gender, caste and ethnic groups. It shall include at least 33% representation of women.

Figure 4: Safeguard Implementation Arrangement



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

- (i) review and confirm existing IEEs and EMPs are updated based on final detailed designs, that new IEEs/EMPs prepared by DSMCs comply to exclusion criteria and project selection guidelines as stipulated in the EARF and government rules; and recommend for approval to PMO;
- (ii) approve subproject environmental category;
- (iii) ensure that EMPs are included in bidding documents and civil works contracts;

- (iv) provide oversight on environmental management aspects of subprojects and ensure EMPs are implemented by RPMOs and contractors;
- (v) establish a system to monitor environmental safeguards of the project including monitoring the indicators set out in the monitoring plan of the EMP;
- (vi) facilitate and confirm overall compliance with all Government rules and regulations regarding site and environmental clearances as well as any other environmental requirements as relevant;
- (vii) supervise and provide guidance to the RPMOs to properly carry out the environmental monitoring and assessments as per the EARF;
- (viii) review, monitor and evaluate effectiveness with which the EMPs are implemented, and recommend necessary corrective actions to be taken;
- (ix) consolidate monthly environmental monitoring reports from RPMOs and submit semi-annual monitoring reports to ADB;
- (x) ensure timely disclosure of final IEEs/EMPs in project locations and in a form accessible to the public;
- (xi) assist with ongoing meaningful consultation and assist in setting up of GRM in respect of environment concerns;
- (xii) address any grievances brought about through the Grievance Redress Mechanism (GRM) in a timely manner as per the IEEs;
- (xiii) undertake regular review of safeguards-related loan covenants, and the compliance during program implementation; and
- (xiv) organize periodic capacity building and training programs on safeguards for project stakeholders, PMO, RPMOs, and WUAs.

163. **RPMOs.** The environmental officer assigned by DWSS to the RPMOs will receive support from (i) the PMO environmental officer; (ii) environmental specialist from PMQAC; and (iii) the environmental specialist and EMP monitors of the regional DSMCs to carry out the following:

- (i) prepare new IEEs and EMPs in accordance with the EARF and government rules;
- (ii) include EMPs in bidding documents and civil works contracts;
- (iii) comply with all government rules and regulations;
- (iv) take necessary action for obtaining rights of way;
- (v) oversee implementation of EMPs including environmental monitoring by contractors;
- (vi) take corrective actions when necessary to ensure no environmental impacts;
- (vii) submit monthly environmental monitoring reports to PMO;
- (viii) assist with ongoing meaningful consultation and assist in setting up of GRM in respect of environment concerns; and
- (ix) address any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs.

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

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

165. **Regional DSMCs.** The RDSMCs will provide support to the RPMOs in the following areas. The detailed TORs are in the PAM:

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

166. **Civil works contracts and contractors.** The contractor will be required to designate an Environment, Health and Safety (EHS) supervisor to ensure implementation of EMP during civil works. Contractors are to carry out all environmental mitigation and monitoring measures outlined in their contract. The contractor will be required to submit to RPMO, for review and approval, a site-specific environmental management plan (SEMP) including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program as per SEMP; and (iv) budget for SEMP implementation. No works can commence prior to approval of SEMP. The contractor will be required to undertake day to day monitoring and report to the respective RPMO and DSMC.

167. A copy of the EMP or approved SEMP will be kept on site during the construction period at all times. Non-compliance with, or any deviation from, the conditions set out in the EMP or SEMP constitutes a failure in compliance and will require corrective actions. The EARF and IEEs specify responsibilities in EMP implementation during design, construction and O&M phases.

168. The PMO and RPMOs will ensure that bidding and contract documents include specific provisions requiring contractors to comply with: (i) all applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity, or caste; and (c) elimination of forced labor; and with (ii) the requirement to disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and local communities surrounding the project sites.

169. **Capacity Building:** The DRTAC safeguards experts (environmental and social) will be responsible for training the; (i) PMO's safeguards officers (environmental and social); (ii) RPMOs' engineers and social development officers. Training modules will need to cover safeguards awareness and management following both ADB and government requirements as specified below:

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

170. **Water Users' and Sanitation Committees (WUSCs):** WUSCs are the eventual operators of the completed projects (Katahariya WUSC for the Katahariya storm water drain subproject). The key tasks and responsibilities of WUSCs are, but not limited to:

**Before construction**

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

**During construction**

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

**During operation**

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

**B. Environmental Management Plan**

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

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

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



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

**Table 28: Environmental Management Plan Matrix**

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
<b>1. Before Construction Activities</b>					
Consents, permits, clearances, No Objection Certificate (NOC), etc.	Failure to obtain necessary consents, permits, NOCs, etc. can result to design revisions and work stoppage	<ul style="list-style-type: none"> <li>- Obtain all of the necessary consents, permits, clearance, NOCs, etc. before the start of civil works.</li> <li>- Include in detailed design drawings and documents all conditions and provisions if necessary</li> </ul>	PMO, RPMOS, and DSMC	Incorporated in final design and communicated to contractors	Before award of contract
Existing utilities	Disruption of services	<ul style="list-style-type: none"> <li>- Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction</li> <li>- Require construction contractors to prepare a contingency and spoil management plan</li> </ul>	DSMC, RPMOS	<p>List of affected utilities and operators;</p> <p>Bid document to include a requirement for a contingency plan for service interruptions, e.g. provision of water if disruption is more than 24 hours, spoil management plan</p>	<p>During detailed design phase;</p> <p>Review of spoils management plan: Twice (once after first draft and once before final approval)</p>
Storm Runoff	<p>Beside storm water, silts and wastewater from other sources may enter the proposed storm drain and may pollute the drain and the receiving bodies of water.</p> <p>Chances of disposal of solid waste by the local into the drains resulting clogging of drains and</p>	<p>The design to consider the following:</p> <ul style="list-style-type: none"> <li>- Provision of cover slab in the design to avoid the illegal entry of waste water and solid waste disposal.</li> <li>- The inlet design to ensure that only storm or rainwater flows into the drainage system.</li> <li>- Prevent households from connecting outlets of septic tanks and grey water to the drainage lines.</li> <li>- Provide siltation or sedimentation chambers (or similar structures) at the outfalls of the drainage system to prevent</li> </ul>	PMO, RPMOS & DSMC	Incorporated in master plan hence, should also be included in the final detailed design	Prior to award of contract

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	polluting the receiving bodies of water	solid wastes or silts from flowing directly to the receiving body of water.  - Position the outfall enough to have space for the provision of siltation or sedimentation ponds (or similar structures), including accessibility during maintenance phase.			
Construction work camps, stockpile areas, storage areas, and disposal areas	Disruption to traffic flow and sensitive receptors	- Determine locations before award of construction contracts.	DSMC, RPMO	List of selected sites for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas. Written consent of landowner/s (not lessee/s) for reuse of excess spoils to agricultural land	During detailed design phase
Waste generation	Generation of solid waste, wastewater from labor camp and other construction waste may cause pollution	- Follow the principle of "Reduce, Reuse, Recycle, and Recover" - Prohibition of unwanted littering and discharge of waste. - Solid waste is either managed in a pit or disposed in municipal collection system.	Contractor	Contractor's records. Visual inspection	Visual inspection by RPMO and DSMC-ESS on monthly basis
Sources of materials	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, resulting	- Prepare list of quarry sites and approved sources of materials	DSMC, RPMOS	List of approved quarry sites and sources of materials; (ii) Bid document to include requirement for verification of quarry sites	During detailed design phase, as necessary with a discussion with detailed design engineers and PIUs suitability of sources and permit for additional quarry sites if necessary.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	water logging, and water pollution				
Road Crossing for Vehicular traffic	Though the subproject area does not experience heavy traffic load, if not properly designed, traffic load may damage the drains	- Provision of Road Slab Culvert with proper design	PMO, RPMOs, and DSMC. Contractor	Incorporated in master plan hence, should also be included in the final detailed design	
EMP Implementation Training	Impact to the environment, workers, and community	- Project manager and contractors should be trained on EMP implementation, spoils management, standard operating procedures (SOP), health and safety, Labor Act (1992)	PMO, RPMOs, and DSMC. Contractor's Environmental Supervisor	Record of completion (Safeguards Compliance Orientation)  Contractor records for EMP implementation at worksites	During the detailed design phase before the mobilization of workers to site
Stormwater Drainage operations	Impact to the environment, workers, and community due to accidents or accidental discharge of domestic wastewater into the drainage system.	Development of O&M manual that is comprehensive and includes measures to prevent discharge of domestic wastewater to the stormwater drainage system and accidents due to the drainage canals.	PMO, RPMOs, and DSMC.	Availability of final version of O&M manual	Ongoing basis until O&M manual is finalized, but prior to O&M phase.
<b>2. During Construction Activities</b>					
<b>A. Physical Characteristics</b>					
Topography landforms, geology, and soils and river morphology and hydrology	Sand, gravel or crushed stone will be required for this subproject.  Extraction of natural aggregate materials may	- Utilize readily available sources with environmental clearance and license - Borrow areas and quarries comply with environmental requirements - Coordinate with local authorities for quarrying from rivers. Alternative sources should be identified.	Contractor	Records of sources of materials	Monthly by RPMOS

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	cause localized changes in topography and landforms (if on land) or river morphology and hydrology (if on the river).				
Water quality	Trenching and excavation, run-off from stockpiled materials and chemical contamination from fuels and lubricants may result to silt-laden runoff during rainfall, which may cause siltation and reduction in the quality of adjacent bodies of water.	<ul style="list-style-type: none"> <li>- Spoils management plan (See Appendix 4 for sample)</li> <li>- Reuse excess spoils and materials</li> <li>- Disposal site in designated areas.</li> <li>- Earthworks during dry season</li> <li>- Stockyards at least 300m away from watercourses.</li> <li>- Fuel storage area away from water drainage</li> <li>- Take precautions to minimize the overuse of water</li> <li>- Prevent discharge of wastewater into water sources.</li> <li>- Ensure safe water diversion</li> <li>- No obstruction in flowing water.</li> </ul>	Contractor	<p>Areas for stockpile storage of fuels and lubricants and waste materials;</p> <p>Number of silt traps installed along trenches leading to water bodies;</p> <p>No visible degradation to nearby drainage, water bodies due to construction activities</p>	<p>Visual inspection by RPMOS and DSMC-ESS on weekly basis</p> <p>Frequency and sampling sites to be finalized during detailed design and final location of subprojects components.</p>
Air quality	<p>Work at the dry season</p> <p>Transporting construction materials may increase dust, carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons into the atmosphere.</p>	<ul style="list-style-type: none"> <li>- Use of physical controls, sprays, covers, compaction, screening, enclosure, windbreaks, binders and road surfacing</li> <li>- Cover delivery trucks during transportation</li> <li>- Construction vehicle's speed limited to 30kph.</li> <li>- Use of vehicles complying with NVMES, 2069</li> <li>- Prohibition of open burning of solid waste.</li> <li>- Minimize stockpile height</li> </ul>	Construction Contractor	<p>Location of stockpiles;</p> <p>Number of complaints from sensitive receptors;</p> <p>Heavy equipment and machinery with air pollution control devices;</p> <p>A certification that vehicles are compliant with air quality standards.</p>	<p>Visual inspection by RPMOS &amp; DSMC-ESS on monthly basis</p> <p>Frequency and sampling sites to be finalized during the detailed design stage and final location of Subproject components</p>

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Acoustic environment	Temporary increase in noise level and vibrations by excavation equipment, and the transportation of materials, equipment and people. However, the proposed subproject drainage line will follow ROW alignment	<ul style="list-style-type: none"> <li>- Prepare work schedule with community consultation and local administration</li> <li>- Overtime work restricted low noise generating equipment.</li> <li>- Minimize drop heights</li> <li>- No horns unless necessary</li> <li>- Use modern vehicles and machinery with low noise emissions</li> <li>- Maintain low noise levels</li> <li>- Warning signs on noise hazard areas. Workers must wear earplugs.</li> <li>- Identify vibration risk to nearby structures. Take caution working in such areas.</li> </ul>	Contractor	<p>Number of complaints from sensitive receptors;</p> <p>Use of silencers in noise- producing equipment and sound barriers;</p> <p>Equivalent day and night time noise levels</p>	Visual inspection by RPMOS and DSMC-ESS on monthly basis
Aesthetics	Interference with the enjoyment of the area and creation of unsightly or offensive conditions	<ul style="list-style-type: none"> <li>- Prepare a debris disposal plan.</li> <li>- Minimize stockpile size</li> <li>- Clear wastes regularly</li> <li>- Avoid stockpiling of excess spoils.</li> <li>- Cover delivery trucks during transportation.</li> <li>- Clean roads.</li> <li>- Use screening enclosure shade cloth, temporary walls</li> <li>- Clean site regularly.</li> <li>- Follow the principle of “Reduce, Reuse, Recycle, and Recover”</li> </ul>	Contractor	<p>Number of complaints from sensitive receptors;</p> <p>Worksite clear of hazardous wastes;</p> <p>Worksite clear of any wastes unutilized materials, and debris;</p> <p>Transport route and worksite cleared of dirt</p>	Visual inspection by RPMOS & DSMC-ESS on monthly basis
<b>B. Biological Characteristics</b>					
Biodiversity	Activities in WUSC acquired area. There are no protected areas in or around subproject sites.	<ul style="list-style-type: none"> <li>- Tree cutting will not be required for this subproject.</li> </ul>	Contractor	<p>PIU and PMO to report in writing the number of trees cut and planted if any (during detailed design stage);</p> <p>Some complaints</p>	Visual inspection by RPMOS and DSMC-ESS on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
				from sensitive receptors on disturbance of vegetation, poaching fishing, etc.	
<b>A. Socioeconomic Characteristics</b>					
Existing provisions for pedestrians and other forms of transport	The road closure is not anticipated. Hauling of construction materials and operation of equipment on-site can cause traffic problems. Similarly, as the drains are proposed to be constructed along the highway, this may obstruct the traffic flow to some extent. However, the proposed subproject's pipeline will follow ROW alignment.	<ul style="list-style-type: none"> <li>- Prepare suitable transportation routes</li> <li>- Safe passage for vehicles and pedestrians through provision of either wooden bridge or metal sheets.</li> <li>- Schedule material deliveries on low traffic.</li> <li>- Erect and maintain barricades if required</li> <li>- Inform through display board about nature, duration of construction and contact for complaints</li> <li>- Complete the work quickly nearby institution, place of worship, business, hospitals, and schools.</li> <li>- Consult with business and institutions for work schedules.</li> <li>- Restore damaged properties and utilities</li> </ul>	Construction Contractor	<p>Traffic route during construction works, Including number of permanent signs, barricades, and flagmen on worksite;</p> <p>Number of complaints from sensitive receptors;</p> <p>Some signages placed at the subproject location;</p> <p>Number of walkways, signages, and metal sheets placed at subproject location</p>	Visual inspection by RPMOS and DSMC-ESS on monthly basis
Socioeconomic status	Staffing will be required during construction. This can result in an increase in local revenue.	<ul style="list-style-type: none"> <li>- Engage the local workforce.</li> <li>- Secure construction materials from local market.</li> </ul>	Construction Contractor	<p>Employment records; Records of sources of materials</p> <p>Records of compliance to Nepal Labor Act(1992), district wages</p>	Visual inspection by RPMOs &DSMC-ESS on monthly basis
Other amenities for community welfare	Civil works may result in an impact to the sensitive	<ul style="list-style-type: none"> <li>- Identify location and nature of existing infrastructure before excavation</li> <li>- Minimize repeated disturbance to</li> </ul>	Construction contractor	Utilities Contingency Plan;	Visual inspection by RPMOs and DSMC-ESS on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	receptors such as residents, businesses, and the communities. Excavation may also damage infrastructure located alongside the roads.	<p>locals by integrating other forms of infrastructures.</p> <ul style="list-style-type: none"> <li>- Inform local about nature, duration and possible impacts of the construction and integrate their concerns</li> <li>- Promptly relocate infrastructure materials</li> <li>- Take prior permission from local authority for water use</li> <li>- Restore damaged properties and utilities to pre- work conditions.</li> <li>-</li> </ul>		Number of complaints from sensitive receptors	
Community health and safety	Construction works will impede the access of residents and business in limited cases	<ul style="list-style-type: none"> <li>- Implementation of WB EHS Guidelines on Construction and Decommissioning (footnote 19)</li> <li>- Restrict work force in designated areas.</li> <li>- Identify stockyard areas in consultation with local administration</li> <li>- Work on private land requires written permission of landowners and DSMC.</li> <li>- Prefer small mechanical excavator for trenching</li> <li>- Construct gender friendly toilets for workers</li> <li>- Prohibit alcohol and drugs on site</li> <li>- Prevent excessive noise;</li> <li>- Code of conduct for workers includes restricting workers in designated areas, no open defecation, no littering, no firewood collection, no fire except designated places, no trespassing, no residence at construction sites, and no obligation to potentially dangerous work</li> <li>- Maintain a complaint logbook in workers camp and take action promptly of complaints</li> </ul>	Contractor	<p>The number of permanent signs, barricades, and flagmen on worksites as per Traffic Management Plan (see Appendix 3 for sample);</p> <p>Number of complaints from sensitive receptors;</p> <p>Number of walkways, signs, and metal sheets placed at the subproject location;</p> <p>Agreement between landowner and contractors in case of using private land as work camps, storage areas, etc.</p>	<p>Visual inspection by RPMOs and DSMC-ESS on weekly basis</p> <p>Frequency and sampling sites to be finalized during detailed design and final location of sub-subproject components</p>
Workers Health	There is invariably	- Comply Labor Act (1992) of GON	Contractor	Site –Specific health	Visual inspection by



Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
& Safety	<p>a safety risk when construction works such as excavation and earthmoving are conducted in urban areas.</p> <p>Workers need to be mindful of the occupational hazards which can arise from working at height and excavation works.</p>	<ul style="list-style-type: none"> <li>- Train all site personnel on environmental health and safety</li> <li>- Exclude public from worksites</li> <li>- Provide personal protective equipment to workers and ensure their effective usage</li> <li>- Document procedures to be followed for site activities; and</li> <li>- Maintain accident reports and records.</li> <li>- Make first aid kits readily available</li> <li>- Maintain hygienic accommodation in work camps.</li> <li>- Ensure uncontaminated water for drinking, cooking and washing,</li> <li>- Assure clean eating areas</li> <li>- Make sure sanitation facilities are readily available</li> <li>- Provide medical insurance coverage for workers;</li> <li>- Provide orientation for guest visitors;</li> <li>- Ensure that visitors do not enter hazard areas unescorted;</li> <li>- Require workers to wear high visibility clothes;</li> <li>- Ensure moving equipment is outfitted with audible backup alarms;</li> <li>- Chemical and material storage areas need to be marked clearly;</li> <li>- Earplugs enforced in noisy environment</li> </ul>		<p>and safety plan;</p> <p>Equipped first-aid stations;</p> <p>Medical insurance coverage for workers;</p> <p>Number of accidents;</p> <p>Records of supply of uncontaminated water;</p> <p>Condition of eating areas of workers;</p> <p>Record of health and safety orientation training;</p> <p>Availability of personal protective equipment at construction site;</p> <p>Number of moving equipment outfitted with audible back- up alarms;</p> <p>Signage for storage and disposal areas;</p> <p>Condition of sanitation facilities for workers.</p>	<p>RPMOS (monthly) and DSMC-ESS on a weekly basis.</p> <p>Frequency and sampling sites to be finalized during detailed design and final location of sub-subproject components</p>
<b>D. Historical, Cultural, and Archaeological Characteristics</b>					
Physical and cultural heritage	There are no archaeological, paleontological, or architectural sites of significance listed by	<ul style="list-style-type: none"> <li>- Stop work immediately to allow further investigation if any findings are suspected.</li> </ul>	Contractor	Records of chance finds	Visual inspection by RPMOS and DSMC-ESS on Monthly basis.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	local, national authority and UNESCO.				
E. Others					
Submission of EMP implementation Report	Unsatisfactory compliance to EMP	<ul style="list-style-type: none"> <li>- Appointment of EHS supervisor</li> <li>- Timely monitoring reports with field photographs</li> </ul>	Contractor	Availability and competency of appointed supervisor Monthly report	Monthly monitoring report to be submitted by RPMOS to PMO PMO to submit semi-annual monitoring report to ADB
Post Construction Activities	Damage due to debris, spoils, excess construction materials	<ul style="list-style-type: none"> <li>- Remove spoils wreckage, rubbish, or temporary structures no longer required;</li> <li>- All excavated roads shall be reinstated to original condition;</li> <li>- All disrupted utilities should be restored;</li> <li>- All affected structures rehabilitated /compensated;</li> <li>- The construction camp needs to clear of spills; e.g. oil, paint, etc. and other pollutants after dismantling;</li> <li>- All hardened surfaces shall be ripped; all imported materials shall be removed and all temporary services shall be cancelled;</li> <li>- Request PMO/PIU in writing that worksites and camps are vacated and restored to pre-project conditions.</li> </ul>	Contractor	RPMOs/PMO report in writing that (i) worksite is restored to original conditions; (ii) camp has been vacated and restored to pre-project conditions; (iii) all construction related structures not relevant to O&M are removed, and (iv) worksite cleanup is satisfactory.	Before turnover of completed works to WUSC
Environmental legislation compliance	Lack of awareness in project managers and WUSC about legislations and IEE requirements	<ul style="list-style-type: none"> <li>- Strengthen capacity of WUSC and project staffs;</li> <li>- Ensure compliance with NDWQS</li> </ul>	PMO, RPMOs, DSMC, and WUSC	Monitoring reports and checking operations against O&M manuals and permits/clearances	After commissioning of systems and semi-annually
Storm Water Runoff	-Illegal entry of waste water from buildings or households;	<ul style="list-style-type: none"> <li>- The design includes cover slab for the proposed drain hence, it should be ensured that each drain is provided with cover slab</li> </ul>	PMO, RPMOs, DSMC, and WUSC	Water quality of discharge at outfalls.	Quarterly monitoring during maintenance phase of the drainage system.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	- Solid Waste disposal to the drains resulting to water pollution and clogging.	<ul style="list-style-type: none"> <li>- Prepare and implement maintenance plan.</li> <li>- Provision of regular monitoring.</li> </ul>			

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

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

175. In addition to regular monitoring on-site (at the town project level) by the ICG and DSMC-ESS on the EMP implementation of the mitigation measures, monitoring of key environmental parameters is proposed. Table 29 presents the indicative environmental monitoring plan for the town project, which includes environmental parameters, with a description of the sampling stations, the frequency of monitoring, applicable standards, and responsible agencies. This will be updated during detailed design to ensure EMP and monitoring program is commensurate to the impacts of the town project.

**Table 29: 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  Construction campsite locations	24-hour monitoring once in a season (except monsoons) during the construction	National Ambient Air Quality Standards, 2003 or WHO guidelines (whichever is stricter)	Contractor
2.	Noise and vibration levels	Before construction to establish baseline Construction phase	Equivalent day and night time noise levels	Worksite locations  Construction campsite locations	Once in a season (except monsoons) during construction	National Noise Standard Guidelines, 2012 or WHO guidelines (whichever is stricter)	Contractor
4	Stormwater discharge quality at outfall	O&M phase	BOD, TSS, COD, total coliform, E-coli	Residue from the sand drying beds	Twice a year	Effluent water quality standard set by the Ministry of Environment on 2003.	WUSC – in the whole period of O&M of the drainage system
5.	Drainage network infrastructures	O&M phase	Quality check, including functional check (e.g. drainage clogging, etc)	All alignments and associated infrastructures of the drainage system.	Quarterly	None	WUSC
6.	Community and occupational	Construction phase  O&M phase	Incidence and types of health and safety issues	Along drainage lines	Twice a year	Zero incidence	Contractor – construction phase

SN	Field	Stage	Parameters	Location	Frequency	Standards	Responsibility
	health and safety						WUA or municipality – in the whole period of O&M of the drainage system.

### C. Institutional Capacity Development Program

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

177. WUSC does not have the capacity to monitor the quality of effluent wastewater as prescribed in “Tolerance limits to discharge in inland surface water from combined wastewater treatment plant published by Government of Nepal in Gazette of 23 June 2003” as National Standard. Although monitoring kits and laboratory rooms will be provided, it does not guarantee that WUSC would be able to handle them for effective monitoring. DWSS has five regional laboratories; however, some are not functioning well due to lack of human resources. For effective monitoring, it is recommended that a licensed and accredited laboratory be engaged in water and wastewater quality monitoring during the first 2-3 years of operation during when WUSC will enhance its capacity by actively participating. After the engagement period and initial phase of “learning by doing”, there should be continuing periodic training to sustain WUSC’s capacity. The cost of monitoring during operation takes account of a licensed laboratory for water quality monitoring and training WUSC.

178. The PMQAC Environmental Safeguards Specialist, together with DSMC Environmental Safeguards Specialist will be responsible for environmental awareness training and management by both ADB and government requirements. Specific modules customized for the available skill set will be devised after assessing the capabilities of the target participants and the requirements of the project. Typical modules would be as follows: (i) sensitization; (ii) introduction to the environment and environmental considerations in water supply and wastewater projects; (iii) review of IEEs and integration into the project detailed design; (iv) improved coordination within nodal departments; and (v) monitoring and reporting system. The contractors will be required to conduct environmental awareness and orientation of workers before deployment to work sites. The proposed training project along with the frequency of sessions is presented in Table 30.

**Table 30: Training Program for Environmental Management**

Items	Pre-construction	Construction	
Training Title	Orientation workshop	Orientation program/ workshop for contractors and supervisory staff	Experiences and best practices sharing
Purpose	To make the participants aware of the environmental safeguard requirements of ADB and Government of Nepal and how the project will meet these requirements	To build the capacity of the staff for effective implementation of the designed EMPs aimed at meeting the environmental safeguard compliance of ADB and Government of Nepal.	To share the experiences and best practices aimed at learning lessons and improving implementation of EMP
Contents	<p>Module 1: Orientation ADB Safeguards Policy Statement Government of Nepal Environmental Laws and Regulations</p> <p>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</p>	<p>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</p>	<p>Experiences on EMP implementation – issues and challenges Best practices followed</p>
Duration	1 day	1 day	1 day on a regular period to be determined by PMO, ICGs, and (provide if PMC or DSMC)
Participants	Executing and implementing agencies, PMO, and PMO staff (technical and environmental) involved in the project implementation	PMO ICGs Contractors	PMO ICGs Contractors

**D. Staffing Requirement and Budget**

179. 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.

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

181. 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.

182. 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. If a licensed laboratory is engaged for the first 2-3 years of operation for training purposes, the cost can be accommodated under the operations plan.

183. The cost of awareness program and WSP during contract is NRs500,000 under provisional sum.

184. The indicative cost of EMP implementation is shown in Table 31.

**Table 31: Indicative Cost of Environmental Management Plan Implementation**

SN	Particulars	Stages	Unit	Total Number	Rate (NRs)	Cost (NRs)	Cost covered by
A.	Monitoring Measures						
1.	Air quality monitoring	- Pre-construction - Construction	Per location	2	100,000	200,000	Civil works contract
2.	Noise levels monitoring	- Pre-construction - Construction	Per location	2	25,000	50,000	Civil works contract
3.	Water quality monitoring	- O&M	Outfalls	As needed			WUSC or municipality
B	Capacity Building						
1.	(i) Orientation workshop for officials involved in the project implementation on ADB Safeguards Policy Statement, Government of Nepal environmental laws and regulations, and environmental assessment process; (ii) induction course for contractors, preparing them for 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 implementation; and (iii) lessons learned information sharing	Module 1 – immediately upon engagement of the (provide if DRTAC or DSMC) environmental specialists  Module 2 – before award of civil works contracts (twice a year for 4 years)  Module 3 – before start of Phase 2 and upon completion of the project	lump sum	1	Module 1 – 150,000	150,000.00	DRTAC
C.	Human Resources Costs						
1	ICG Environment Safeguard Assistants	Construction phase	1	10	20,000	200,000	Budget covered through DSMC
2	DSMC Environmental Safeguard Specialist	Responsible for environmental safeguards of the project at ICG level	person months (spread over entire project implementation period)	10	25,000	250,000	Remuneration and budget for travel covered by the DSMC contract
D.	Administrative Costs						
1.	Legislation, permits, and agreements	Permit for excavation, tree-cutting permits, etc.	Lump sum				These consents are



SN	Particulars	Stages	Unit	Total Number	Rate (NRs)	Cost (NRs)	Cost covered by
							to be obtained by the contractor at his expense.
		Environmental assessment and environmental clearances as per EPA 1996 and EPR, IEE presentation at review committee related expenses	Lump sum	1	50,000	50,000	50,000
E.	Other Costs						
1.	Public consultations and information disclosure	Information disclosure and consultations during preconstruction and construction phase, including public awareness campaign through media	As per requirement	Lump sum		50,000	Covered under DSM Contract
2.	GRM implementation	Costs involved in resolving complaints (meetings, consultations, communication, and reporting/information dissemination)		Lump sum		50,000	PMO cost
3.	Any unanticipated impact due to project implementation	Mitigation of any unanticipated impact arising during construction		Lump sum	Contractor's liability	As per insurance requirement	Civil works contract – contractor's insurance defect liability period
<b>TOTAL (Indicative and partial. To be finalized in the updated IEE)</b>						<b>1,000,000</b>	

185. Hence, the provisional amount of NRs1,000,000 has been provided to execute all necessary environmental mitigation measures.

**Table 32: Proposed Topics for Capacity Building/Training**

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

## X. MONITORING AND REPORTING

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

187. RPMO will submit monthly monitoring and implementation reports to PMO, who will take follow-up actions, if necessary. PMO will submit semi-annual environmental monitoring reports to ADB. The suggested semi-annual environmental monitoring report format is in **Error! Reference source not found.** Subproject budgets will reflect the costs of monitoring and reporting requirements.

188. 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 (PMO-ESS) will document monitoring results, identify the necessary corrective actions, reflect them in a corrective action plan, and for each quarter, will study the compliance with the action plan developed in the previous quarter. Compliance with loan covenants will be screened by the PMO Environmental Safeguards Officer (PMO-ESO), with support from PMO-ESS.

189. 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.

## XI. CONCLUSION AND RECOMMENDATION

190. The proposed subproject is not an environmentally critical undertaking. The IEE indicates that the proposed subproject, and its components, is not located within or adjacent to environmentally sensitive areas.

191. The extent of adverse impacts is expected to be local, confined within the projects' main areas of influence, quarry or burrowing sites, waste disposal sites, and the routes to and from these sites. With mitigation measures in place and ensuring that the bulk of earthworks are

completed before the onset of the rainy season, the potential adverse impacts during construction would be site-specific.

192. The few adverse impacts of moderate magnitude during construction will be temporary and short-term (i.e., most likely to occur only during peak construction activities). These will not be sufficient to threaten or weaken the surrounding resources. Mitigation measures, integral to socially and environmentally responsible construction practices, are commonly used at construction sites and are well known to Contractors. Hence, mitigation measures would not be difficult to implement.

193. After construction, the drainage system will be able to serve the town. No adverse environmental impacts is expected. WUSCs will (i) implement regular monitoring of the drainage system in order to ensure that it is functioning well, and (ii) undertake regular maintenance activities such as drainage cleaning to ensure that no clogging occurs.

194. Based on the above findings, the classification of the Katahariya stormwater drainage subproject as Category B per ADB SPS is confirmed, and no further special study or detailed EIA needs to be undertaken.

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

- (i) Study of the impact of the stormwater to the aquatic ecology in the area, including fish survey in all surface water bodies where stormwater will be discharged;
- (ii) Assessment of the amount of waste generated during the construction activities, including the volume of spoils and detailed information of disposal site;
- (iii) The design of the stormwater drainage system will ensure that only stormwater or rainwater will be flowing to the drainage canals once they become operational. The final detailed design will ensure that the following:
  - (a) Inlets to the drainage system be positioned away from outlets of septic tanks and greywater lines of households or commercial establishments. This will avoid the situation where the drainage system will be used as discharge point of septic and household wastes that could pollute the receiving bodies of water; and
  - (b) Silt traps are integrated in the design to avoid heavy siltation in the drainage system during monsoon season that could eventually affect the receiving bodies of water at the outfalls of the drainage system.
- (iv) The design of the outfalls will ensure the following:
  - (a) Siltation or sedimentation chambers (or similar structures) be constructed at the outfalls with sizes depending on the peak volume flow. This will avoid heavy siltation and pollution of the receiving body of water;
  - (b) Position the outfalls at locations enough to provide space for the construction of siltation or sedimentation chambers (or similar structures); and
  - (c) Position the outfalls and siltation or sedimentation chambers (or similar structures) at locations that will be accessible for maintenance and cleaning during the operation phase.

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

## RAPID ENVIRONMENTAL ASSESSMENT CHECKLIST FOR KATAHARIYA STORM WATER DRAINAGE SUBPROJECT

<b>Country/Project</b>	NEP: Urban Water Supply and Sanitation Project
<b>Title/Project:</b>	Katahariya Storm Water Drainage Subproject

Screening Questions	Yes	No	Remarks
<b>A. Project Siting</b> Is the project area Adjacent to or within any of the following environmentally sensitive areas?		√	The subproject components are not within locations in or near sensitive and valuable ecosystems, including protected areas, forests, and other sensitive areas defined in ADB SPS.
▪ Cultural Heritage Site		√	
▪ Protected Area		√	
▪ Wetland		√	
▪ Mangrove		√	
▪ Estuarine		√	
▪ Buffer zone of protected area		√	
▪ Special area for protecting biodiversity		√	
<b>B. Potential Environmental Impacts</b> Will the Project Cause...			
▪ encroachment on historical/cultural areas; disfiguration of landscape by road embankments, cuts, fills, and quarries?		√	The subproject locations are not nearby the historical/cultural monuments/areas.
▪ encroachment on precious ecology (e.g. sensitive or protected areas)?		√	The subproject components are not within locations in or near sensitive and valuable ecosystems, including protected areas, forests, and other sensitive areas defined in ADB SPS.
▪ alteration of surface water hydrology of waterways crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site?	√		This is due to excavation and run-off from stockpiled materials. The impacts are negative but short-term and site-specific within a relatively small area and reversible through mitigation measures. Good construction practices will mitigate soil erosion and silt runoff, and are specified in the EMP.

Screening Questions	Yes	No	Remarks
<ul style="list-style-type: none"> <li>deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?</li> </ul>	√		This is due to silts and wastes coming from worker camps and spills from stored petroleum products or chemicals used by heavy equipment. The impacts are negative but short-term and site-specific within a relatively small area and reversible through mitigation measures. Good construction practices will mitigate soil erosion and silt runoff, and are specified in the EMP. Storage and handling of petroleum chemicals used during construction will follow internationally accepted standards. These are included in the EMP.
<ul style="list-style-type: none"> <li>increased local air pollution due to rock crushing, cutting and filling works, and chemicals from asphalt processing?</li> </ul>		√	Not anticipated.
<ul style="list-style-type: none"> <li>risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?</li> </ul>	√		This risk is inherent in construction works. However, occupational health and safety measures are included in the EMP following internationally accepted guidelines, such as the WB EHS guidelines on construction and decommissioning activities.
<ul style="list-style-type: none"> <li>noise and vibration due to blasting and other civil works?</li> </ul>	√		Nuisance to neighboring areas due to noise during construction phase may be relevant to the construction of drainage. All mitigation measures in order to avoid or reduce the impact of noise and vibration due to construction works are included in the EMP.
<ul style="list-style-type: none"> <li>dislocation or involuntary resettlement of people?</li> </ul>		√	Not applicable. There will be no IR impacts.
<ul style="list-style-type: none"> <li>dislocation and compulsory resettlement of people living in right-of-way?</li> </ul>		√	Not applicable. There will be no IR impacts.
<ul style="list-style-type: none"> <li>disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?</li> </ul>		√	The subproject will positively impact all sectors of the society.
<ul style="list-style-type: none"> <li>other social concerns relating to inconveniences in living conditions in the project areas that may trigger cases of upper respiratory problems and stress?</li> </ul>	√		Generation of dusts and noise could trigger upper respiratory problems and stress to people living around the construction sites. However, this issue will be mitigated through dust control measures that are included in the EMP.
<ul style="list-style-type: none"> <li>hazardous driving conditions where construction interferes with pre-existing roads?</li> </ul>		√	Not anticipated. Construction activities for the drainage will be mostly at the roadsides.

Screening Questions	Yes	No	Remarks
<ul style="list-style-type: none"> <li>poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations?</li> </ul>	√		Poor housekeeping at construction camps and work sites could create breeding habitats of disease vectors and could be source of communicable diseases. These situations will be mitigated with the institution of good housekeeping measures at construction camps and work sites. These are included in the EMP.
<ul style="list-style-type: none"> <li>creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents?</li> </ul>	√		
<ul style="list-style-type: none"> <li>accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials?</li> </ul>		√	Not anticipated. The subproject town does not have high volume of vehicles.
<ul style="list-style-type: none"> <li>increased noise and air pollution resulting from traffic volume?</li> </ul>		√	
<ul style="list-style-type: none"> <li>increased risk of water pollution from oil, grease and fuel spills, and other materials from vehicles using the road?</li> </ul>		√	
<ul style="list-style-type: none"> <li>social conflicts if workers from other regions or countries are hired?</li> </ul>		√	Not anticipated. The contractors will be encouraged to hire local workers from the local labor force
<ul style="list-style-type: none"> <li>large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?</li> </ul>		√	Not anticipated. The contractors will be encouraged to hire local workers from the local labor force
<ul style="list-style-type: none"> <li>risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?</li> </ul>	√		Construction will not involve use of explosives. Excavation and trenching will be done manually. Petroleum products that will be used by heavy equipment during construction will be handled properly to avoid spills. The measures are included in the EMP.
<ul style="list-style-type: none"> <li>community safety risks due to both accidental and natural causes, 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.</li> </ul>	√		Construction area will be clearly demarcated and access will be controlled. Only workers and project-concerned members will be allowed to visit the sites. Protection barriers and signages will be provided to excavation areas to avoid accidents. These are all included in the EMP.

## NO MITIGATION MEASURES SCENARIO CHECKLIST

### Detailed Guidance SAUW Environment Safeguards Team Checklist When Reviewing an IEE or EIA **NO MITIGATION MEASURES SCENARIO** **Package No. W20 (Katahariya Drainage)**

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

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
<b>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)?</b>				
1.1	Permanent or temporary change in land use, land cover or topography including increases in intensity of land use?	Yes	Temporary change in land use at the designated stockyards by disposing excess of excavated materials	No, it is short term and is limited to construction period only
1.2	Clearance of existing land, vegetation and buildings?	No		
1.3	Creation of new land uses?	No		
1.4	Pre-construction investigations e.g. boreholes, soil testing?	No		
1.5	Construction works?	Yes	Same as 1.1	
1.6	Demolition works?	Yes	Will require demolition of 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, bazaar 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 may generate noise to the surroundings.	No, it is short term effect and it can be minimised by using equipment that emits the least noise with efficient mufflers.



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?
1.15	Facilities for storage of goods or materials?	No		
1.16	Facilities for treatment or disposal of solid wastes or liquid effluents?	No		
1.17	Facilities for long term housing of operational workers?	No		
1.18	New road, rail or sea traffic during construction or operation?	No		
1.19	New road, rail, air, waterborne or other transport infrastructure including new or altered routes and stations, ports, airports etc?	No		
1.20	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	No		
1.21	New or diverted transmission lines or pipelines?			
1.22	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?	No		
1.23	Stream crossings?	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?	Yes	Will generate dust and noise by vehicles for transportation of construction materials	No, because transportation of materials will be intermittent.
1.27	Long term dismantling or decommissioning or restoration works?	No		
1.28	Ongoing activity during decommissioning which could have an impact on the environment?	No		
1.29	Influx of people to an area in either temporarily or permanently?	No		
1.30	Introduction of alien species?	No		

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?
1.31	Loss of native species or genetic diversity?	No		
1.32	Any other actions?	No		
<b>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?</b>				
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		
<b>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?</b>				
3.1	Will the project involve use of substances or materials which are hazardous or toxic to human health or the environment (flora, fauna, water supplies)?	No		
3.2	Will the project result in changes in occurrence of disease or affect disease vectors (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		
<b>4. Will the Project produce solid wastes during construction or operation or decommissioning?</b>				
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	No, it is short term

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
			polluted by the waste generated by the workers.	
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	<ul style="list-style-type: none"> <li>• Air Pollution by the dust generated from the wastes</li> <li>• Discomfort to the passer-by if the wastes are not safely disposed</li> </ul>	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		
<b>5. Will the Project release pollutants or any hazardous, toxic or noxious substances to air?</b>				
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources?	No		
5.2	Emissions from production processes?	No		
5.3	Emissions from materials handling including storage or transport?	Yes	Dust generation by the 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?			
5.7	Emissions from burning of waste in open air (eg slash material, construction debris)?	Yes	The locality of the worker's camp may be affected by the open burning of waste generated from the worker's camp.	No, because it is limited to the local area only and is limited to the duration up to which the labours will be residing.
5.8	Emissions from any other sources?	No		

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?
<b>6. Will the Project cause noise and vibration or release of light, heat energy or electromagnetic radiation?</b>				
6.1	From operation of equipment eg engines, ventilation plant, crushers?	No		
6.2	From industrial or similar processes?	No		
6.3	From construction or demolition?	Yes	The continuous demolition of road section for drain construction may release noise.	No because it is short term (limited to construction phase)
6.4	From blasting or piling?	No		
6.5	From construction or operational traffic?	Yes	Moving of vehicles carrying construction materials may affect core area like Katahariya Bazaar	No- because it is short term
6.6	From lighting or cooling systems?	No		
6.7	From sources of electromagnetic radiation (consider effects on nearby sensitive equipment as well as people)?	No		
6.8	From any other sources?	No		
<b>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?</b>				
7.1	From handling, storage, use or spillage of hazardous or toxic materials?	No		
7.2	From discharge of sewage or other effluents (whether treated or untreated) to water or the land?	Yes	Increasing urban population of this town indicates that this project may further help to increase the population that will increase the generation of municipal sewage	No, there will be provision of treatment facilities and there will be also regular monitoring of this issue.
7.3	By deposition of pollutants emitted to air, onto the land or into water?	Yes	The water bodies or land nearby the workers camp may be polluted by the daily activities of the workers residing there temporarily.	No because there will be provision of strict monitoring of this area.
7.4	From any other sources?	No		
7.5	Is there a risk of long term build up of pollutants in the environment from these sources?	No		
<b>8. Will there be any risk of accidents during construction or operation of the Project which could affect human health or the environment?</b>				

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?
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		
<b>9. Will the Project result in social changes, for example, in demography, traditional lifestyles, employment?</b>				
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, hospitals, social facilities?	No		
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 neighbouring 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?			
9.5	By creating jobs during construction or operation or causing the loss of jobs with effects on unemployment and the economy?	Yes	Requirement of labour for the construction works prioritize the local people hence, providing employment opportunities to the local people.	Yes, because the skills they learnt during their employment period can be utilized in the future in other similar kind of works.
9.6	Any other causes?	No		
<b>10. 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?</b>				
10.1	Will the project lead to pressure for consequential	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?
	development which could have significant impact on the environment eg more housing, new roads, new supporting industries or utilities, etc?			
10.2	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: <ul style="list-style-type: none"> <li>• supporting infrastructure (roads, power supply, waste or waste water treatment, etc)</li> <li>• housing development</li> <li>• extractive industries</li> <li>• supply industries</li> <li>other?</li> </ul>	No		
10.3	Will the project lead to after-use of the site which could have an impact on the environment?	No		
10.4	Will the project set a precedent for later developments?	Yes	The safe access to water supply and sanitation by this project may create opportunities for other development infrastructures.	Yes, because it will be the important factor for the sustainable development of the emerging town like Katahariya
10.5	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)

<p><b>Question - Are there features of the local environment on or around the Project location which could be affected by the Project?</b></p> <ul style="list-style-type: none"> <li>• 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?</li> <li>• Other areas which are important or sensitive for reasons of their ecology e.g.</li> </ul>	<p>Yes, the core Katahariya bazaar area may be susceptible to traffic congestion during pipeline laying works that may provide discomfort to the passer-by as well as other environmental problems too.</p>
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<ul style="list-style-type: none"> <li>• Wetlands,</li> <li>• Watercourses or other waterbodies,</li> <li>• the coastal zone,</li> <li>• mountains,</li> <li>• forests or woodlands</li> </ul> <p>• 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?</p> <ul style="list-style-type: none"> <li>• Inland, coastal, marine or underground waters?</li> <li>• Areas or features of high landscape or scenic value?</li> <li>• Routes or facilities used by the public for access to recreation or other facilities?</li> <li>• Transport routes which are susceptible to congestion or which cause environmental problems?</li> <li>• Areas or features of historic or cultural importance?</li> </ul>	
<b>Question - Is the Project in a location where it is likely to be highly visible to many people?</b>	Yes. The project components like drainage lines run along the bazaar area, former VDC office area etc.
<b>Question - Is the Project located in a previously undeveloped area where there will be loss of greenfield land?</b>	No
<b>Question - Are there existing land uses on or around the Project location which could be affected by the Project? For example:</b> <ul style="list-style-type: none"> <li>• Homes, gardens, other private property,</li> <li>• Industry,</li> <li>• Commerce,</li> <li>• Recreation,</li> <li>• public open space,</li> <li>• community facilities,</li> <li>• agriculture,</li> <li>• forestry,</li> <li>• tourism,</li> <li>• mining or quarrying</li> </ul>	No
<b>Question - Are there any plans for future land uses on or around the location which could be affected by the Project?</b>	No
<b>Question - Are there any areas on or around the location which are densely populated or built-up, which could be affected by the Project?</b>	No
<b>Question - Are there any areas on or around the location which are occupied by sensitive land uses which could be affected by the Project?</b> <ul style="list-style-type: none"> <li>• hospitals,</li> <li>• schools,</li> <li>• places of worship,</li> <li>• community facilities</li> </ul>	No
<b>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:</b> <ul style="list-style-type: none"> <li>• groundwater resources,</li> <li>• surface waters,</li> <li>• forestry,</li> </ul>	No

<ul style="list-style-type: none"> <li>• agriculture,</li> <li>• fisheries,</li> <li>• tourism,</li> <li>• minerals.</li> </ul>	
<b>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?</b>	No
<b>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?</b>	No
<b>Question - Is the Project likely to affect the physical condition of any environmental media?</b> <ul style="list-style-type: none"> <li>• The atmospheric environment including microclimate and local and larger scale climatic conditions?</li> <li>• Water - eg quantities, flows or levels of rivers, lakes, groundwater. Estuaries, coastal waters or the sea?</li> <li>• Soils - eg quantities, depths, humidity, stability or erodibility of soils?</li> <li>• Geological and ground conditions?</li> </ul>	Yes but the effects are insignificant
<b>Question - Are releases from the Project likely to have effects on the quality of any environmental media?</b> <ul style="list-style-type: none"> <li>• Local air quality?</li> <li>• Global air quality including climate change and ozone depletion</li> <li>• Water quality – rivers, lakes, groundwater. Estuaries, coastal waters or the sea?</li> <li>• Nutrient status and eutrophication of waters?</li> <li>• Acidification of soils or waters?</li> <li>• Soils</li> <li>• Noise?</li> <li>• Temperature, light or electromagnetic radiation including electrical interference?</li> <li>• Productivity of natural or agricultural systems?</li> </ul>	Yes, the construction activities may affect local air quality through dust emissions. It also generate noise pollution by the movement of vehicles for transporting materials and demolition works.
<b>Question - Is the Project likely to affect the availability or scarcity of any resources either locally or globally?</b> <ul style="list-style-type: none"> <li>• Fossil fuels?</li> <li>• Water?</li> <li>• Minerals and aggregates?</li> <li>• Timber?</li> <li>• Other non-renewable resources?</li> <li>• Infrastructure capacity in the locality - water, sewerage, power generation and transmission, telecommunications, waste disposal roads, rail?</li> </ul>	No
<b>Question - Is the Project likely to affect human or community health or welfare?</b> <ul style="list-style-type: none"> <li>• The quality or toxicity of air, water, foodstuffs and other products consumed by humans?</li> </ul>	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



<ul style="list-style-type: none"> <li>• Morbidity or mortality of individuals, communities or populations by exposure to pollution?</li> <li>• Occurrence or distribution of disease vectors including insects?</li> <li>• Vulnerability of individuals, communities or populations to disease?</li> <li>• Individuals' sense of personal security?</li> <li>• Community cohesion and identity?</li> <li>• Cultural identity and associations?</li> <li>• Minority rights?</li> <li>• Housing conditions?</li> <li>• Employment and quality of employment?</li> <li>• Economic conditions?</li> <li>• Social institutions?</li> </ul>	as they may not have access to safe water supply and sanitation.
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### 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

## **SAMPLE TRAFFIC MANAGEMENT PLAN**

### **A. Principles**

1. One of the prime objectives of this Traffic Management Plan (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; and
- (v) addressing issues that may delay the project.

### **B. Operating Policies for TMP**

2. 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; and
- (viii) Make appropriate accommodation for abutting property owners, residents, businesses, emergency services, railroads, commercial vehicles, and transit operations.

3. Figures below illustrate the operating policy for TMP for the construction of water pipes and the sewers along various types of roads.

### **C. Analyse the impact due to street closure**

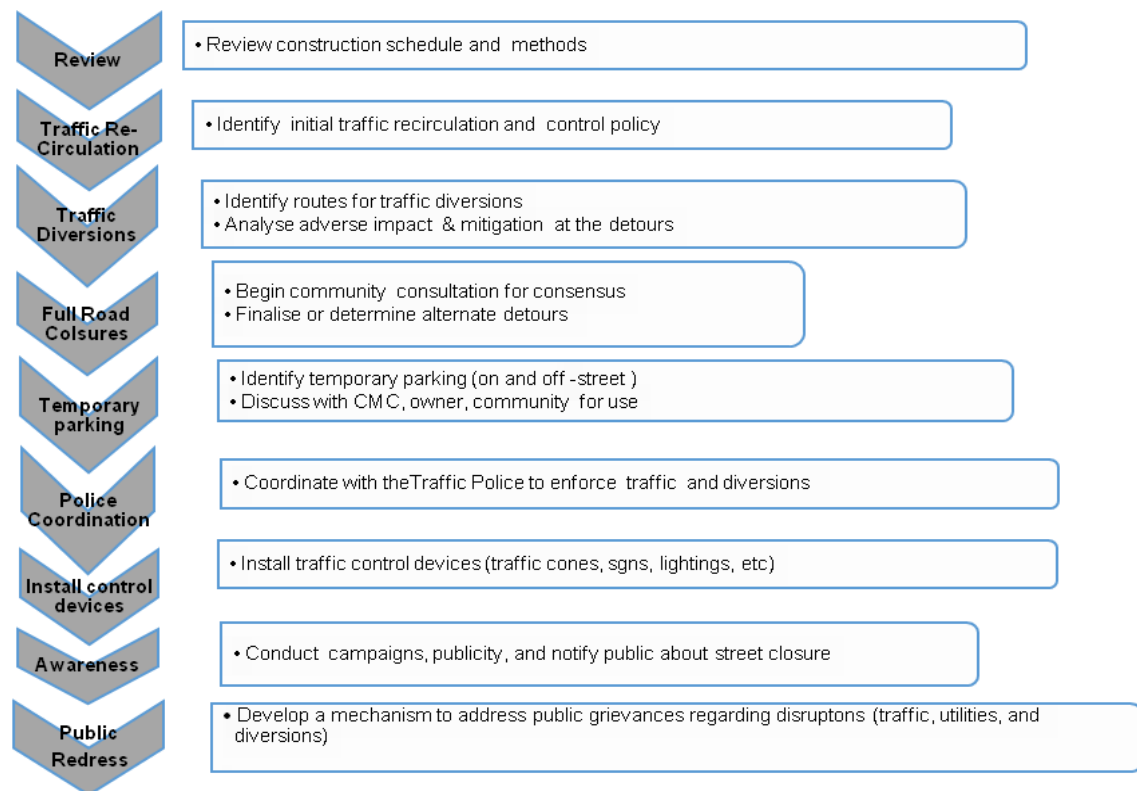
4. Apart from the capacity analysis, a final decision to close a particular street and divert the traffic should involve the following steps:

- (i) approval from the local government 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

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

5. 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 A2.1. Policy Steps for the TMP**



#### **D. Public awareness and notifications**

6. 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.

7. 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.

8. The PIU 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 behaviour along the work zones; and
- (iii) reduced speeds enforced at the work zones and traffic diversions.

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

10. 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 centres. 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 PIU, 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 behaviour 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. Install traffic control devices at the work zones and traffic diversion routes**

11. 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

12. 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”).

13. Below descriptions illustrate a typical set-up for installing traffic control devices at the work zone of the area, depending on the location of work on the road way, and road geometrics:

- Work on shoulder or parking lane
- Shoulder or parking lane closed on divided road
- Work in Travel lane
- Lane closure on road with low volume
- Lane closure on a two-line road with low volume (with yield sign)
- Lane closure on a two-line road with low volume (one flagger operation)
- Lane closure on a two lane road (two flagger operation)
- Lane closure on a four lane undivided Road
- Lane closure on divided roadway
- Half road closure on multi-lane roadway
- Street closure with detour

14. 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.

15. 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 for regulating the traffic during night time.

16. 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.

## SAMPLE 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:

- (i) To minimize spoil generation where possible
- (ii) Maximize beneficial reuse of spoil from construction works in accordance with spoil management hierarchy
- (iii) Manage onsite spoil handling to minimize environmental impacts on resident and other receivers
- (iv) Minimize any further site contamination of land, water, soil
- (v) 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 that does not 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 and there should be any legal and resettlement related issues. Such areas need to be identified and prior cliental approval should be obtained to use it as spoil disposal area. The local administration must be consulted and if required permission should be obtained from them.

### **Storage and stock piling Transportation and haulage route**

Based on the above, the contractor will prepare a SMP as an integral part of EMP and submit it to the 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

### MINUTES OF CONSULTATION MEETING

आज मिति २०७५/०२/०२ गते कटहरिया साना शहरी खानेपानी तथा सरसफाई उपभोक्ता संस्थाका अध्यक्ष श्री छोटेला मिश्र ज्यूको अध्यक्षता बैठक बसि निम्न निर्णयहरु गरियो

उपस्थिति

१ छोटेला मिश्र (अध्यक्ष)

२ जामुन ठाकुर (उपाध्यक्ष)

३ योगेश्वर साह (सचिव)

४ रामप्रवेश साह (को. अध्यक्ष)

५ सुकुलाल शर्मा (सदस्य)

६ सुकुलाल शर्मा (सदस्य)

७ जयन्ती देवी खत्री (सदस्य)

८ जयन्ती देवी खत्री (सदस्य)

९ जयन्ती देवी खत्री (सदस्य)

१० विद्यामोहारी शर्मा

१०. राजदेव मुखिया प्र. उ. अ.

११ नुरज्जुन खान

१२ नरेश्वर अमाई

१३ चन्दन कुमार कुँडा

१४ लक्ष्मी राय

१५ आरुण शर्मा

१६ विनोद शर्मा

१. सतह ढलको सम्बन्धमा ।

निर्णय

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

सहसचिव  
जामुन ठाकुर  
सुकुलाल शर्मा  
रामप्रवेश साह  
योगेश्वर साह  
नुरज्जुन खान  
नरेश्वर अमाई  
चन्दन कुमार कुँडा  
लक्ष्मी राय  
आरुण शर्मा  
विनोद शर्मा



### English Translation of Minutes of Meeting

Today dated 16 May 2018, a public meeting with the beneficiaries of the service area of the Katahariya 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	Chhotelal Mishra	Chairman, Katahariya WUSC
2	Jamun Thakur	Vice Chairman, Katahariya WUSC
3	Yogendra Sah	Secretary, Katahariya WUSC
4	Ram Prabesh Sah	Treasurer, Katahariya WUSC
5	Sakelal Gupta	Member, Katahariya WUSC
6	Sakelal Mahato	Member, Katahariya WUSC
7	Jayanta Devi Baitha	Member, Katahariya WUSC
8	Fula Devi Patel	Member, Katahariya WUSC
9	Junga Bahadur Chhetri	Member, Katahariya WUSC
10	Vidya Sagar Yadav	Katahariya Municipality
11	Raj Dev Mukhiya	Katahariya Municipality
12	Nurjan Khatun	Katahariya Municipality
13	Narashudhin Ansari	Katahariya Municipality
14	Chandan Kumar Kushwaha	Katahariya Municipality
15	Rakesh	Katahariya Municipality
16	Achhelal Sah	Katahariya Municipality
17	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 water 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 and construction team to sort out social and environmental issues, if any.

## 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 enable us to get in touch with you for clarification and feedback. Should you choose to include your personal details but want that information remain confidential, please inform us by writing/typing\* (CONFIDENTIAL)\* above your name. Thank you.

Date		Place of registration		
Contact Information/personal details				
Name	Gender	*Male *Female	Age	
Home Address				
Place				
Phone No.				
E-mail				
<b>Complaint/Suggestion/Comment/Question</b> 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

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

## TEMPLATE FOR SEMI-ANNUAL ENVIRONMENTAL MONITORING REPORT

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

### I. INTRODUCTION

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

No.	Subproject Name	Status of Sub-Project				List of Works	Progress of Works
		Design	Pre-Construction	Construction	Operational		
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

### II. COMPLIANCE STATUS WITH NATIONAL/STATE/LOCAL STATUTORY ENVIRONMENTAL REQUIREMENTS

No.	Subproject Name	Statutory Environmental Requirements	Status of Compliance	Action Required

### III. COMPLIANCE STATUS WITH ENVIRONMENTAL LOAN COVENANTS

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

### IV. COMPLIANCE STATUS WITH THE ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

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

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

### Summary Monitoring Table

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

### Overall Compliance with CEMP/EMP

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


## V. APPROACH AND METHODOLOGY FOR ENVIRONMENTAL MONITORING OF THE PROJECT

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

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

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

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

### Air Quality Results

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

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

### Water Quality Results

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

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


**Noise Quality Results**

Site No.	Date of Testing	Site Location	LA <sub>eq</sub> (dBA) (Government Standard)	
			Day Time	Night Time

Site No.	Date of Testing	Site Location	LA <sub>eq</sub> (dBA) (Government Standard)	
			Day Time	Night Time

**VII. SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS**

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

**Appendixes**

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

## SAMPLE ENVIRONMENTAL SITE INSPECTION REPORT

Project Name

Contract Number

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

TITLE: \_\_\_\_\_

LOCATION: \_\_\_\_\_

GROUP: \_\_\_\_\_

WEATHER CONDITION: \_\_\_\_\_

INITIAL SITE CONDITION: \_\_\_\_\_

CONCLUDING SITE CONDITION:

Satisfactory:\_\_\_\_ Unsatisfactory:\_\_\_\_ Incident:\_\_\_\_ Resolved:\_\_\_\_ Unresolved:\_\_\_\_

INCIDENT:

Nature of incident:

Project Activity Stage	Survey	
	Design	
	Implementation	
	Pre-Commissioning	
	Guarantee Period	

Intervention Steps: \_\_\_\_\_

Incident Issues

Resolution

**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	<input type="checkbox"/>	No <input type="checkbox"/>

Signature

**Sign off**\_\_\_\_\_  
Name, Position\_\_\_\_\_  
Name, Position