INITIAL ENVIRONMENTAL EXAMINATION (IEE)

Project No. 35173-013

November, 2020

NEP: Urban Supply and Sanitation (Sector) Project- Charikot Sewerage (DEWATS) Project, DolakhaDistrict

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

List of Abbreviations

A.D.	Anno Domini
ABR	Anaerobic Baffle Reactor
ADB	Asian Development Bank
AIDS	Acquired Immunodeficiency Syndrome
AM	Accountability Mechanism
BOD_5	5 Days Biological Oxygen Demand
B.S.	Bikram Sambat
CBD	Convention on Biological Diversity
CBO	Community Based Organization
CBS	Central Bureau of Statistics
CFUG	Community Forest User's Group
CI	Cast Iron
CITES	Convention on International Trade in Endangered Species
COD	Chemical Oxygen Demand
CRO	Complaint Receiving Officer
DCC	District Coordination Committee
DEDR	Detailed Engineering Design Report
DEWATS	Decentralized Wastewater Treatment System
DMC	Developing Member Countries
DRTAC	Design Review & Technical Audit Consultant
DSMC	Design Supervision and Management Consultant
DWSSM	Department of Water Supply & Sewerage Management
EA	Executing Agency
EARF	Environmental Assessment Review Framework
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Act
EPR	Environmental Protection Rules
ERDSMC	Eastern Regional Design Supervision Management Consultant
ESA	Environmental Safeguard Assistant
ESO	Environmental Safeguard Officer
etc	Et cetera
FGD	Focus Group Discussion
FSM	Faecal Sludge Management
GoN	Government of Nepal
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
HDPE	High Density Poly Ethylene
HFCW	Horizontal Flow Constructed Wetland
HHs	Households
HIV	Human Immunodeficiency Virus
IA	Implementing Agency
IBAT	Integrated Biodiversity Assessment Tool

IEE	Initial Environmental Examination
IN	Indirect
IO	International Organization
IUCN	International Union for Conservation of Nature
LT	Long Term
MoWS	Ministry of Water Supply
MS	Mild Steel
MT	Medium Term
NAAQS	National Ambient Air Quality Standards
NCS	Nepal Conservation Strategy
NEA	Nepal Electricity Authority
NGO	Non-Governmental Organization
NRs.	Nepalese Rupees
NVEMS	Nepal Vehicle Emission Mass Standards
PCC	Plain Cement Concrete
PMO	Project Management Office
PMQAC	Project Management Quality Assurance Consultants
PN	Pressure Nominal
PVC	Polyvinyl Chloride
RCC	Reinforced Cement Concrete
RDSMC	Regional Design Supervision & Management Consultant
REA	Rapid Environmental Assessment
RPMO	Regional Project Management Office
SDB	Sludge Drying Bed
SDG	Sustainable Development Goal
SPS	Safeguard Policy Statement
SS	Site Specific
SSO	Social Safeguard Officer
SSTWSSSP	Second Small Towns Water Supply and Sanitation Sector Project
ST	Short Term
STWSSSP	Small Towns' Water Supply & Sanitation Sector Project
TDF	Town Development Fund
ToR	Terms of Reference
TS	Total Solids
TSS	Total Suspended Solids
UV	Ultra Violet
UWSSSP	Urban Towns' Water Supply & Sanitation (Sector) Project
VDC	Village Development Committee
WHO	World Health Organization
WN	Ward Number
WSSDO	Water Supply and Sanitation Division Office
WSSP	Water Supply & Sanitation Project
WUA	Water User's Agency
WUSC	Water Supply User's & Sanitation Committee
WWTP	Waste Water Treatment Plant

WEIGHTS AND MEASURES

°C	Degree Celsius/Centigrade
%	Percentage
CFU/mL	Colony Forming Units per milliliter
dBA	Decibels
hrs	hours
km	Kilometer
km^2	Square Kilometer
kW	Kilowatts
lps	liter per second
m	meter
m^2	Square Meter
m^3	Cubic Meter
mm	millimeter
m^3/ day	Cubic Meter per day
m^3/ million m^3	Cubic Meter per million cubic meter
MLD	Million liters per day

NOTES

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

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

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EXECUTIVE SUMMARY

I. Introduction

1. Project Management Office (PMO), Urban Water Supply and Sanitation (Sector) Project (UWSSSP) of the Government of Nepal, The Department of Water Supply and Sewerage Management (DWSSM) is the proponent (implementing agency) of this project whereas, The Ministry of Water Supply (MoWS) is the approval agency for this project. TAEC Consultant P. Ltd. / Integrated Consultants Nepal Pvt. Ltd. JV is the consultant preparing the IEE report.

2. Charikot Sewerage (DEWATS) Project is one of the projects proposed under UWSSSP.This UWSSSP will support Nepal in expanding access to community managed water supply and sanitation services like storm water drainage and waste water (sewerage) in 20 project municipalities by drawing on experiences and lessons from three earlier projects funded by ADB. This project is currently being prepared to support further GoN's continuing efforts to provide water supply and sanitation services including storm water drainage and wastewater (sewerage) projects to selected urban municipalities of Nepal. In support of GoN's endeavor, the Asian Development Bank (ADB) funded this Urban Water Supply and Sanitation (Sector) Project (UWSSSP).

3. The Project area of Charikot DEWATS Project lies in Bhimeshwore Municipality, Dolakha District, a hilly district in the Bagmati Province of Nepal. The municipality lies between 27º37' 58" N to 27º44' 42" N latitude to 85º5' 12" E to 85º 59' 31" E longitude.

4. The main purpose of IEE is to ensure the environmental sustainability of the project, to integrate environmental considerations into the project preparation process, and to manage environment during project implementation.

5. Majority of households in core area of Charikot and Old Dolakha Bazaar do not have ample space to make proper septic tank. Proper and effective management of septage has become the most serious problem of the project town because of the compact settlement of core bazaar area. The city wise WWTP is necessary to collect and treat the sewerage of the core area of the town.

6. The rationale of the project is based on the increasing demand of effective sewerage system, increased risk of seepage problems and prevailing difficulty in inspection and de-sludging of the existing septic tank.

7. The IEE study for the proposed project is needed to be carried out from the environmental point of view as per EPA 2076B.S.(2019 A.D.) and EPR 2077 B.S. (2020 A.D.) and as per ADB Safeguard Policy Statement (SPS), 2009. The proposed project falls within the definitions stated in Schedule 2 (Pertaining to Rule 3) - (Clause I) of EPR, 2077 B. S. (2020 A.D.) for solid waste management sector projects; only IEE is required.

II. Policy, Legal & Administrative Framework

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

a) **Major Law, Acts & Rules:** i)Constitution of Nepal; ii) Environmental Protection Act (EPA), 2076 B.S. (2019 A.D); iii) Environmental Protection Rules (EPR), 2077B.S. (2020 A.D.)

b) **Plans, Policies & Strategies:** i) National Environmental Policy & Action Plan (NEPAP), 2050B.S. (1993 A.D.); ii) Water Resources Strategy, 2059 B.S. (2002) A.D.; iii) National Water Plan, 2062 B.S. (2005 A.D.); iv) National Urban Policy, 2063 B.S. (2007 A.D.); v) National Urban Water Supply & Sanitation Sector Policy, 2065 B.S. (2009 A.D.); vi) Updated 15-yr Development Plan for Small Towns Water Supply and Sanitation Sector, 2066 B.S. (2009 A.D. and Amendments in 2015A.D.); vii) Sanitation & Hygiene Master Plan, 2068 B.S. (2011 A.D.); viii) National Water Supply &Sanitation Policy, 2071 B.S. (2014 A.D.); ix) Land Acquisition, Rehabilitation and Resettlement Policy, 2015 A.D.; x) Land Use Policy, 2072 B.S. (2015 A.D.); xi) Draft Nepal Water Supply, Sanitation& Hygiene Sector Development Plan (2016-2030), 2073 B.S. (2016 A.D.); xii) National Urban Development Strategy, 2074 B.S. (2017 A.D.); xiii) National Land Policy, 2075 B.S. (2019 A.D.); xiv) National Forest Policy, 2075 B.S. (2019 A.D.); xv) Fifteenth Three Years Plan (2076/77- 2080/81); xvi)Climate Change Policy,2076 B.S. (2019 A.D.) and xvii) National Environmental Policy, 2076 B.S. (2019 A.D.)

c) **Laws & Acts:** i) Aquatic Animal Protection Act, 2017 B.S. (1961 A.D.) with Amendments (2055 B.S. (1997 A.D.)); ii) Town Development Act , 2045 B.S. (1988 A.D.); iii) Land Acquisition Act,2049 B.S. (1993 A.D.); iv) Child Labor Prohibition and Regulation Act, 2056 B.S. (2001 A.D.); v) Solid Waste Management Act, 2068 B.S. (2011 A.D.); vi) Labour Act, 2074 B.S. (2017 A.D.); vii) Local Government Operation Act, 2074 B.S. (2017 A.D.); viii) Public Health Service Act, 2075 B.S. (2018 A.D.); ix) Forest Act, 2076 B.S. (2019 A.D.) and x) Land Use Act, 2076 B.S. (2019 A.D.)

d) **Rules & Regulations:** i) Solid Waste (Management & Resource Mobilization) Rules, 2044 B.S. (1987 A.D.) & Amendments 2049 B.S. (1992 A.D.); ii) Forest Regulations, 2051 B.S. (1995 A.D.); iii) Solid Waste Management Rules, 2070 B.S. (2013 A.D.) and iv) Labor Rules, 2075 B.S. (2018 A.D.)

e) **Directives, Guidelines, Frameworks& Manuals:** i) National EIA Guidelines, 2049 B.S. (1993 A.D.); ii) Guidelines for Community Noise by WHO, 2055 B.S. (1999 A.D.) ; iii) WHO Air Quality Guidelines, Global Update, 2061 B.S. (2005 A.D.); iv)National Noise Standard Guidelines, 2068 B.S. (2012 A.D.); v) Environment Friendly Local Governance Framework, 2070 B.S. (2013 A.D.); vi) WHO Guidelines for Drinking-water Quality, Fourth Edition, 2073 B.S. (2017 A.D.); vii) Instituional and Regulatory Framework for Faecal Sludge Management, 2074 B.S. (2017 A.D.); viii) Total Sanitation Guidelines, 2073 B.S. (2017 A.D.) and ix) Working procedure for the use of national forest for national priority projects, 2076 B.S. (2019 A.D.)

9. All projects funded by the ADB must comply with the Safeguard Policy Statement (SPS) 2009 to ensure that projects funded under ADB loan are environmentally sound, legally compliant, and safe. On the environment, the ADB Operations Manual, Bank Policy (OM Section F1/OP, 2010), underpins the SPS 2009. ADB's Environmental Safeguards policy principles are defined in SPS (2009), Safeguard Requirements

III. Methodology

10. The IEE study has been carried out in accordance with the requirements of the ADB's Safeguard Policy Statement (SPS 2009) and environmental requirements of GoN i.e., EPA

2076 B.S.(2019 A.D.) and EPR 2077 B.S. (2020 A.D.). The methodology adopted to carry out this IEE study involves;

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

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

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

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

e) Impact Identification, Prediction & Evaluation Method: This method is carried out through simple checklist & questionnaire method and through professional judgement to determine adversity of the anticipated impacts. The study has followed the procedures outlined in the approved ToR and has covered the issues delineated therein.

IV. Description of the Project

11. The proposed service area of the proposed project covers core area of Charikot Bazaar. This consists of partial and core areas of ward number 3 and 6. The project area has been delineated in consultation with WUSC and the local community. In addition, ward no. 4 will also be used for the construction WWTP.

12. The proposed project has been conceptualized as Decentralized Waste Water Treatment System (DEWATS).This type of system generally convey, treat and dispose or reuse wastewater from small communities, buildings and dwellings in remote areas, individual public or private properties. In this type of system, the treatment and disposal system is carried out in relatively close vicinity to its source of generation.

13. The major project components of this proposed project are listed below:

14. Sewer Lines: There are three sewer lines proposed for the project among which one starts from from the down side of Lamosangu – Jiri road upto Satdobato while the second one starts from old Charikot bazaar and runs along old trail route to Chaisapani / Dandagaon. And, the last one starts from Lamosangu – Jiri Road and upstream settlement, Charighyang to Satdobato and downstream sloping the towards WWTP-2 (Jilu/ Gaude) site.Bottlenecks of the sewer lines would be with other infrastructure services such as storm water drain lines and telephone cable ducts at various locations. In order to avoid such bottlenecks, the crown of the sewer line should be laid below these interfering infrastructure lines.

15. Manholes & Sewer Inlet Chamber: Circular brick masonry manholes with CI cover has been proposed which will have inside plaster to prevent the leakage and provide smooth flow.There will be one or two chambersmade of Brick Masonry/RCC as per requirement on either side of the manhole depending upon the household to receive the household sewer. Each household has to connect its sewer to this chamber at their own costs

16. Sewer Connection Chamber: In some areas, the depth of manhole appears to be more than (4.5 to 5)m. It would be difficult to construct the manhole for such greater depths. To overcome such difficulties, two RCC Sewer Connection Chambers will be constructed at the top & bottom respectively and HDPE pipe will be connected in between these two chambers. Here, Hume pipe cannot be used because it cannot be retained at its position due to weight and ground slope

17. Waste Water Treatment Plant (WWTP): The outlet of the sewerage system will be the inlet of the WWTP. In total, there are 2 Outlets for the proposed sewer system that includes WWTP Shantinagar / Gairabari WWTP inlet and Deurali Danda/ Jilu/ Gaude Danda outfall. This WWTP comprises various sub components that includes i) Screen Chamber; ii) Hydrocyclone; iii) Equilization Tank; iv) Settler; v) Anaerobic Baffle Reactor (ABR); vi) Horizontal Flow Constructed Wetland (HFCW); vii) Polishing Pond and viii) Sludge Drying Bed

18. Laboratory Setup: There is also provision of laboratory set up at the final point of WWTP to monitor the minimum effluent characteristics before final disposal to the water bodies.

19. Blacktopped/PCC/RCC/Road Cutting & Reinstatement Works:Since the sewerage pipeline will be laid at the centerline of the road, there is requirement of frequent road surface cutting. The project has all types of road such as Blacktopped, RCC, PCC, Graveled and Earthen.

20. ***Sludge Management Plan***: Haphazard Disposal of Dried sludge is not acceptable in regard to the future environmental implications. The dried sludge can be applied for multiple uses. Prior to this, the sludge needs to be properly processed and dewatered to avoid odor nuisance. Sludge Drying Bed provide the simplest method of dewatering. The sludge is kept for drying by natural drainage process and heat from the sunlight on the sludge drying bed till the sludge cake can be removed by shovel. Drying takes place by a combination of evaporation and gravity drainage through the sand. After about six weeks of drying, the sludge cake may have solid content of about 40 percent. It can then be removed from the sludge drying bed with a shovel. This removed sludge is taken to the sludge storage yard for storage. There is provision of 35HP capacity boom type tractor for loading and transportation of sludge to the sludge storage yard. The sludge storage yard gives the retention period for the dried sludge, supports in reducing moisture and helps in reducing pathogens.

21. After certain duration of storage, the treated sludge from the sludge storage yard needs to be disposed off finally. Normally, the final disposal point of the treated sludge is the land. Dewatered sludge can be buried underground in a sanitary landfill. It can also be spread on agricultural land in order to use it as a fertilizer. But, for this, availability of sufficient space must be ensured. This treated sludge can also be used for the production of biogas, charcoal, biodiesel, powdered industrial fuel and electricity. As the responsibility of operation & maintenance of this proposed project is of the Municipality, the final disposal process of the treated sludge and its location will be confirmed by the municipality. Also, its application either as fertilizer or on the underground of sanitary landfill site or other multiple uses as mentioned above shall be decided by the municipality itself.

22. As per DDR report, the available land at Gairabari WWTP and Jilu WWTP areas are 2543.22$m^2$and 9155.59m^2respectively. Our study shows that the area of the land required for the construction of Gairabari WWTP and Jilu WWTP are 1406.99m^2 and 3382.81m^2respectively. Hence, this shows the proposed sites have sufficient space for all the WWTP components including buffer zones and possible future expansion.

V. Description of the Existing Environment

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

24. Regarding this, details on various physical environmental aspects like Landforms & Topography, Geology & Soil, Water Resources, Climate, Air Quality, Acoustic Environment and biological features like Flora, Fauna, Aquatic Life, Protected Areas & Community Forest Areas were collected through simple checklist, REA checklist, professional judgment and interaction with the locals & the concerned bodies during field study. No existence of protected areas within the project area was observed during the field study. However, the study shows that the proposed WWTP for Gairabari Oulet requires the land within the Shree Gaude Community Forest for which the study shows that there is requirement to cut down around 25 trees.

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

VI. Anticipated Environmental Impacts and Mitigation Measures

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

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

28. Here, Beneficial Impacts includes Employment Generation, Skill Enhancement, Local Trade & Business Opportunities, Improved Health & Hygiene, Social Comfort, Increase Urban Aesthetic Value, Beneficial Reuse of Effluent & Sludge and Increased Land Value. Similarly, Adverse Impacts includes Soil Erosion& Land Surface Disturbances, Spoil Disposal & Gully Erosion, Noise Pollution, Impacts on Air Quality, Surface Water Quality, Generation of Solid Waste & Waste water from the construction site & worker's camp, Accidental Leakage or Spillage of Stored Fuel/Chemicals, Land Use Pattern, Haphazard Disposal of Dismantled Debris, Impacts on Water Bodies, Impacts on Flora & Fauna, Impact on Aquatic Life, Impact on Water Quality of nearby rivers, Structural Instability, Workers & Community Health & Safety Hazards, and Damage to the existing Utilities, Traffic Hindrance,

Public Protests, Disruption to Local Vendor's Business, Dsturbance o the achool nearby the proposed WWTP site, Mobilization of Child Labour, Occupational Health & Safety Hazards, Impact on Sustainability of Works, Damage to the existing utilities, Blocking & Clogging of Sewer Lines, Nuisance to Neighbouring Areas, Overflow Flooding, Clogging & Overloading of Sludge Drying Bed and Non-sustainability of Services or Complete Works

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

VII. Alternative Analysis

30. The alternative analysis of the project shall be considered as an integral part of the IEE study, which involves alternative ways of achieving the objectives of a proposed project in terms of environmental point of view. Primarily, this involves two alternatives that includes "Without Project" or "Do-nothing" Alternative and "With Project" Alternative.The limitation of "Without Project" Alternatives regarding the increasing demand of effective sewerage system, increased risk of seepage problems and prevailing difficulty in inspection and de-sludging of the existing septic tank leads to go for "With Project" Alternative. In regard to "With Project" Alternative analysis, the proposed project is a unique system and it shall not have any alternatives

VIII. Environmental Management Plan

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

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

32. The total estimated local level monitoring and mitigation cost for the project is NRs. 2,000,000.00.

IX. Information Disclosure, Consultation & Participation

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

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

X. Grievance Redress Mechanism

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

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

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

(a) WUSC Secretary;

(b) RPMO Engineer;

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

(d) Representative of affected persons,

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

(f) Representative of reputable and relevant CBO/SHG/organization working in the project area as invitee1 , and

(g) Contractor's representative

XI. Monitoring & Reporting

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

XII. Conclusion

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

37. In conclusion, the IEE study shows that the proposed project is not an environmentally critical undertaking. The proposed project, its components, are not within or adjacent to environmentally sensitive areas. The proposed project will reduce the increased risk of seepage problem resulting from the poor performance of the existing septic tanks.This will also help to get rid of the problem due to insufficiency of the space for the construction of septic tank that has been bothering the residents for years.

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

(i) the benefits of improved waste water management;
(ii) promotion of good hygiene and sanitation practices and reduced health and safety risks as positive impacts; and
(iii) enhanced community health, improved quality of life and safe communities as outcomes.

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

I. INTRODUCTION

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

i. Name of the Proposal

1. The Name of the Proposal is Charikot Sewerage (DEWATS) Project

ii. Name and Address of the Proponent

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

Name of the Proponent:

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

Address of the Proponent:

Panipokhari, Kathmandu
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Name of the Approval Agency:

Ministry of Water Supply
Government of Nepal

iii. Consultant Preparing the Report

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B. Background

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

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

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

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

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

C. Sub Project Selection Criteria Based on Environmental Assessment & Review Framework (EARF)

8. This EARF has been prepared in accordance with ADB SPS and Government of Nepal Environment Protection Act (EPA) 2076 B.S. (2019 A.D.) and Environment Protection Rules (EPR) 2077 B.S. (2020 A.D.). This EARF will provide guidance on subproject selection, screening and categorization, information disclosure and consultation, assessment, planning, institutional arrangement, and processes to be followed in the formulation and implementation of subprojects during project implementation. The proposed project has strictly followed the criteria mentioned in EARF. The *Table I-I* given below depicts the compliance matrix of the subproject selection criteria as per EARF.

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

S. No.	Sub Project Selection Criteria	Compliance Status (Yes/No)	Remarks
A.	**General Criteria**		
1	Located in the core area of the municipality (most densely populated) area and with an existing or proposed water supply that provides sufficient flow to achieve self-cleansing velocities in the sewers. In case of the latter, water supply subproject will have been completed before the waste water/DEWATS is commissioned.	Yes	The service area belongs to core area of Bhimeshwore municipality.
2	Public or WUA land with no or minimum involuntary resettlement impacts is available for construction.	Yes	The proposed system has considered this issue.
B.	**Specific Criteria**		
1	Design, construct, operate, and maintain wastewater treatment facilities and achieve effluent water quality consistent with applicable national requirements or internationally accepted standardsand consistent with effluent water quality goals based on the assimilative capacity and the most sensitive end use of the receiving water	Yes	The design concept has followed this criterion and this shall be followed even during construction and O & M phase also.
2	Equip pumping stations with a backup power supply, such as a diesel generator, to ensure uninterrupted operation during power outages, and conduct regular maintenance to minimize service interruptions. Consider redundant pump capacity in critical areas	No	The project is a gravity system. So, there is no requirement of pumping stations.
3	Consider the receiving water body use (e.g. navigation, recreation, irrigation, or drinking) together with its assimilative capacity to establish a site-specific discharge quality that is consistent with the most sensitive use	Yes	The proposed system has considered this criterion.
4	Treated wastewater (liquid effluents) may be reused for irrigation or other purposes or disposed subject to regulatory oversight	Yes	The proposed system has consideredthis criterion.

S. No.	Sub Project Selection Criteria	Compliance Status (Yes/No)	Remarks
5	Land application or other beneficial re-use of wastewater treatment plant residuals shall be considered but only based on an assessment of risks to human health and the environment.	Yes	The proposed system has considered this criterion. This issue has been discussed in this report also.
6	Select appropriate sludge treatment technologies, considering, for example, the quantity and sources of sludge; available resources for capital expenditures, training, operations and maintenance; availability of skilled operators, maintenance personnel, etc.; and the desired disposal methods or end uses of the treated solids.	Yes	The proposed system has considered this criterion.
7	Cover emission points (e.g., aeration basins, clarifiers, sludge thickeners, tanks, and channels), and vent emissions to control systems (e.g., compost beds, bio filters, chemical scrubbers, etc.) as needed to reduce odors and otherwise meet applicable national requirements and internationally accepted guidelines. Where necessary, consider alternate aeration technologies or process configurations to reduce volatilization	Yes	The proposed system has considered this criterion.
8	Locate sewage pumping stations at least 50 m from houses, sensitive buildings like schools, hospitals, religious places etc.,	No	As the project is a gravity system, no sewage pumping station is required.

EARF, 2018 A.D.

D. Project Area Description

40. The Project area of Charikot DEWATS Project lies in Bhimeshwore Municipality, Dolakha District, a hilly district in the Province 3 of Nepal. The municipality lies between 27º37' 58" N to 27º44' 42" N latitude to 85º5' 12" E to 85º 59' 31" E longitude.

41. This ***figure I-I*** below shows that the project area belongs to Bhimeshwore Municipality of Dolakha District of Nepal. Bhimeshwore Municipality is bounded by Kalinchowk Rural Municipality in the north, Baiteshwore Rural Municipality in the east, Sailung Rural Municipality in the south and Sindhupalchowk District (Tripura Sundari Rural Municipality & Lisangkhu Pakhar Rural Muniicpality) in the west. The region is bordered by the Sunkoshi River on the west and the Khimti Khola River on the east. It is divided unequally by the River Tama Koshi, proportionately two-thirds to the west of the river and one-third to the east. To the north east lies the impressive Rolwaling Himal to the western edge of which are such peaks as Gauri Shankar and Melungtse. Gauri Shankar is synonymous with the god Shiva and his consort Parvati.

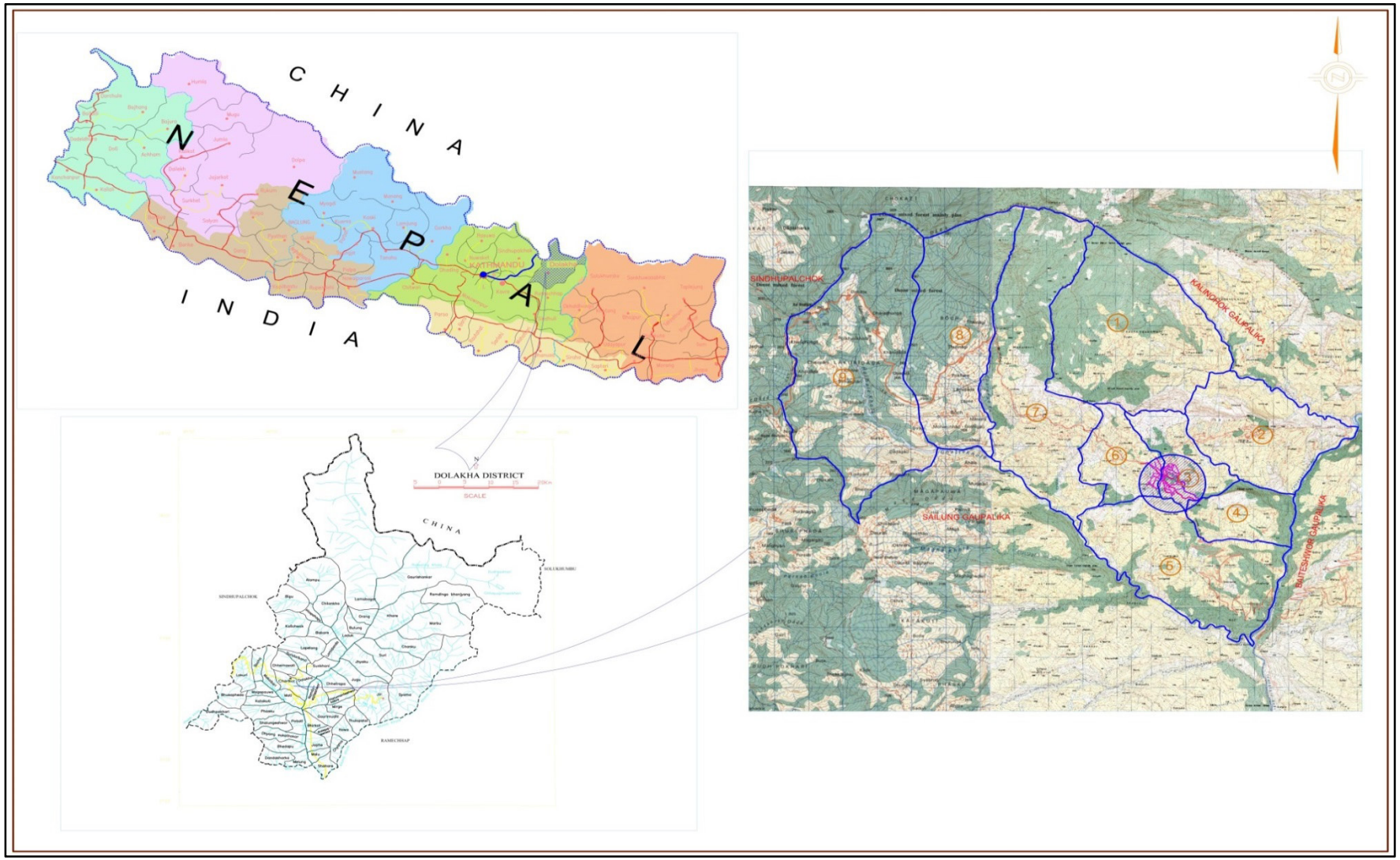

Figure I-I: Project Location Map

42. This new Bhimeshwore municipality was reformed on March 10, 2017 merging former VDCs namely Suspachhemawati, Boch, Lakuridanda and former Bhimeshwore municipality.

Table I-II: Bhimeshwore Municipality Ward Profile

Former VDC/Municipality	Former Ward No.	Wards of Reformed Bhimeshwore Municipality	Wards of Service Areas
Supuspachhemawati	1 to 9	1	Partial Areas of Wards 3, 4 & 6
Bhimeshwore Municipality	2 to 4	2	
Bhimeshwore Municipality	1	3	
Bhimeshwore Municipality	5 & 7	4	
Bhimeshwore Municipality	6, 8 & 9	5	
Bhimeshwore Municipality	10	6	
Bhimeshwore Municipality	11 to 13	7	
Boch VDC	1 to 9	8	
Lakuridanda VDC	1 to 9	9	

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

43. The above *Table I-II* shows that the reformed Bhimeshwore municipality has been divided into 9 wards. The current ward 1 of the municipality belongs to wards 1 to 9 of the former Supuspachhemawati VDC. Similarly, the current ward 2 belongs to wards 2 to 4, ward 3 belongs to ward 1, ward 4 belongs to former wards 5 & 7, ward 5 belongs to wards 6,8 & 9, ward 6 belongs to ward 10 and ward 7 belongs to ward 11 to 13 of former Bhimeshwore municipality. Likewise, the current wards 8 & 9 belong to wards 1 to 9 of former Boch VDC and Lakuridanda VDC respectively.

44. The Lamosanghu-Jiri road passes through the Bhimeshwor Municipality. Lamosanghu is located on the Arniko Highway (also referred as Kodari Rajmarga). The project area is approximately 139 km from Kathmandu. Regular local and express bus services are available from Kathmandu. The project area is in a hilly region.

45. The project town has a subtropical to a temperate climate and is heavily influenced by the monsoon (June-September) with an average annual rainfall of about 1710 mm.

E. Purpose of the IEE

46. The main purpose of IEE is to ensure the environmental sustainability of the project, to integrate environmental considerations into the project preparation process, and to manage environment during project implementation. All projects funded by ADB must comply with the Safeguard Policy Statement (SPS) 2009 to ensure that projects are environmentally sound, designed to operate in compliance with applicable regulatory requirements, and are not likely to cause significant environmental, health, or safety hazards. The rapid environmental assessment using ADB's REA Checklist and Scoping Checklist has indicated that the Subproject is a "Category B" undertaking, requiring an IEE. On the GoN side, the statutory requirement that has to be adhered is the Environment Protection Act (EPA) 2076 B.S. (2019 A.D.), and Environment Protection Rules (EPR) 2077 B.S. (2020 A.D.). Based on EPR Schedule 2 Pertaining to Rule 3, the

Subproject is within the threshold of activities under Clause I i.e., the solid waste management sector requiring an IEE. This IEE fulfills the policy requirements of both ADB and GoN.

47. The IEE Report primarily:

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

F. Need for the Project

48. Proper and effective management of septage has become the most important problem of the project town because of the compact settlement of core bazaar area. Majority of households in core area of Charikot (WN 1 & 10) and Old Dolakha Bazaar (WN 2, 3 & 4) do not have ample space to make proper septic tank. Most of them constructed septic tanks underneath the houses because of land constrain which make difficult access for inspecting and de-sludging. Similarly, the existing septic tanks are often undersized and poorly constructed.

49. People when refer to septic tanks, they mean seepage pits or cesspools, which are unlined earthen receptacles with poor performances in treating the sewer. Such designs serve as direct conduits to aquifers resulting in fecal contamination that can affect shallow groundwater. Theseproblemsneedtobeaddressedinaholisticmannerand correct remedial measures needto beproposed. Hence, the city wise Waste Water Treatment Plant (WWTP) is necessary to collect and treat the sewerage of the core area of the town.

G. Rationale of the Project and IEE

Rationale of the Project

50. The rationale of the project is based on the increasing demand of effective sewerage system, increased risk of seepage problems and prevailing difficulty in inspection and de-sludging of the existing septic tank.

Rationale of the IEE

51. The IEE study for the proposed project is needed to be carried out from the environmental point of view as per EPA 2076B.S.(2019 A.D.) and EPR 2077 B.S. (2020 A.D.) and as per ADB Safeguard Policy Statement (SPS), 2009. The proposed project falls within the definitions stated in Schedule 2 (Pertaining to Rule 3) - (Clause I) of EPR, 2077 B. S. (2020 A.D.) for solid waste management sector projects; only IEE is required.

52. The following given table gives the brief details on fulfillment of the criteria for the requirement of IEE as per *Schedule 2-Clause I* of Environmental Protection Regulations 2077 B.S. (2020 A.D.)

Table I-III: Criteria for Requirement of IEE for Drinking Water Supply Projects as per Schedule 2 (Clause I) of Environment Protection Regulation 2077 B.S. (2020 A.D.)

S.No.	Condition described in the Act and Regulations	Conditions in the Project
1	Operation up to 5MLD capacity of sewerage management project	Within the limit (The proposed waste water design discharge is 1.599 MLD.)
2	Operation of sewerage management and solid waste management with the objective to provide service up to 50,000 populations.	Within the limit (The project town has about 14,413design year populations.)

Source: EPR 2077 B.S. (2020 A.D.)

53. The Project does not involve the relocation and resettlement of people or households. The proposed project is intended to provide proper & effective sewerage facilities in core areas of ward number 3 & 6 of Bhimeshwore municipality. In addition, ward no. 4 will also be used for the construction of WWTP. The project is expected to benefit a population of about 8,555 populations of th survey year 2016A.D. & design year populations of 14,413 (2038) by providing a properly planned sewerage management system and promotion of good hygiene and sanitation practices.

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

54. The IEE study has followed the necessary policy, legal and administrative framework outlined in the approved ToR.

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

Constitution of Nepal

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

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

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

- Article 35 (4) of the constitution states that "Every citizen shall have the right of access to clean drinking water and sanitation".

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

Environmental Protection Act, 2076 B.S. (2019 A.D.)

57. The Parliament enacted the Environment Protection Act, 2076 B.S. (2019 A.D.) (the "**Act**") on July 19th, 2019. As a result, the earlier Environment Protection Act, 2053 B.S. (the "**1997, Act**") is now repealed.

58. One of the main features of the Act in contrast to the 1997 Act, is that it mandates several compliances to Project Developers while developing a Proposal of a Project, to ensure that the implementation of the Project does not harm the environment.

The 1997 Act, mandated a project developer to only comply with Initial Environment Examination and Environmental Impact Assessment. As per the present Act, a Project Developer needs to comply with the following compliances while developing a Project:

Environmental Study Report - is to be prepared prior to initiation of the Proposal, depending on the Proposal, and includes the following:

- Summary Environmental Study (environmental study report in short)
- Initial Environment Examination (examination of the possible impact on the environment and measures to mitigate it) or
- Environmental Impact Assessment (assessment of possible impact on the environment and solutions that can be opted)

59. This EPA:

- sets out the review and approval process of Environmental Study Reports, that involve informing and consulting stakeholders;

- stipulates that no one is to create pollution that would cause significant adverse impacts on the environment or harm to public life and health, or to generate pollution beyond the prescribed standards;
- specifies for the Ministry in charge of environment (currently the MoFE) to conduct inspection of approved projects to ensure that pollution prevention, control or mitigation is carried out according to the approved Environmental Study Report;
- provides for the protection of objects and places of national heritage and places with rare plants, wildlife and biological diversity; and
- states that any person/party affected by pollution or adverse environmental impact caused by anybody may apply to the prescribed authority for compensation to be recovered from the polluter/pollution generator.

Environmental Protection Rules, 2077 B.S. (2020A.D.)

60. The government has made public the Environment Protection Rules (EPR) 2077 B.S. (2020 A.D.) on 15 June, 2020. This EPR has also repealed EPR 2054 B.S. (1997 A.D.). The brief environmental study (BES) report is an addition in the EPR 2020.

61. Environmental Protection Rules (EPR), 2077 B.S. (2020 A.D.) defines the implementing rule and regulations of the IEE/EIA process, elaborating the provisions in the EPA, 2076 B.S. (2019 A.D.).

62. This EPR obliges the proponent to prepare ToR as per the format prescribed in Schedule 6, 7 & 8 for BES, IEE & EIA respectively.

63. The preparation, review and approval of IEE and EIA Reports are dealt with in Rules 3 to 9 and 12 to 13. Schedules 1, 2 & 3 list down the projects of activities that require BES, IEE and EIA, respectivelyand the proponent will proceed for preparing BES, IEE or EIA reportsas mentioned in EPR.

64. Other environmental policies, laws, rules, conventions & standards that provide general context in the environmental assessment of water supply & sanitation works are presented in the table given below:

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

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

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
		conservation and protection in donor-assisted development projects.	
National Urban Water Supply & Sanitation Sector Policy,	2065 B.S. (2009 A.D.)	The Policy requires the IEE or EIA of proposed WSS projects by the EPA/EPR to (i) incorporate consultations with key stakeholders, including endpoint users; & (ii) specify measures to mitigate environmental impacts before, during construction & operation, as well as corrective measures.	The IEE study will meet the provisions of this policy.
Updated 15-yr Development Plan for Small Towns Water Supply and Sanitation Sector	2066 B.S. (2009 A.D. and Amendments in 2015A.D.)	The Plan emphasizes monitoring and evaluation as an important component of a project to determine the overall impact of a project.	EMP prescribes performance monitoring & evaluation to minimize the anticipated environmental impacts.
Sanitation & Hygiene Master Plan	2068 B.S. (2011 A.D.)	• Its main goal is to achieve universal access to sanitation by 2017 A.D. Though it has been ended in 2017 A.D., several elements from the plan laid the groundwork for the sector.	This has been thoroughly reviewed.
National Water Supply & Sanitation Policy	2071 B.S. (2014 A.D.)	The Policy addresses the need in the protection of property and human health by providing storm water drains in densely populated urban centers.	The proposed project is solely committed to provide sanitation service through decentralized waste water treatment system in emerging towns like Charikot.
Land Acquisition, Rehabilitation and Resettlement Policy	2072 B.S. (2015 A.D.)	• Contribute to overall development of the nation and its citizens by creating a conducive environment for implementation of infrastructure development projects • Facilitate timely execution (completion) of development projects by minimizing adverse impacts on economic, social and cultural aspects of affected families/people and the project area • Improve social and economic status of project-affected families by providing fair and adequate compensation, appropriate resettlement and rehabilitation assistances/ allowances.	There is no issue of any kind of Land Acquisition, Rehabilitation and Resettlement in this project.
Land Use Policy	2072 B.S. (2015 A.D.)	• The strategy 3 of Policy 2 has taken into account to maintain a balance between physical infrastructure development and environment.	The proposed project will maintain balance between construction activities and

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
		• The strategy 3 of Policy 10 focusses on adoption of principle of sustainable development in view of the impact of climate change during any construction and/or development works in order to keep balance between land, environment and development.	environmental aspects of the project town.
Draft Nepal Water Supply, Sanitation and Hygiene Sector Development Plan (SDP) (2016-2030)A.D.	2073 B.S. (2016 A.D.)	• It establishes the progressive path to deliver pour-flush latrines with septic tanks or connected to sewers, while maintaining ODF status. The vision for future sanitation in Nepal is total sanitation in eco-villages and green cities, which entails that all wastes produced will be recycled, recovered and reused. • It also states that "The vision for the future will be to have: properly managed wastes; adequate and safe water supply and well-functioning sewerage system; pollution control and beautiful, clean and green cities and settlements,"	As this plan is fully focused on upgrading sanitation status in Nepal along with Water Supply & Hygiene sector, the proposed project must comply with this plan to sustain the project.
National Urban Development Strategy	2074 B.S. (2017 A.D.)	• This strategy assesses the existing conditions of infrastructures, environment, economy and governance establishes benchmarks and desirable standards. • It identifies prioritized strategic initiatives for investment in infrastructure and environment to realize the comparative advantages of urban areas.	The IEE study has duly followed this.
National Forest Policy	2075 B.S. (2019 A.D.)	It guides sub sectoral programmes relating to forests, plant resources, wildlife, biodiversity, medicinal plants, and soil and watershed conservation. It also covers periodic assessment and updating of information on forest resources of the country.	The proposed project activities must follow this policy.
National Land Policy	2075 B.S. (2019 A.D.)	• The vision of this policy is Sustainable Land Management for development and prosperity of life. • The goal of this policy is to bring qualitative changes in living standard of people and economic prosperity of the nation through judicial distribution, maximum use and good governance of land. • It (i)ensures the conservation of Land Tenure, Land Ownership and Land Right; (ii) Guarantees the right to	The IEE study has duly followed this policy.

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
		access to the land for citizens; (iii) Ensures the maximum use of land and management of land for environmental balance, food security, organized infrastructure development and safe living standard etc.	
Fifteenth Three Years Plan (2076/77-2080/81)	2076/77-2080/81	This plan also has separate provision for water supply & sanitation sector. Regarding this sector, this plan aims to ensure access to safe water supply & sanitation service and to enhance quality service. This plan has also its own strategy, working policy and expected positive outcomes through various development works in the field of water supply & sanitation service.	The successful implementation of the proposed project shall be the expected outcome of this plan.
Climate Change Policy	2076 B.S. (2019 A.D.)	This has various objectives that includes i) advancing capacity on CCA, ii) developing ecosystem resilience, iii) promoting green economy by adopting low carbon economic development concept, iv) mobilizing national and international financial resources, v) making effective the information service, vi) mainstreaming climate change into relevant policy, strategy, plan and programmes, and vii) also mainstreaming gender and social inclusion, including in climate change mitigation and adaptation programmes	This will be followed during project implementation as per requirement.
National Environmental Policy	2076 B.S. (2019 A.D.)	• This encourages the state to control pollution, manage wastes and promote greenery so as to ensure citizens' right to live in a fair and healthy environment. This was framed to guide the implementation of environment related laws and other thematic laws, realize international commitment and enable collaboration between all concerned government agencies and non-government organizations on environmental management actions. • The policy has entrusted the federal government with the responsibility for looking after national-level policy, law and standards related works for environmental protection and management.	This will be followed during the proposed project implementation phase.
b)Laws & Acts			

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
Aquatic Animal Protection Act	2017 B.S. (1961 A.D.) with Amendments (2055 B.S. (1997 A.D.))	This act renders punishment to any party introducing poisonous, noxious or explosive materials into a water source or destroying any dam, bridge or water system with the intent of catching or killing aquatic life. It also emphasizes that GoN empowers to prohibit catching, killing and harming of certain kinds of aquatic animals by notification in Nepal Gazette.	Information of this act will be delivered to the construction workers, as they may get involved in fishing during construction period.
Town Development Act	2045 B.S. (1988 A.D.)	This act has provision of services and facilities like road, transport, electricity, drainage, sanitation and open space based on density of such area.	This act has also been reviewed as the proposed project is solely for the provision of sanitation service through decentralized waste water treatment system.
Land Acquisition Act	2049 B.S. (1993 A.D.)	It guides the compulsory acquisition of land. It also describes that GoN can acquire land at any place and in any quantity by giving compensation pursuant to the act for the land acquired for any public purposes or for operation of any development project initiated by GoN.	There is no requirement of land acquisition of private land. All the land required are under the ownership of GoN.
Child Labor Prohibition and Regulation Act	2056 B.S. (2001 A.D.)	The section 3 of the Act prohibits a child from engaging in work, sub-clause 1 of the clause 3 states "Nobody shall engage in work a child who has not completed fourteen years of age as a labor and subclause 2 states "Nobody shall engage a child in a risk full occupation or work set forth in the Schedule". The section 4 states "Child not to be engaged in work against his will by temptation or fear or pressure or by any other means.	This provision has been stated in EMP.
Solid Waste Management Act	2068 B.S. (2011 A.D.)	Article 4 provides that the management of hazardous, medical, chemical or industrial waste rests upon the generators of such wastes. Management should be as prescribed in the Act. Article 5 provides that individuals and entities must reduce the amount of solid waste generated while carrying out work or business.	EMP prescribes eco-friendly management of solid and hazardous wastes.
Labor Act	2074 B.S. (2017 A.D.)	• This Act has provisions for the rights, interest, facilities and safety of workers and employees working in enterprises of various sectors. • This Act emphasizes on occupational health and safety	These provisions are stated in EMP.

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
		of workers and stipulates provision of necessary safety gears and adopting appropriate precautionary measures against potentially hazardous machine/equipment in the workplace. • It also specifies to arrange such as removal of waste accumulated during production process and prevention of dust, fume, vapor and other waste materials, which adversely affect the health of workers. • It specifies the provision of controlling the communicable diseases at the construction site. It also prohibits mobilization of child as a labor. It emphasizes on the provision of temporary camp, safe drinking water and necessary food supplies to the workers.	
Local Government Operation Act	2074 B.S. (2017 A.D.)	The Act gives Province Government the functions, duties & powers to: (i) entrust municipalities with responsibility of WSS services, (ii) conserve & protect their local environment & natural resources; (iii) plan, implement &/or operate & maintain WS projects at local level; (iv) implement or arrange for implementation local sanitation/sewerage & drainage projects; (v) protect cultural heritage & religious sites; &/or (vi) monitor project activities within their respective jurisdictions.	Provides a basis for Local Government to monitor the environmental performance of the projects. EMP provides the responsibilities of LGs in EMP implementation.
Public Health Service Act	2075 B.S. (2018 A.D.)	• As per Chapter 5 of this act in regard to Sanitation & Waste Management, it states that "The Government of Nepal may, in order to control or cause to be controlled the adverse effect to the human health by environmental pollution and waste, make necessary standards in accordance with the prevailing Federal law."	The IEE study has duly reviewed this act.
Forest Act	2076 B.S. (2019 A.D.)	• The Act facilitates (i) to manage the national forest in the form of Government Managed Forest, Forest Protection Zone, Community Forest, Partnership Forest, Lease-hold Forest & Religious Forest and (ii) to contribute for national prosperity by conserving, promoting and utilizing the wild life, environment, watersheds and bio-diversity, while promoting the private, public and urban forest.	• The WWTP proposed for Jilu system requires to occupy some portion of land of Shree Gaude Community Forest. Hence, this act has been reviewed thoroughly for the IEE study of this project. • This project is also national

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
		• Chapter 12 of this act has provisions related to development projects. It states in regard to the use of forest area that "Notwithstanding anything contained elsewhere in this Act, if there is no other alternative to the using of forest area for the operation of a national priority project, plan of which investment is approved by the Investment Board, project of national pride and it appears from the environment examination referred to in the prevailing law that the operation of such plan does not result in significant adverse effects on the environment, the Government of Nepal may give approval, as prescribed, to use any part of the national forest for the purpose of operating such plan. • It also states that "If there is no other alternative to the using of forest area for the operation of any development project by the Province or and it appears from the environment examination referred to in the prevailing law that the operation of such plan does not result in significant adverse effects on the environment, it may request the Government of Nepal for acquisition of the land in such forest area for the operation of that project.	priority project and acquisition of land of community forest does not seem to affect the environment significantly. Hence, the approval for the use of forest area for the construction of the project has been granted by the community forests user's group.
Land Use Act	2076 B.S. (2019 A.D.)	The main aim of the act is to ensure that land is properly used and managed and that land set aside for one purpose is not used for other. The act has assigned the responsibility for implementing the act to not only the federal government but also to the provincial and local governments.	Information on this act is necessary for this project to avoid misuse of land for the construction of project components. However, as this project requires RoW of the public road for the proposed components, land misuse May not be a serious issue.
c)Rules & Regulations			
Solid Waste (Management & Resource Mobilization), Rules	2044 B.S. (1987 A.D.) & Amendments 2049 B.S. (1992A.D.)	• This act focusses on the management of solid waste and mobilization of resources related. • These also ensure the health convenience of the common people by controlling the adverse impact on pollution	• This act needs to be reviewed during construction phase. • EMP covers the requirement of this rule for the proposed

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
		from solid waste.	project.
Forest Regulations	2051 B.S. (1995 A.D.)	• This has separate provision for the protection of Community Forest along with the duties & responsibilities of Community Forest User's Group.	The proposed WWWTP for Gairbari Outlet requires the land of the Shree Gaude Community Forests. The IEE study has considered this forest regulation assuring the protection of this Community Forest.
Solid Waste Management Rules	2070 B.S. (2013 A.D.)	• GoN has issued these rules by exercising the power conferred by the section 50 of the Solid Waste Management Act, 2068. • Section 3 of this rule focuses on Segregation & management of solid wastes.	EMP for this proposed project covers this matter focused by this rule.
Labor Rules	2075 B.S. (2018 A.D.)	• GoN has issued these rules by exercising the power conferred to it under the section 184 of the Labor Act, 2074 • Section 7 of these rules deals with Occupational Safety & Health Policy.	EMP for this proposed project covers this matter focused by this rule.
d)Directives, Guidelines, Framework & Manuals			
National EIA Guidelines	2049 B.S. (1993 A.D.)	This guidelines aims to assess the environmental impacts likely to be caused by a project, and promote its positive impacts and mitigate or eliminate adverse impacts by undertaking preventive and other effective measures after integrating the environmental impacts in the planning cycle of all the projects to be initiated in Nepal, prior to their initiation, so as to make the economic benefits from development projects sustainable.	This has been followed for evaluation of the anticipated environmental impacts.
Guidelines for Community Noise by WHO	2055 B.S. (1999 A.D.)	It provides basis for global standards in noise quality at community level that are designed to offer guidance in reducing the health impacts of noise pollution.	During noise quality monitoring, this guideline will be followed.
WHO Air Quality Guidelines, Global Update	2061 B.S. (2005 A.D.)	It provides basis for global standards in air quality that are designed to offer guidance in reducing the health impacts of air pollution.	During air quality monitoring, this guideline will be followed.

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
National Noise Standard Guidelines	2068 B.S. (2012 A.D.)	It provides basis for national standards in noise quality that are designed to offer guidance in reducing the health impacts of noise pollution.	During noise quality monitoring, this guideline will be followed.
Environment Friendly Local Governance Framework	2070 B.S. (2013 A.D.)	• This has been issued to add value to the environment friendly local development concept encouraging environmental protection through local bodies. • One of its expected results is to bring improvement in the field of environment protection, waste management, climate change adaptation and disaster management throughout the nation.	This needs to be followed during project design, construction and operation period.
WHO Guidelines for Drinking-water Quality, Fourth Edition	2073 B.S. (2017 A.D.	It provides the recommendation of WHO for managing the risk from hazards that may compromise the safety of drinking water.	During water quality monitoring, this guideline will be considered and followed
Institutional and Regulatory Framework for Faecal Sludge Management in Urban Areas of Nepal	2074 B.S. (2017 A.D.)	• The issuance of this framework has made Nepal, the first country in South Asia to have countrywide FSM framework. This is the greatest achievement for Nepal in the sanitation sector. • The framework establishes that the primary responsibility for FSM lies with local institutional bodies, including municipality and village development committees. • The framework references tolerance limits and standards of effluent discharge as established by the former Ministry of Population and Environment.	• This framework aims to improve planning, implementation, monitoring and regulation of faecal sludge management for the septic tank system. However, the proposed project is based on the sewerage system i.e., piped network system. • But, this framework can be taken as reference for the dried sludge management by the municipality after the completion of treatment and drying of the sludge.
Total Sanitation Guidelines	2073 B.S. (2017 A.D.)	• It streamlines and ensures efficiency of sanitation and hygiene programming. • It is based on Hygiene & Sanitation Master Plan and Environmental Friendly Local Governance Framework (2013). • It is developed for the use of government agencies, local bodies, development partners and other WASH	This has been followed during design and shall be followed during construction & operation phase also.

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
		stakeholders to better implement sanitation programmes following total stages of development. • One of its main objectives is to ensure either the reuse of solid waste & waste water or to dispose them on the basis of standards prescribed.	
Working procedure for the use of national forest for national priority projects	2076 B.S. (2019 A.D.)	• It emphasizes on the management regarding the use of national /community forests for the implementation of national priority project. • It also states that the approval from the concerned ministry is necessary before the approval of IEE report if there is requirement of use of national forest for any development projects.	• As per forest act 2076 B.S., the provisions relating to the community forest states that the division forest officer hand over the rights of the community forest to the user's group. Hence, Approval from the community forest user's group has already been granted.

Source:IEE Study, 2020

B. Environmental Agreements

International Environmental Agreements

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

(i) Convention on Biological Diversity (CBD), 1992 A.D.

(ii) The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) 1973 A.D.

(iii) International Covenant on Economic, Social and Cultural Rights (ICESCR), 1976 A.D.

(iv) Worst Forms of Child Labour Convention, 1999 A.D.

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

67. The Charikot Sewerage (DEWATS) Project does not and will not break or go against Nepal's commitment to these international agreements.

C. Environmental Standards

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

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

Table II-II: Relevant Environmental Quality Standards

Particular	National Standard	International Standard
Treated Waste Water	Discharge Standard for Treated Waste water of Nepal	
Waste Water	Tolerance Limits for wastewater to be discharged into inland surface waters from combined wastewater treatment plant (generic standards)	

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

Source:IEE Study, 2020

69. As shown in the above table, National Ambient Air Quality Standards, for Nepal, 2003 is enforced by GoN that has set quality standards for seven parameters TSP, PM10, Sulphur Dioxide (SO2), Nitrogen Oxide (NO2), Carbon Mono-oxide (CO), Lead (Pb) and Benzene at national level. Similarly, WHO Air Quality Guidelines, Global Update, 2005 enforced by WHO has set quality standards for four parameters PM10, PM2.5, SO2 and NO2 at international level. Both standards provide guidelines to follow and comply the set standards for the ambient air quality during construction period. The acceptable level criteria for ambient air quality as per both standards are given below:

Table II-III: Standards for Ambient Air Quality

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

Source:

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

70. Similarly, *National Noise Standard Guidelines, 2012 has* set the standard noise levels measured in dBAfor Industrial area, Commercial Area, Rural Residential Area, Urban Residential Area, Mixed Residential Area and Quiet Area. This also has provision of standard values for the noise level generated by Water Pumps and Diesel Generator also. This is limited within the country only. For international level, *WHO Noise Level Guidelines*has set the standard noise levels measured in dBA for two areas that includes

residential and commercial areas. The standard values for ambient noise quality are given in the table given below:

Table II-IV: Standards for Ambient Noise Quality

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

* Guidelines for Community Noise, WHO, 1999.

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

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

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

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

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

Note: This standard is equivalent to Bharat III standards.

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

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

Note: This standard is equivalent to Bharat II standards.

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

*b) kW= Power Factor * kW*

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

Source: Diesel Power Generation, 2014 by the World Bank

72. The wastewater treatment plant should comply the effluent standard as shown in the table given below:

Table II-VI: Tolerance Limits for wastewater to be discharged into inland surface waters from combined wastewater treatment plant (generic standards)

गुणहरु (Characteristics)	घटि बढी सीमा (Tolerance limit)
Total Suspended solids, mg/L, Max	50
Particle size of total suspended particles	Shall pass 850-micron Sieve.
pH	5.5 to 9.0
Temperature	Shall not exceed 40 degree C in any section of the stream within 15 meters down-stream from the effluent outlet.
Biochemical oxygen demand (BOD) for 5 days at 20 degree C, mg/L, Max	50
Oils and grease, mg/L, Max	10
Phenolic compounds, mg/L, Max	1.0
Cyanides (as CN), mg/L, Max	0.2
Sulphides (as S), mg/L, Max	2.0
Radioactive materials: a. Alpha emitters, c/ml, Max b. Beta emitters, c/ml, Max	 10^{-7} 10^{-8}
Insecticides	Absent
Total residual chlorine, mg/L	1
Fluorides (as F), mg/L, Max	2.0
Arsenic (as As), mg/L, Max	0.2
Cadmium (as, Cd), mg/L, Max	2.0
Hexavalent chromium (as Cr), mg/L, Max	0.1
Copper (as Cu), mg/L, Max	3.0
Lead (as Pb), mg/L, Max	0.1
Mercury (as Hg), mg/L, Max	0.01
Nickel (as Ni), mg/L, Max	3.0
Selenium (as Se), mg/L, Max	0.05
Zinc (as Zn), mg/L, Max	5
Ammonical nitrogen, mg/L, Max	50
Chemical Oxygen Demand, mg/L, Max	250
Silver, mg/L, Max	0.1

Source: New Collection of Environmental Standards,MoFE, 2018

D. Environmental Assessment Requirements

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

i. Environmental Assessment Requirements of ADB

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

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

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

Table II-VII: SPS 2009 Safeguard Requirements

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

SPS 2009 - Safeguard Requirements	Remarks
and disclose monitoring reports.	
Do not implement project activities in areas of critical habitats, unless (i) there are no measurable adverse impacts on the critical habitat that could impair its ability to function, (ii) there is no reduction in the population of any recognized endangered or critically endangered species, and (iii) any lesser impacts are mitigated. If a project is located within a legally protected area, implement additional programs to promote and enhance the conservation aims of the protected area. In an area of natural habitats, there must be no significant conversion or degradation, unless (i) alternatives are not available, (ii) the overall benefits from the project substantially outweigh the environmental costs, and (iii) any conversion or degradation is appropriately mitigated. Use a precautionary approach to the use, development, and management of renewable natural resources.	• The subproject does not encroach into areas of critical habitats. • However, the WWTP for Jilu system requires 3209.31sq. m area of Shree Gaude Community forest for which around 25 trees have been observed to be cut down to clear the area for the construction. • EPR 2077 B.S. (2020 A.D.) recommends compensatory plantation in the ratio 1:10 for every felled tree. EMP provides this provision of EPR as mitigation measures for the execution of tree felling process.
Apply pollution prevention and control technologies and practices consistent with international good practices as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health, and Safety Guidelines. Adopt cleaner production processes and good energy efficiency practices. Avoid pollution, or, when avoidance is not possible, minimize or control the intensity or load of pollutant emissions and discharges, including direct and indirect greenhouse gases emissions, waste generation, and release of hazardous materials from their production, transportation, handling, and storage. Avoid the use of hazardous materials subject to international bans or phase-outs. Purchase, use, and manage pesticides based on integrated pest management approaches and reduce reliance on synthetic chemical pesticides.	This requirement is marginally applicable to the project regarding waste generation. The project will not involve hazardous materials subject to international bans or phase-outs.
Provide workers with safe and healthy working conditions and prevent accidents, injuries, and disease. Establish preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks to the health and safety of local communities.	EMP provides measures to mitigate health and safety hazards during construction and operation.
Conserve physical, cultural resources and avoid destroying or damaging them by using field-based surveys that employ qualified and experienced experts during the environmental assessment. Provide for the use of "chance find" procedures that include a pre-approved management and conservation approach for materials that may be d0iscovered during project implementation.	The project will not affect any physical, cultural resource. The EMP recommends the measure/s mitigate the adverse impact on PCRs in the case of the chance find.

Source: ADB, SPS, 2009

ii. Environmental Assessment Requirements of Nepal

76. The Environmental Protection Rules (EPR, 2077 B.S. (2020 A.D.)) defines the process that should be followed in the preparation, review, and approval of environmental assessment reports. The process applicable to this project is summarized in ***Table II-VIII***.

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

Steps in the Process	Remarks
Proponent refers to EPR Schedules 2&3 for the required environmental assessment (IEE or EIA) to carry out.	The project requires an IEE.
If a proposed project requires an IEE, the proponent prepares an IEE schedule of work/ToR as per Rule 5 of Chapter 2, using the format prescribed in Schedule 7 of the EPR and submits this to the CSA for approval.	ToR has already been prepared and submitted to MoWS accordingly.
The proponent carries out public hearing program followed by information delivery in regard to this program via local newspapers, radio & other forms of communications as well as pasting of public notice at the premises of the concerned local authorities as per Rule 6 of Chapter 2,at the project impact area in regard to deliver the information on the project implementation in the presence of local groups, community forest user's groups as well as local representatives and collects review/suggestions accordingly.	
Proponent carries out IEE according to the approved work schedule/ToR and prepares an IEE Report as per Rule 8 of Chapter 2, following the format prescribed in EPR Schedule 11 and incorporating stakeholders' feedback applying the consultation procedure specified in the EPR.	The project carried out the IEE and prepared the IEE Report accordingly.
During the preparation of IEE report, 7 days public notice should be pasted at the concerned local authorities as per the format given in Schedule 9 and accordingly, this public notice must be published in any local newspaper for the sake of information delivery in regard to the project implementation.	
Proponent submits IEE Report along with the project proposal and recommendation of the concerned town or town to the CSA.	The project submits documents accordingly for review and approval.
CSA conducts review and grants approval of IEE Report.	The approval of IEE Report will be taken from the concerned ministry
If the review reveals project implementation to have no substantial adverse impact on the environment, CSA grants approval within 15 days of receipt of the report as per Sub Rule 8 of Rule 9 of Chapter 2.	
If the review reveals the necessity to carry out an EIA, Proponent conducts an EIA following the prescribed EIA process.	The IEE study shows that there is no requirement of EIA. IEE is sufficient for the project.
Proponent implements approved IEE Report and any terms and conditions given the approval.	The project has not started implementation.
CSA monitors and evaluates the impact of project implementation. When necessary, issue directives to the Proponent to institute environmental protection measures.	The project has not started implementation.
MoFE conducts the environmental audit after two years of project commissioning/operation.	The project has not started implementation.

Source: EPR, 2077 B.S. (2020 A.D.)

III. METHODOLOGY

77. The IEE study was carried out in accordance with the requirements of the ADB's Safeguard Policy Statement (SPS 2009) and environmental legal requirements of GoN i.e., EPA2076 B.S. (2019 A.D.) and EPR 2077 B.S. (2020 A.D.). The IEE study was conducted through preliminary exercise to solicit information from the planners, policy makers, concerned authorities, WUSC and the relevant stakeholders. This involves walkthrough survey, desk study, field visits and impact identification & evaluation. For this, the stepwise processes to undertake these activities are as follows:

A. Literature Review/ Desk Study

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

B. Impact Area Delineation

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

80. *Core Area:* The Core Area indicates the area required permanently as well as temporarily for the proposed project. This area refers to the service area as well the area where the construction of the project components will be carried out and has the highest magnitude impact from the proposed project activities. Hence, here, regarding this proposed project, this core area includes the service area of the proposed project which comprises partial areas of wards 3, 4 & 6 of Bhimeswore Municipality.

81. *Surrounding Area:* Here, the Surrounding Area indicates the area within the immediate surroundings of the core area of proposed project. It includes the area of the project town which is closely associated with the core area of the project and has spill-over effects of those effects that occur within the core area. This has low to medium magnitude impact from the proposed project activities.Hence, here in this proposed project, the surrounding area covers partial areas of wards 3, 4 & 6 that are not covered under the service area and other adjoining wards of the service area that includes wards 1, 2 & 5.

C. Field Study

82. Field studies were carried out in the project site areas in an extensive manner by a multidisciplinary team comprising a) an Environmental Specialist; b) Water Supply & Sanitation Engineer; c) Sociologist; d) Geo-hydrologist and e) Botanist. During the visit, baseline information on physico-chemical, biological, and socio-economic & cultural conditions of the core area and surrounding areas of the project area were collected through simple checklist method and Survey Questionnaire method. During field study, Rapid Environmental Assessment (REA) Checklist (***Refer Appendix1***) as recommended by ADB as per SPS, 2009 will be duly followed and filled up. This checklist primarily includes the data regarding physico-chemical, biological, socio-economic & cultural environment. Various approaches and methodological tools that were used for the data collection of various environmental aspects during this field study are described below:

a) Physico-Chemical Environment

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

b) Biological Environment

84. The baseline information regarding biological environment were collected through walkthrough survey throughout the core & surrounding areas of the project area by adopting simple checklist method (***Refer Appendix5***), through professional judgment and local interaction. Under this baseline information in regard to the biological environment, types of vegetation and forests were identified based on the species composition. The protected vegetation (rare, endangered, indigenous, etc.) of the project area as per IUCN Red Book, CITES Appendices, IBAT Report generated by ADB and GoN list species were enumerated based on consultation with the local people and the expert judgment.

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

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

c) Socio-economic & Cultural Environment

87. Household surveys were conducted through interviews by simple questionnaire method to obtain information on the socio-economic & cultural environment that primarily

includes demography, ethnicity, education, health & sanitation, drinking water condition of the project area, irrigation facility, local traditions, religions, land use patterns, incomes & expenditures and to acquire their perception towards the proposed project, etc. Information on Migratory patterns of the local people and the Impact of river on settlements & agriculture was also collected. Information on the people residing within the core area of the proposed project town was collected through socio-economic survey. The sample of Household Survey Questionnaire that should be filled up during household survey has been included in ***Appendix 5***.

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

D. Stakeholder & Public Consultation

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

E. Impact Identification, Prediction & Evaluation Methods

90. The information regarding Physico-chemical, Biological and Socio-economic & Cultural aspects as mentioned above were collected to identify the susceptibility of these aspects to be affected by the proposed project activities. This help to identify the anticipated environmental impacts of the proposed project. For this, Simple Checklist method was adopted for the impact identification. This was carried out by using Rapid Environmental Assessment (REA) Checklist prepared by ADB (***Refer Appendix 1***) and by using simple household survey questionnaire (***Refer Appendix 5***) prepared during the desk study. These checklists explainedabout the environmental features or factors that need to be addressed while identifying the impacts of projects and activities.

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

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

93. Impact predictions are generally made against a baseline established by the existing environment. Hence, during our field study, the baseline data was used as reference point against which the characteristics and parameters of impact related changes

were analyzed. Impact predictions were also made by considering the future state of the environment. This also requires professional judgment for accuracy.

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

Table III-I: Scoring of Impacts

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

Source: National EIA Guidelines 1993

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

Table III-II: Significance of Impacts

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

Source: National EIA Guidelines 1993

96. This evaluation will be done as per the professional judgment by the key expert team involved in the IEE study.

IV. DESCRIPTION OF THE PROJECT

A. ServiceArea

97. The proposed service area of the proposed project covers core area of Charikot Bazaar. This consists of partial areas of core areas of ward number 3 and 6 of Bhimeshwore municipality. Thisservice area has been delineated in consultation with WUSC and the local community. In addition, the project also coversward no. 4 of the project town wherethe WWTPs have been proposed to be constructed.

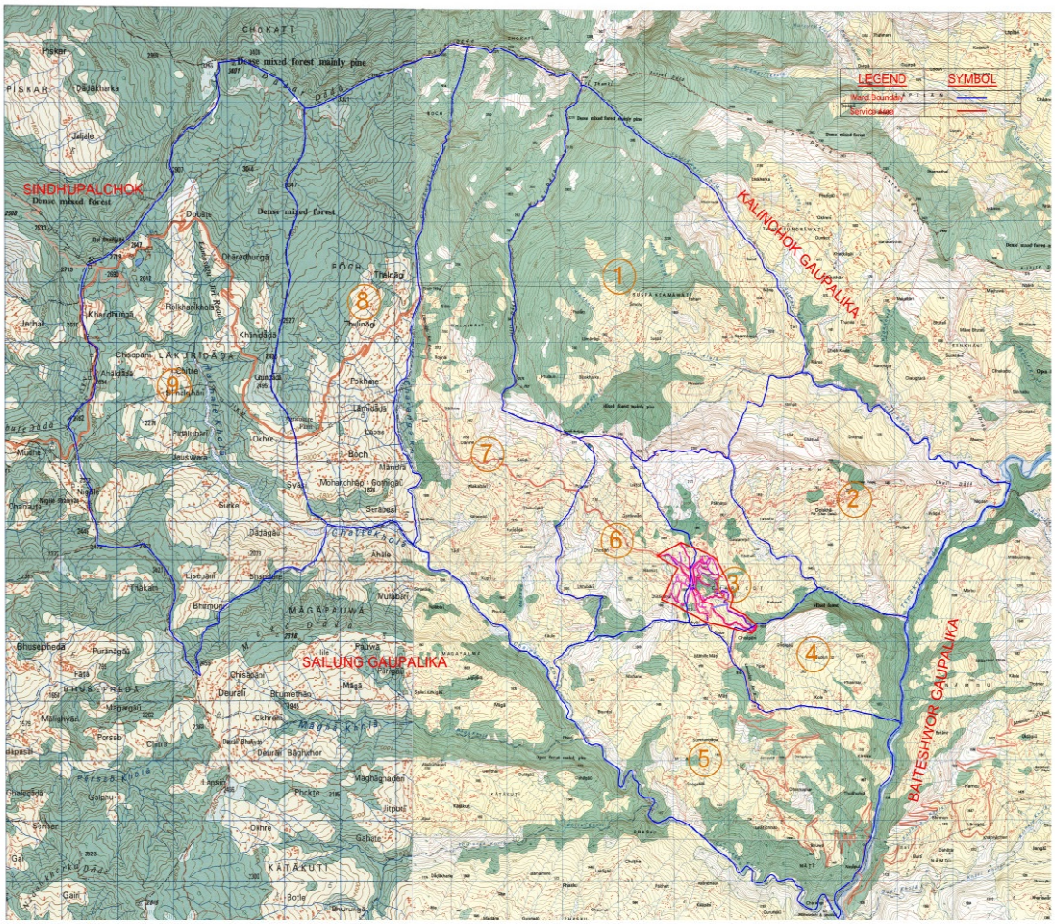

Figure IV-I: Proposed Service Area

B. Project Components

98. The proposed project is a completely new system as there is no existing sewerage system at all. This project has been conceptualized as Decentralized Waste Water Treatment System (DEWATS). This type of system generally convey, treat and dispose or reuse wastewater from small communities, buildings and dwellings in remote areas, individual public or private properties. In this type of system, the treatment and disposal system is carried out in relatively close vicinity to its source of generation. The proposed

system is a totally gravity system. Hence, there is no requirement of pumping due to which the operating cost will be also low.

99. DEWATS application is based on the principle of low-maintenance since most important part of the system works without technical energy inputs. It is used when the humane waste is transported through sewer line and includes grey water and storm water as well. DEWATS compliment conventional treatment system for more suitable and effective service, also provide treatment of both domestic and industrial sources. Whereas, it's application are reliable, long lasting and tolerant towards inflow fluctuation.

100. The major project components of this proposed project will be as follows:

a) Sewer Lines

i. Sewer Line at Shantinagar Area for Gairabari WWTP

101. This line starts from the down side of Lamosangu – Jiri road upto Satdobato i.e., starting point 8, 9,17. This system covers the design population population 1959 in 364 HHs carryout the design discharge 2.8lps. The WWTP is located at Gairabari. The sewer of this area cannot go to Jilu WWTP site.

ii. Line # 83-82-81(DD#1)

102. This line starts from old Charikot bazaar and runs along old trail route to Chaisapani / Dandagaon. In addition to cater main bazaar (old and new), other secondary drain also serve army barrack of Gairiswanra. The end designed discharge is 3.10 lps.

iii. Line #90-89-81 (DD#2)

103. This line starts from Lamosangu – Jiri Road and upstream settlement, Charighyang to Satdobato and downstream sloping the towards WWTP-2 (Jilu/ Gaude) site. From Satdobato Chowk the sewer line runs along the Lamosangu-Jiri road. This line passes through the bus-park area and then diverts and runs along the Upper Tamakoshi Road. This line finally joins Line# DD-1 at point (81) near treatment plant inlet. The end designed discharge served by this line only is 13.70 lps. As the last stretched passes from valley section, the depth of the drain is more.

104. Bottlenecks of the sewer lines would be with other infrastructure services such as storm water drain lines and telephone cable ducts at various locations. In order to avoid such bottlenecks, the crown of the sewer line should be laid below these interfering infrastructure lines.

b) Manholes & Sewer Inlet Chamber

105. Circular brick masonry manholes with CI cover has been proposed which will have inside plaster to prevent the leakage and provide smooth flow. Depending upon the size of sewer average 1.0 -1.5 m internal dia. and average 1.75m - 2.5m high manholes of brick masonry has been proposed based on designed flow. The RCC rectangular manhole is designed for a depth more than 2.5m upto 4.5m. The spacing of manhole will be kept (30-40) m apart, at each drop and each road junction. The two HH connection chamber has been provisioned at each side of road of each Manhole, depending upon the site requirement. There will be 4 to 6 household sewer connection arrangements at each chamber. There will be one or two chamber on either side of the manhole depending upon the household. These two to four chambers will be connected to the manhole to receive the

household sewer. The pipe HDPE of 200mm and 160mm dia will be connected from each collection chamber to the manhole. This arrangement will decrease frequent road cutting to connect the household sewerage in to the manhole.

106. Brick masonry/ RCC inlets chamber are proposed which will have plaster inside to prevent the leakage. Rectangular brick masonry sanitary sewerage inlet box with RCC cover slab on top are proposed. This chamber will receive house sewerage and allow to main sewer. There will be 4 to 6 house sewer pipe connection hole in the chamber. Individual house shall connect the sewer pipe in the chamber at the own cost and make leak free from the joints.

c) Sewer Connection Chamber

107. In some areas, the depth of manhole appears to be more than (4.5 to 5)m. It would be difficult to construct the manhole for such greater depths. To overcome such difficulties, two RCC Sewer Connection Chambers will be constructed at the top & bottom respectively and HDPE pipe will be connected in between these two chambers. Here, Hume pipe cannot be used because it cannot be retained at its position due to weight and ground slope.

d) Wastewater Treatment Plant (WWTP)

108. The study shows that there is no sewerage system in the project area. Wastewater from individuals HHs is managed inside the house. The socio economic survey conducted in 2016 shows that 96% HHs have their own toilet. Some of them have constructed septic tanks and some have directly connected with surface drains. There is no wastewater treatment plant in the Municipality to treat domestic sewage/septage.

109. Similarly, during the study, the sampling process has been carried out at the Gairabari & Jilu Danda WWTP Area to assess the quality of waste water. The test report of the representative samples has been attached in *Appendix 6*. As per the test report, the important physical parameters like pH for Gairabari & Jilu Danda outlet is found to be 6.59 &6.46 respectively.Similarly, the value for the temperature of the samples taken from Gairabari & Jilu Danda outlet are found to be 18.59°C& 18.51°C respectively that are within the prescribed tolerance limit i.e., (5.5 to 9.0) for pH and Not exceeding 40°C for Temperature. Similarly, E-coli as biological parameter is found to be $3*10^4$ CFU/mL and $5*10^4$ CFU/mL in the samples taken from Gairabari Outlet Area & Jilu Danda Outlet area. Likewise, the major chemical parameters from these two samples as mentioned below are also compared with the Tolerance limits;

Table IV-I: Chemical Parameters of Representative Sample in Comparison to the Tolerance Limit

S. No.	Chemical Parameters	Test Results		Tolerance Limit
		Gairabari	Jilu Danda	
1.	Biological Oxygen Demand (BOD) for 5 days at 20°C, mg/L, Max	293	427	50
2.	Chemical Oxygen Demand (COD) ,mg/L, Max	446	560	250
3.	Total Suspended Solids (TSS), mg/L, Max	152	330	50

Source: IEE Study, 2020

110. The above given table shows that the values for BOD_5, COD & TSS exceeds the tolerance limit set by MoFE. Higher values of BOD & COD reduce dissolved oxygen (DO) level leading to anaerobic conditions. If such waste water gets dischsrged to the water bodies, this can result in stress on aquatic lives, making the environment unsuitable for life. Similarly, higher value of TSS means higher concentration of bacteria, nutrients, pesticides & metals. This can cause many problems for the aquatic lives as high TSS blocks the light from reaching the submerged vegetation. This also causes an increase in surface water temperature leading to the reduction in the level of DO. This indicates the requirement of DEWATS to balance the waste water quality. Hence, in regard to this, the DEWATS has been proposed.

111. Here, the outlet of the sewerage system will be the inlet of the WWTP. In total, there are 2 WWTPsproposed for theproject. The first one is Gairawari WWTPAccordingly, this WWTP that has been designed will receive 2.8 lps sewerage flow.

112. The second WWTP of the proposed projet is Jilu WWTP that has two inlets to treat the total sewerage flow of 16.8 lps.

113. Generally, DEWATS comprises the three components that are as follows:

i. Primary Treatment Units

114. Primary treatment units are the components that remove floating materials, heavy settleable inorganic solids and fats from the wastewater. They are also referred as the physical unit operations. The unit operations used are screening for removing floating papers, rages, cloths, plastics, cans stoppers, labels, etc.; Grit Chambers or Cyclone tanks for removing grit and sand; skimming tanks for removing oils and grease; and settlers for removal of residual settle able suspended matter.Hence, this can reduce the increased value of total suspended solids by getting large solids out. Here, settlers as Primary treatment units can also reduce COD to certain extent. Primary treatment units can also reduce BOD by (20 to 30)%and suspended solids up to 60%. The primary treatment phase retains all settable solids and allows only dissolved solids to discharge to next treatment phase.

ii. Secondary Treatment Units

115. Secondary treatment uses biological processes to catch the dissolved organic matter missed in primary treatment. Microbes consume the organic matter as food, converting it to carbon dioxide, water, energy, and cell tissue. While secondary treatment technologies vary, from the conventional treatment units, to constructed wetland systems, the final phase of each involves an additional settling process to remove more suspended solids. The primary objective of the secondary treatment units is to convert the dissolved and colloidal organic matter present in sewage to biological cell tissues and to end products. Secondary treatment can be achieved by applying aerobic, Anaerobic, Anoxic, and facultative Processes. DEWATS normally use anaerobic process in the secondary treatment units as this process does not require energy input. Anaerobic Baffle Reactors, Anaerobic filters, Trickling filters, and contact beds are the examples of the secondary treatment units. Secondary treatment can remove up to 85 percent of BOD and total suspended solids.

iii. Tertiary Treatment Units

116. Tertiary and/or advanced wastewater treatment is employed when specific wastewater constituents which cannot be removed by secondary treatment must be removed. Tertiary treatment processes are necessary to remove nitrogen, phosphorus, additional suspended solids, refractory organics, and heavy metals and dissolved solids. The main purpose of the tertiary treatment is to ensure that the treated water which is to be released on to the environment is biologically accepted by all other fresh water organisms such as weeds and algae. In DEWATS, Normally, Constructed Wetlands and polishing ponds are used as tertiary treatment units. In the design for this project, the Horizontal Flow Constructed Wetland (HFCW) followed by Polishing Pond (PP) are provisioned as Tertiary Treatment Units.

117. The arrangement of this treatment system is shown below:

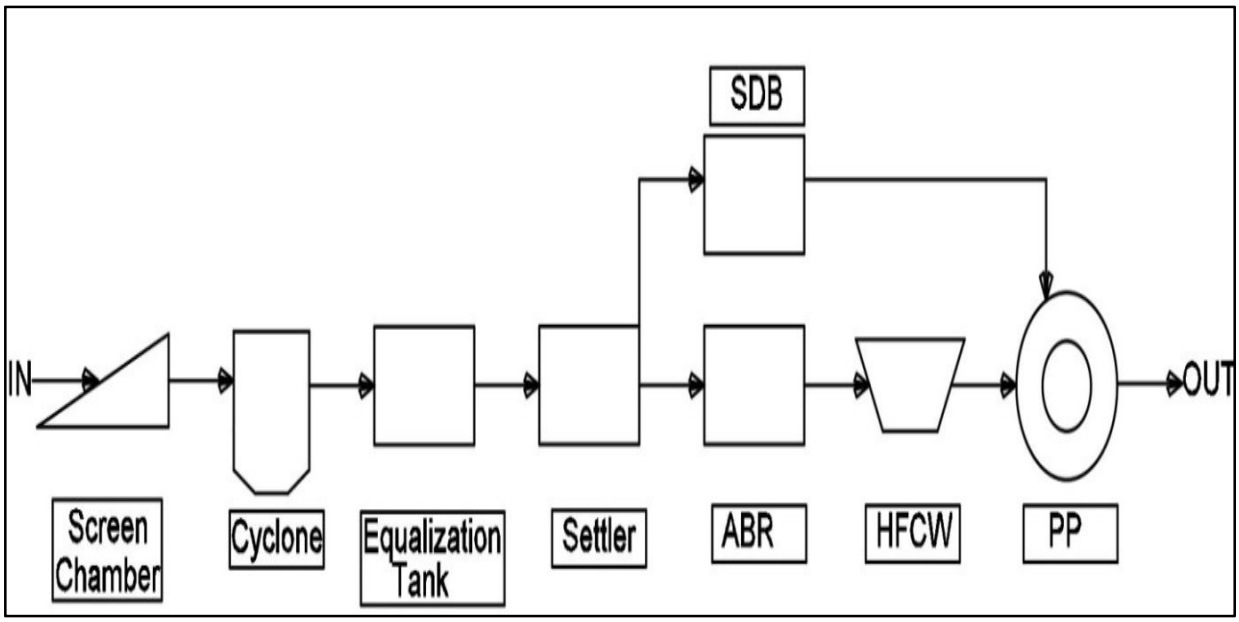

Figure IV-II: Treatment System

System Configuration

118. DEWATS are modular treatment systems, configured from several possible treatment modules according to the wastewater characteristics, treatment requirements and local conditions. The system configuration for the proposed DEWAT is as shown in figure below:

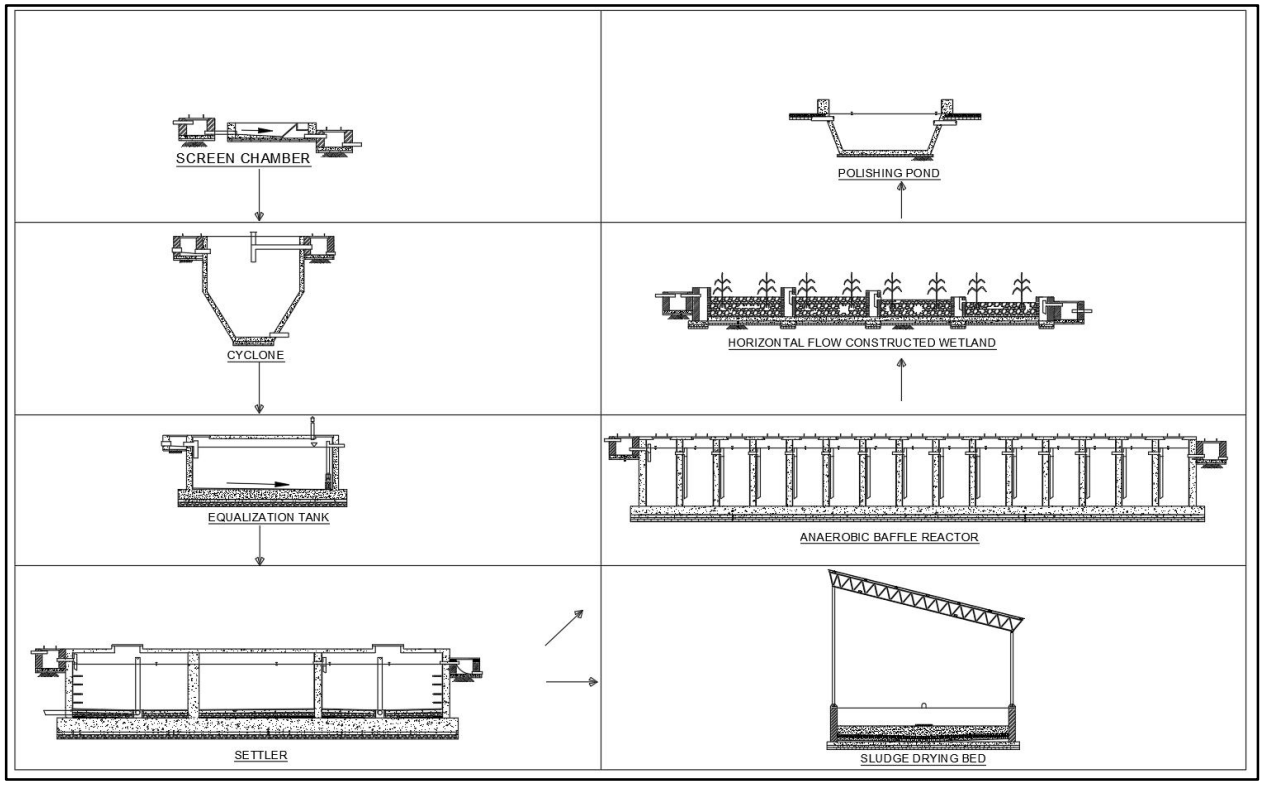

Figure IV-III: DEWATS System Configuration

119. The configuration stats from the bar screen to remove floating objects from the wastewater. The liquid from the screen moves towards hydro cyclone where grits are removed by using vortex and sedimentation technique. After the cyclone, the liquid is send to settler to remove settle able organic solids by sedimentation technique. The organic solid settles at the bottom of the settler for further decomposition by anaerobes. The liquid after settler moves towards anaerobic baffle reactor to remove dissolved organic matters by using anaerobic bacteria living in the sludge at the bottom of the reactor. The liquid from the reactor flows upward direction through filter material. The suspended solids and dissolved organic matters leaving the anaerobic baffle reactor get removed by adhesion and bio film activity within the filter media. The liquid coming out from anaerobic filter further passes through horizontal flow constructed wetland where the wastewater get further treated due to aeration and settling action. Furthermore, nutrients like nitrogen and phosphorous compounds are removed by plant uptake. The flow leaving the horizontal flow constructed wetland further goes to vertical flow constructed wetland for further removal of micro nutrients and suspended solids. The final effluent coming out of the vertical flow constructed wetland is collected in a polishing pond. The polishing pond helps to disinfect the pathogens in the effluent by exposing wastewater to ultraviolent rays coming from the sun. Further, it helps to increase the concentration of dissolved oxygen into the effluent, which is essential for aquatic animals living downstream.

120. Hence, this shows that the proposed WWTP can balance the existing waste water quality to a greater extent.

121. All the above mentioned treatment units are separately described below:

I. Screen Chamber

122. This is the first module of the proposed DEWATS in Gairabari. Bar screens with debris pocket that retains objects larger than 20 mm is used so that the treatment

component is free from foreign materials that may affect the treatment process and may block the pipe lines. Coarse Screen has been designed in the proposed DEWATS with 20mm clear opening between the bars of 10 mm dia. There are 2 chambers with bed slope 1:100. The parameters for the design of Screen Chamber is shown in the table given below:

Table IV-II: Parameters for design of screen chamber

Parameters	Values, Gairabari	Values, Jilu/ Gaude
Maximum hourly flow (m3/hr)	59	80.69
Maximum discharge (m3/s)	0.016	0.022
Peak factor	4.5	4.5
Average Discharge (m3/s)	0.004	0.017
No. of units of chamber	2	2
Length of Approach channel	1	1
Height(m)	0.15	0.15
Width of Channel(m)	0.23	0.3
Free Board(m)	0.30	0.3
Total depth of channel(m)	0.45	0.45
Clear spacing between bars	25	15
Each bar width (mm)	10	10
Design no of bars	6	12
Actual Spacing (mm)	23.57	13.85
Angle of inclination	45	45
Slope of channel	1:100	1:100

Source: DEDR, 2020

II. Hydrocyclone

123. Cyclone module is the part of primary treatment unit kept after the screen chamber. The purpose of the cyclone is to separate the grits and sands from the wastewater stream entering the treatment plant. The flow enters the cyclone tangentially and swirls in the downward direction leaving the heavier particles at the bottom of the cyclone. The schematic diagram of the cyclone is shown in the figure below. The flow enters the cyclone at the lower level than the outlet of the cyclone. As the outlet level is higher than the inlet level, the wastewater is raised with the help of available water head after the screen chamber.The grits are collected at the bottom of the cyclone. The underflow is connected to the grit disposal unit via 160mm diameter PVC pipe which can be regulated via. Gate valve.

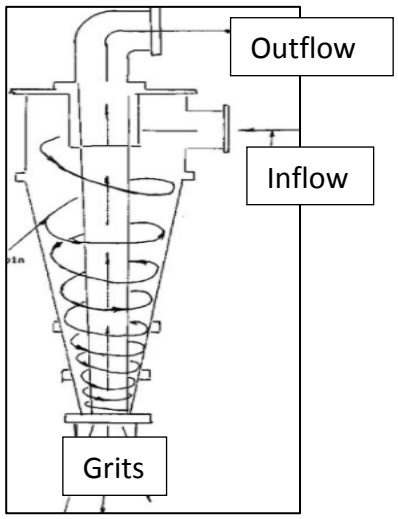

Table IV-III: Parameters for design of Hydrocyclone

Parameters	Values, Gairabari	Values, Jilu/ Gaude
Average Discharge (Qavg) m3/s	0.004	0.017
No. of units of cyclone	1	2
Hydraulic Retention Time (hr)	1	1
Surface Loading rate at Qavg (m3/m2-day)	29	29
Design SLR	36.81	36.81
Specific gravity of sludge	1.03	1.03
Sludge Cleaning period (days)	15	7

Parameters	Values, Gairabari	Values, Jilu/ Gaude
SS removed kg/day	60	87.1
Water content of sludge	95	95

Source: DEDR, 2020

III. Equalization Tank

124. The Equalization tank for the wastewater treatment plant refers to the holding tank. The effluent from the collection tank flows to the equalization tank. It acts as buffer i.e. it collects the effluent that comes at widely fluctuating rates and position to the rest of the effluent at average flow rate. During peak hours, the effluent comes at high flow rate. This equalization tank stores this effluent and lets it out during non-peak hour.Hence, this helps to balance out the flow and loading rates. The parameters for the design of Equilization Tank is shown in the table given below:

Table IV-IV: Design parameters of Equalization Tank

Descriptions	Adopted size and Other Design Parameters, Gairabari	Adopted size and Other Design Parameters, Jilu/ Gaude
Length, L (m)	5	12
Breadth, B (m)	3.5	9
Depth, H (m)	1.50	1.5
Diameter of mouth piece (mm)	40	80

Source: DEDR, 2020

IV. Septic Tank (Settler)

125. Settler is a part of the primary treatment. In the proposed DEWATS, the settler is a rectangular tank designed to remove suspended solids from the wastewater stream by sedimentation process. The velocity of the wastewater is lowered to allow the settleable solids at the bottom of the tank.

126. The settler consists of two chambers viz., (I) sedimentation chamber and (II) Outlet chamber. These two chambers areas are separated by the partition wall located at the two third of its total length from the inlet point. There are two units of settler provisioned in this proposed DEWATS. The Hydraulic Retention Time of the settler is designed as 2 hours and de-sludging period is designed as 12 months. The pollutants like BOD_5 and TSS are removed by sedimentation process in the sedimentation chamber. The settled particles at the bottom of the settler undergo anaerobic degradation generating biogas. The residue organic matter or sludge at the bottom of the settler is send to sludge drying bed for further treatment. The parameters for the design of Settler is shown in the table given below:

Table IV-V: Design Parameters of Settler

Descriptions	Adopted size and Other Design Parameters, Gairabari	Adopted size and Other Design Parameters, Jilu/ Gaude
No. of units (N)	2	8
Length of 1st chamber (m)	8.60	8
Length of 2nd chamber (m)	4.30	4
Length, L(m)	12.90	12.7
Breadth, B (m)	6.50	5.5
Depth, D (m)	2.00	2.675

Source: DEDR, 2020

V. Anaerobic Baffle Reactor (ABR)

127. An anaerobic baffle reactor is a part of secondary treatment unit designed to remove the organic matter content in the influent by using microbial activities. The dissolved organic matters are metabolized by the anaerobic bacteria whereas the settleable suspended solids are removed by sedimentation process at the bottom of the chambers. This component helps to reduce the BOD and COD along with TSS.The parameters for the design of ABR is summarized in the table given below:

Table IV-VI: Design parameters of anaerobic baffle reactor

Descriptions	Adopted size and Other Design Parameters, Gairabari	Adopted size and Other Design Parameters, Jilu/ Gaude
Length of chamber, L (m)	1.1	1.1
Breadth, B (m)	3.80	5.8
Height of tank including Free Board, H (m)	2.3	2.3
Hydraulic Retention Time, HRT, (hrs)	24	24
Number of chambers (n)	15	15
Number of Units (N)	2	8
Sludge Withdrawal Period (year)	1	1
Design waste water flow (m^3/day)	118.1	182

Source: DEDR, 2020

VI. Horizontal Flow Constructed Wetland (HFCW)

128. HFCW has been designed as the tertiary treatment unit to remove the total nitrogen and the total phosphorous from the influent by plant uptake. In this HFCW, the wastewater is allowed to percolate from the graded size of aggregate placed in layers. The wastewater flows in the horizontal direction through the pores of the gravel media preventing the undesirable odor to spread into the ambient environment. The nutrients in the wastewater are taken by the plant for its growth. The bacterial population living on the surface of gravel media also uses the nutrients for their metabolism and cell growth.The parameters for the design of HFCW is summarized in the table given below:

Table IV-VII: Design parameters of horizontal flow constructed wetland

Descriptions	Adopted size and Other Design Parameters, Gairabri	Adopted size and Other Design Parameters, Jilu/ Gaude
Number of Units (N)	2	8
Number of compartments in each unit	4	4
Length, L (m)	8	7
Breadth, B (m)	10	10
Depth of the media, H (m)	0.5	0.5
Adopted depth		
1st bed	0.7	0.7
2nd bed	0.7	0.7
3rd bed	0.6	0.6
4th bed	0.5	0.5
Size of gravel media (mm)		
1st bed (Natural Gravel)	40-80	40-80
2nd bed (Natural Gravel)	40-80	40-80
3rd bed (Coarse Sand)	10-20	10-20
4th bed (Coarse Sand)	5-10	5-10
Bed Slope (%)	1	1
Media Withdrawal Period (year)	10	10
Plant	Reed	Reed

Source: DEDR, 2020

VII. Polishing Pond

129. The Polishing Pond has been proposed to improve the quality of effluent discharged from HFCW. It is also the part of tertiary treatment unit focused to kill the pathogens using ultra violet rays from the sunlight thus raising the hygienic quality of the effluent.The parameters for the design of Polishing Pond is summarized in the table given below:

Table IV-VIII: Design parameters of polishing pond

Descriptions	Adopted size and Other Design Parameters, Gairabari	Adopted size and Other Design Parameters, Jilu/ Gaude
Number of Units (N)	1	3
Hydraulic Retention Time (day)	1	0.026
Diameter of Pond, (m)	4.1	4
Depth of water, H (m)	1.3	1
Maximum hourly flow (m3/hr)	59	80.69
Average Discharge (m3/s)	0.004	0.017
Volume of the Pond (m^3)	17.15	16.33

Source: DEDR, 2020

VIII. Sludge Drying Bed& Leachate Tank

130. Although, SDB's are typically used for primary treatment in solid liquid separation of waste water, it has been used as a pseudo-secondary treatment in the current design. It is used to retain the high TS content that would have been carried over to the ABR. The SDB also screens other pollutants like BOD, COD and helminthic significantly by retaining the majority of the solids in the FS.

131. Bad smell may arise in SDB during the splashing while loading the bed. It is highly imperative that the SDB is not overloaded and that a single batch is emptied on the bed in each cycle to allow sludge to dry and be removed before next load is received.

132. The sludge drying bed separates the liquid and solids from the slurry. The liquid known as leachate percolates down to leachate collection tank. Solids parts remain on the surface of the drying bed until it get dried by ambient temperature. The leachate is transferred via small pump to the anaerobic baffle reactor for the further treatment.

133. The parameters for the design of Sludge Drying Bed is summarized in the table given below:

Table IV-IX: Design parameters of sludge drying bed

Parameters	Values, Gairabari	Values, Jilu/ Gaude
Influent TSS, (g/Lit)	45	45
Sludge loading rate(kg TS/m^2/yr)	53.67	51
Total no. of beds	1	1
Length of bed, (m)	16.50	15.5
Breadth of bed, (m)	6.00	10
Depth of bed, (m)	1.85	1.85
BOD of influent sludge, (mg/Lit)	2500	2500

Source: DEDR, 2020

IX. Sludge Storage Yard

134. It is not possible to dispose the dried sludge promptly each time right after its removal from the sludge drying bed. There is requirement of storage areas for the temporary storage of those removed dried sludge so that certain significant quantity of the

dried sludge that has been stored can be collectively led to its final disposal place. Hence, Sludge Storage Yard has been proposed for both Gairawari as well as Jilu systems within the proposed waste water treatment plant site near the sludge drying bed. The location of each sludge storage yard is depicted clearly in the following sections.

e) Laboratory Setup

135. There is also provision of laboratory set up at the final point of WWTP to monitor the minimum effluent characteristics before final disposal to the water bodies. This also determines the efficiency of the proposed DEWATS and helps to enhance the performance of the system.

f) Blacktopped/PCC/RCC Road Cutting and Reinstatement Works

Since the sewerage line will be laid at the centerline of the road, there is requirement of frequent road surface cutting. The project has all types of road such as Blacktopped, RCC, PCC, Graveled and Earthen. After road cutting, the dismantled road surfaces shall be reinstated to its original condition as soon as the laying works of sewer pipe is completed.

C. Operation System of WWTP

a) Gairawari WWTP (WWTP-1)

136. The inlet pipe is connected to the screen chamber at the beginning. It removes floating object from the wastewater. The hydro cyclone has been kept after the screen chamber to remove the grit particles from the wastewater stream. The flow after hydro cyclone goes to equalization tank which collects the effluent coming at widely fluctuating rates and positions the rest of the effluent at average flow rate. Then the waste water goes to the settler. Most of the settleable organic matters settles down at the bottom of the settler. Two units of settler have been designed to accommodate the designed flow. The sludge accumulated in the settler goes into the sludge drying bed to reduce the moisture content of the sludge. The free water gets infiltrated in the form of leachate through the different layers of filtering media. The remaining solid mass on the surface of the sludge drying bed eventually gets dry due to evaporation. Similarly, the grits accumulated at the bottom of the hydro cyclone goes to the grit disposal unit. The liquid from settler then goes to anaerobic baffle reactor (ABR) in order to remove biodegradable organic matter by means of anaerobic digestion process. Two units of ABR have been designed for this purpose. The treated liquid from ABR is send to horizontal flow constructed wetland (HFCW). HFCW further removes the organic matters, suspended materials, and nutrients from the wastewater. Two units of HFCW are designed for this purpose. The nutrients in the HFCW get reduced due to plant uptake and direct entrapment of suspended solids into the filter media. The effluent from the HFCW is collected into the polishing pond for disinfection of pathogens by UV radiation from direct sunlight. The water in the polishing pond can be reused for gardening and flushing of water closet.

137. The net footprint area covered by the DEWATS structures and staff quarter for caretaker of the treatment plant is **1406.99** sq.m. Other area is assigned for pipe lines and landscaping works. The flow bypass pipeline is also provided for diverting excess inflow of waste water to treatment plant. The boundary of treatment plant is placed with barbed wire fence and there is separate entrance gate for vehicle and pedestrian to enter inside the treatment plant.

138. This Gairawari WWTP area has easy access through the existing earthened road of 4m width.

139. The layout plan and flow diagram of the Gairabari WWTP is shown below:

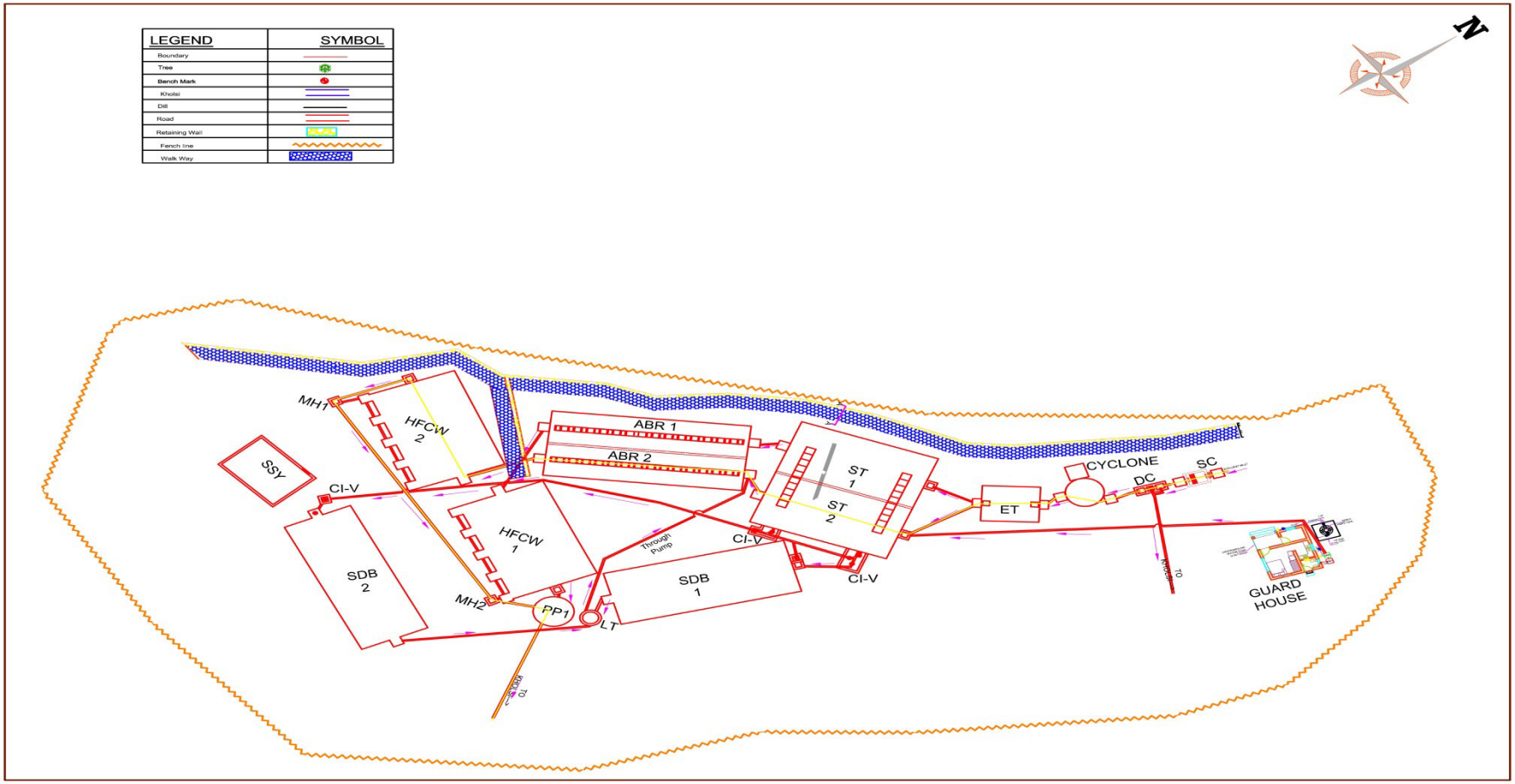

Figure IV-IV: Layout plan of the Proposed Gairawari WWTP

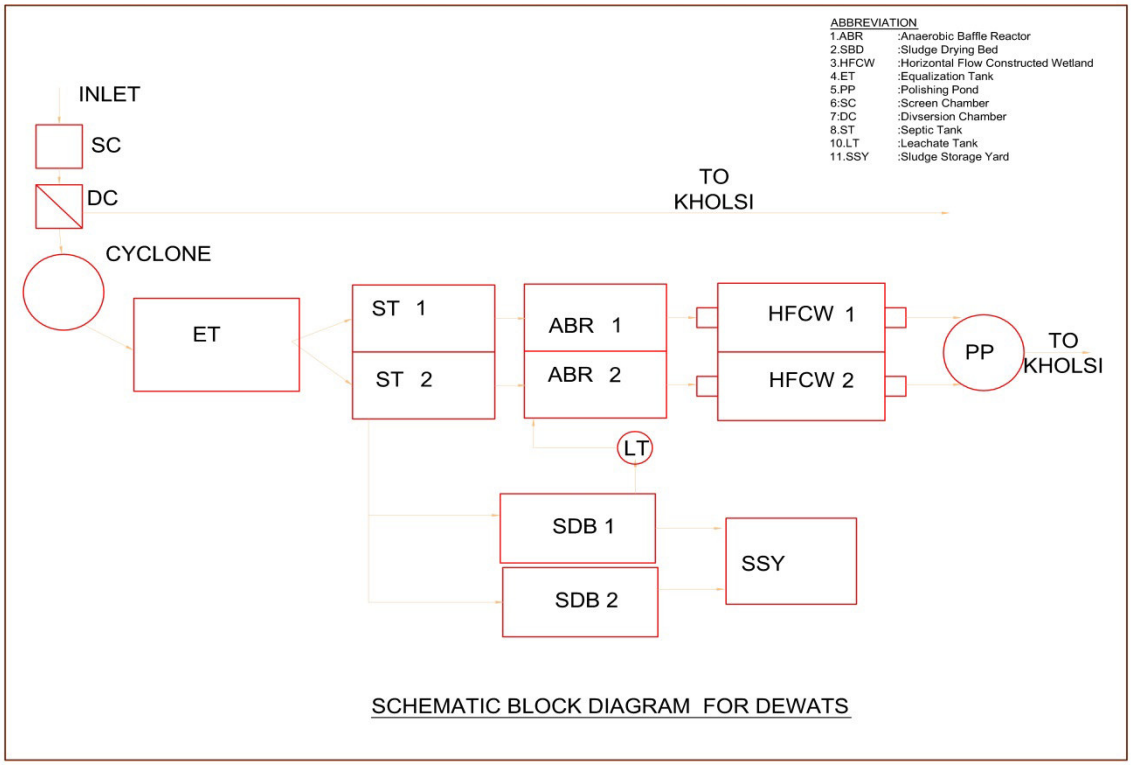

Figure IV-V: Flow Diagram of the Proposed Gairawari WWTP

b) Jilu WWTP (WWTP-2)

140. The inlet pipe is connected to the screen chamber at the beginning. It removes floating object from the wastewater. The hydrocyclone has been kept after the screen chamber to remove the grit particles from the wastewater stream. Two units of Hydro-cyclone is designed for this purpose. The flow after hydrocyclone goes to equalization tank which collects the effluent coming at widely fluctuating rates and positions the rest of the effluent at average flow rate. Then, the waste water goes to the settler. Most of the settleable organic matters settles down at the bottom of the settler. Eight units of settler have been designed to accommodate the designed flow. The sludge accumulated in the settler goes into the sludge drying bed to reduce the moisture content of the sludge. The free water gets infiltrated in the form of leachate through the different layers of filtering media. The remaining solid mass on the surface of the sludge drying bed eventually gets dry due to evaporation. Similarly, the grits accumulated at the bottom of the hydro cyclone goes to the grit disposal unit. The liquid from settler then goes to anaerobic baffle reactor (ABR) in order to remove biodegradable organic matter by means of anaerobic digestion process. Eight units of ABR have been designed for this purpose. The treated liquid from ABR is send to horizontal flow constructed wetland (HFCW). HFCW further removes the organic matters, suspended materials, and nutrients from the wastewater. Eight units of HFCW are designed for this purpose. The nutrients in the HFCW get reduced due to plant uptake and direct entrapment of suspended solids into the filter media. The effluent from the HFCW is collected into the polishing pond for disinfection of pathogens by UV radiation from direct sunlight. There are three units of polishing pond. The effluent from polishing pond it disposed to nearest natural drain.

141. The net footprint area covered by the DEWATS structures is **3382.81**sq.m. Other area is assigned for pipe lines and landscaping works. There are 26 sets of Manhole from which the waste water flow inside the treatment plant to the different treatment components. The boundary of treatment plant is placed with barbed wire fence and there is separate entrance gate for vehicle and pedestrian to enter inside the treatment plant. The layout plan and flow diagram of the proposed DEWATS is as shown in the attached sheet.

142. This Jillu WWTP area requires about 50m road for easy access. Hence, here the design also proposes the construction of this 50m road and the cost has been estimated accordingly.

143. The layout plan and flow diagram of the Jilu WWTP is shown below:

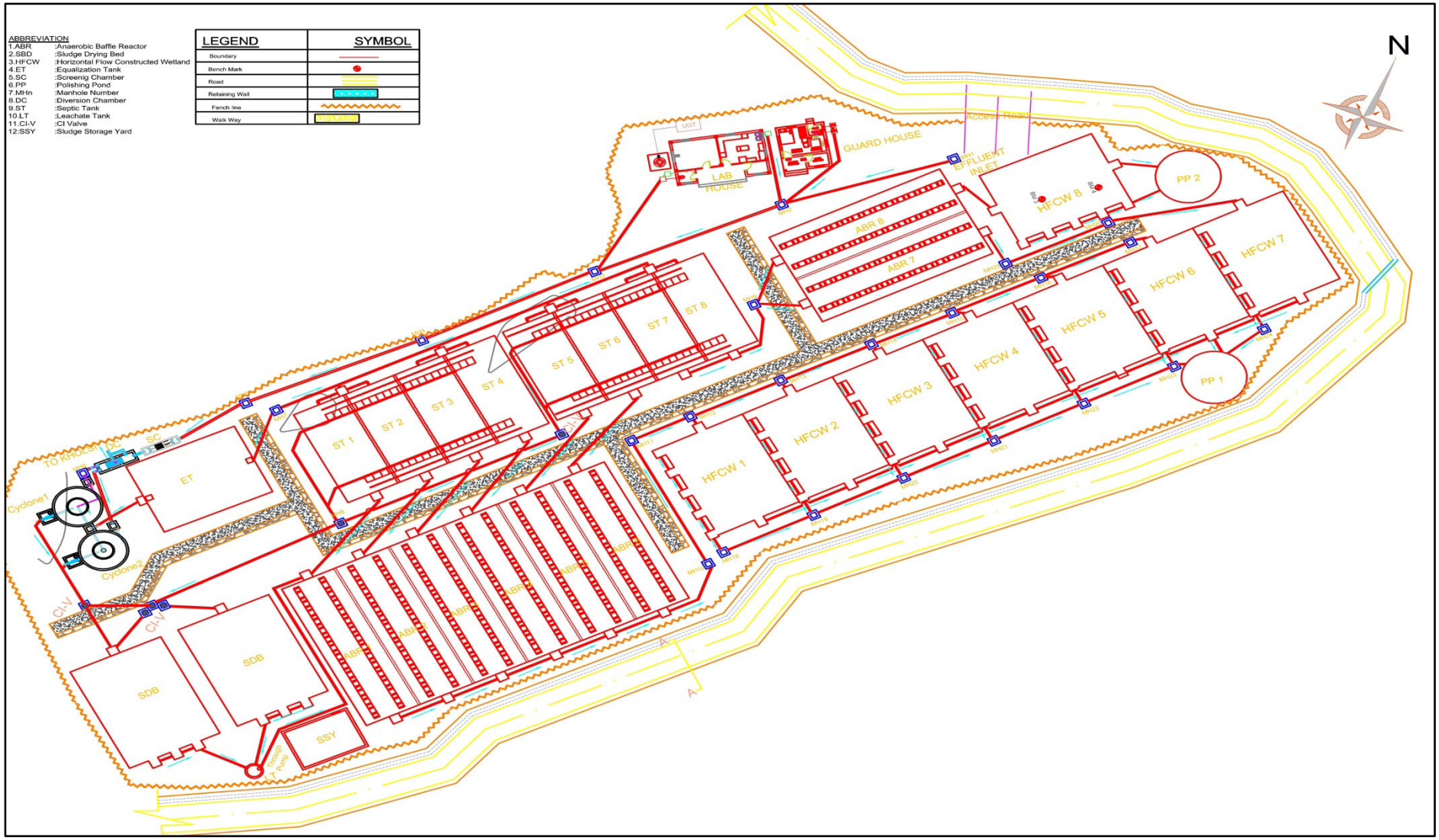

Figure IV-VI: Layout plan of the Proposed Jilu WWTP

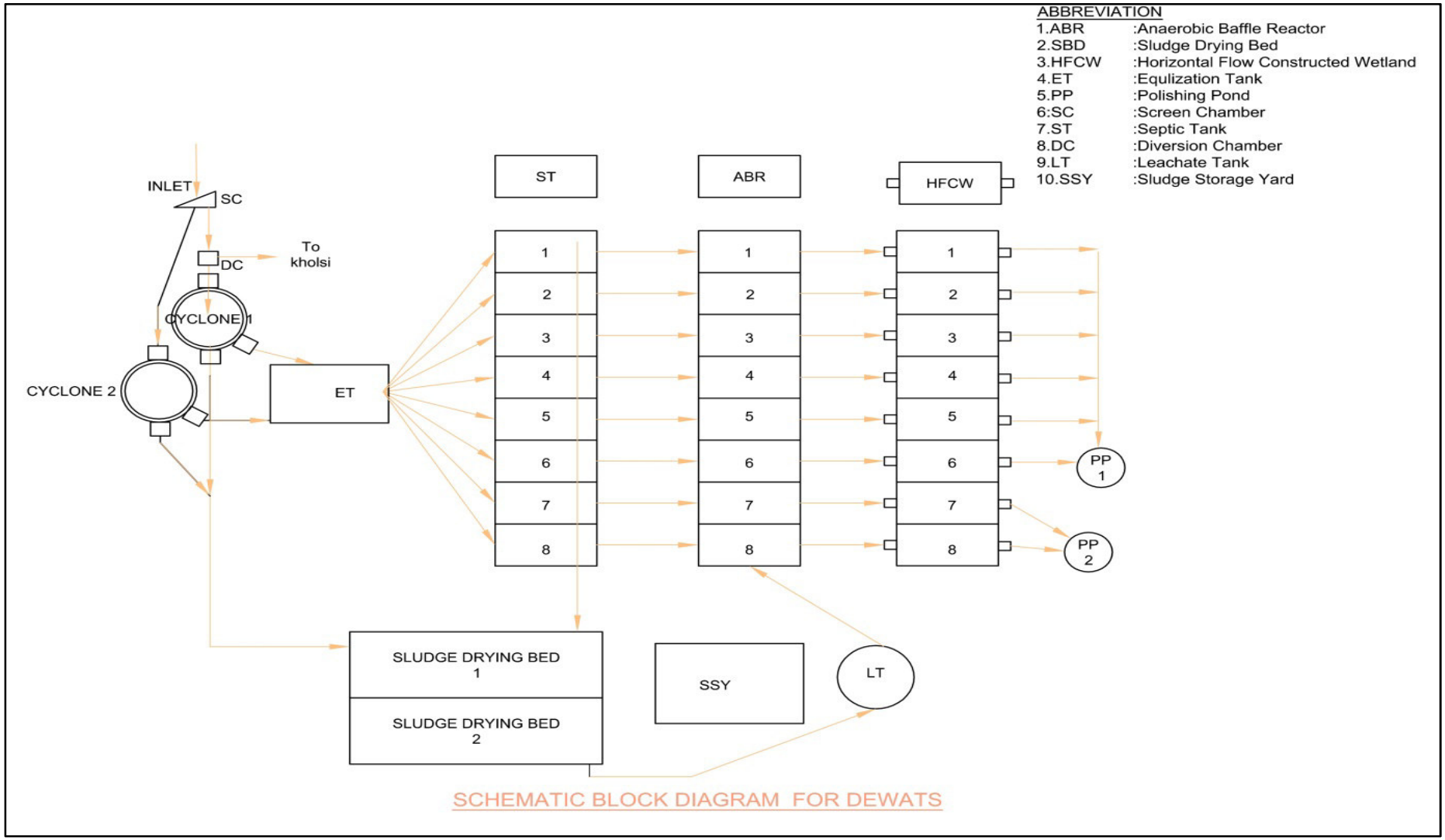

Figure IV-VII: Flow Diagram of the Proposed Jilu WWTP

144. The schematic diagram of the sewerage system of both Gairawari & Jilu Systems are as follows:

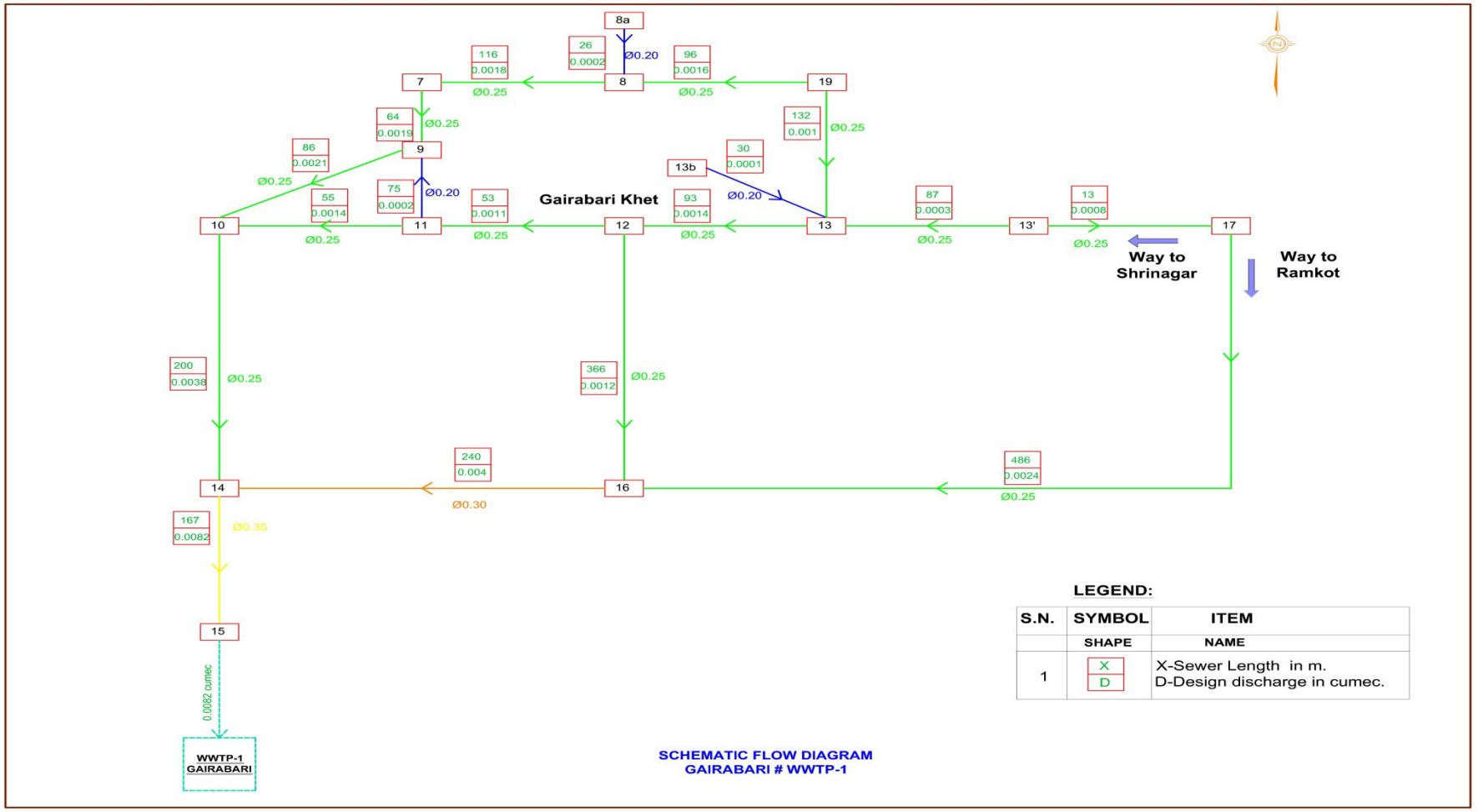

Figure IV-VIII: Schematic Diagram of the Sewerage System of Gairawari WWTP

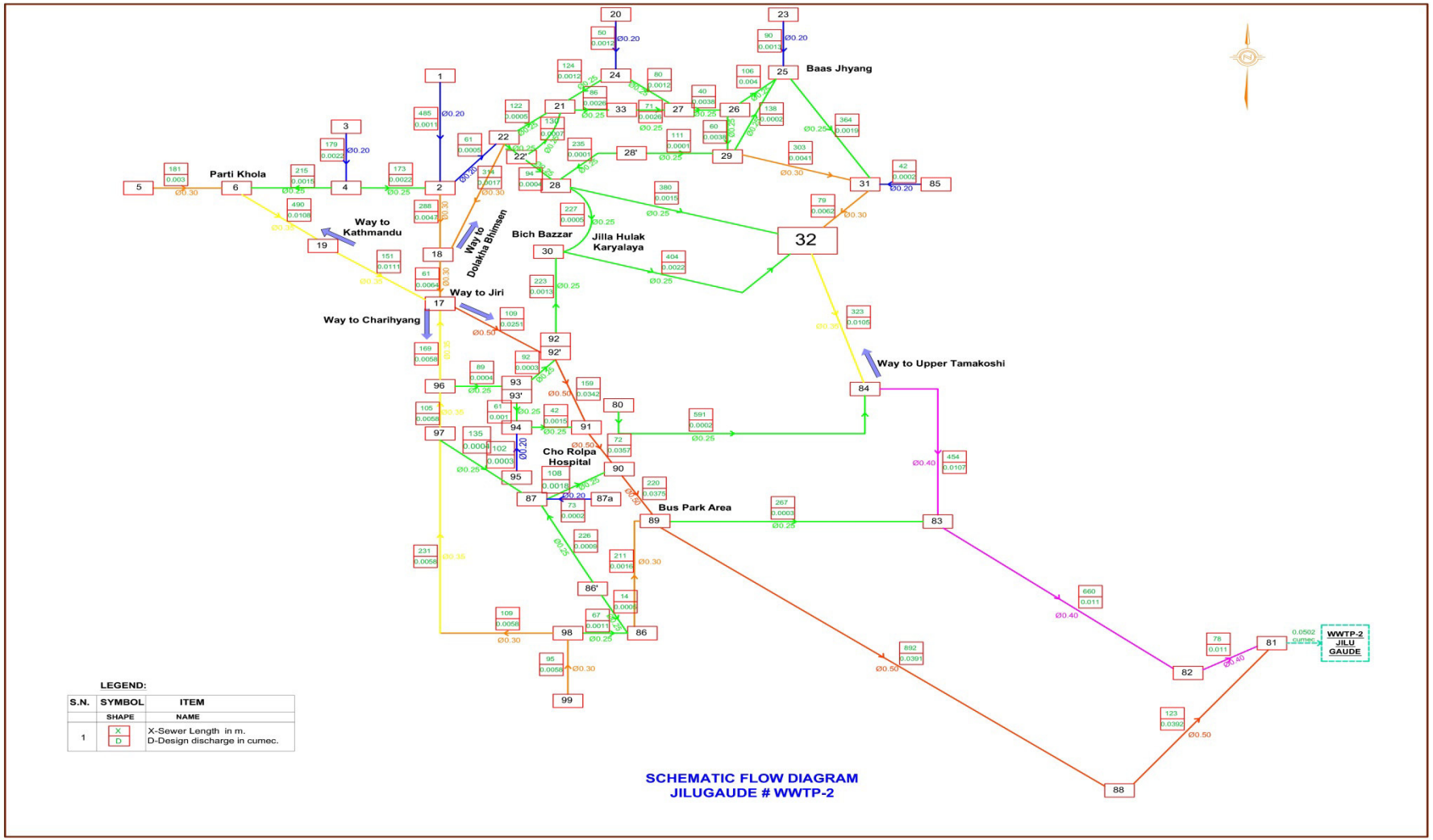

Figure IV-IX: Schematic Diagram of the Sewerage System of Jilu WWTP

145. The overall sewerage network along with the location of the proposed WWTPs are shown in the figure given below:

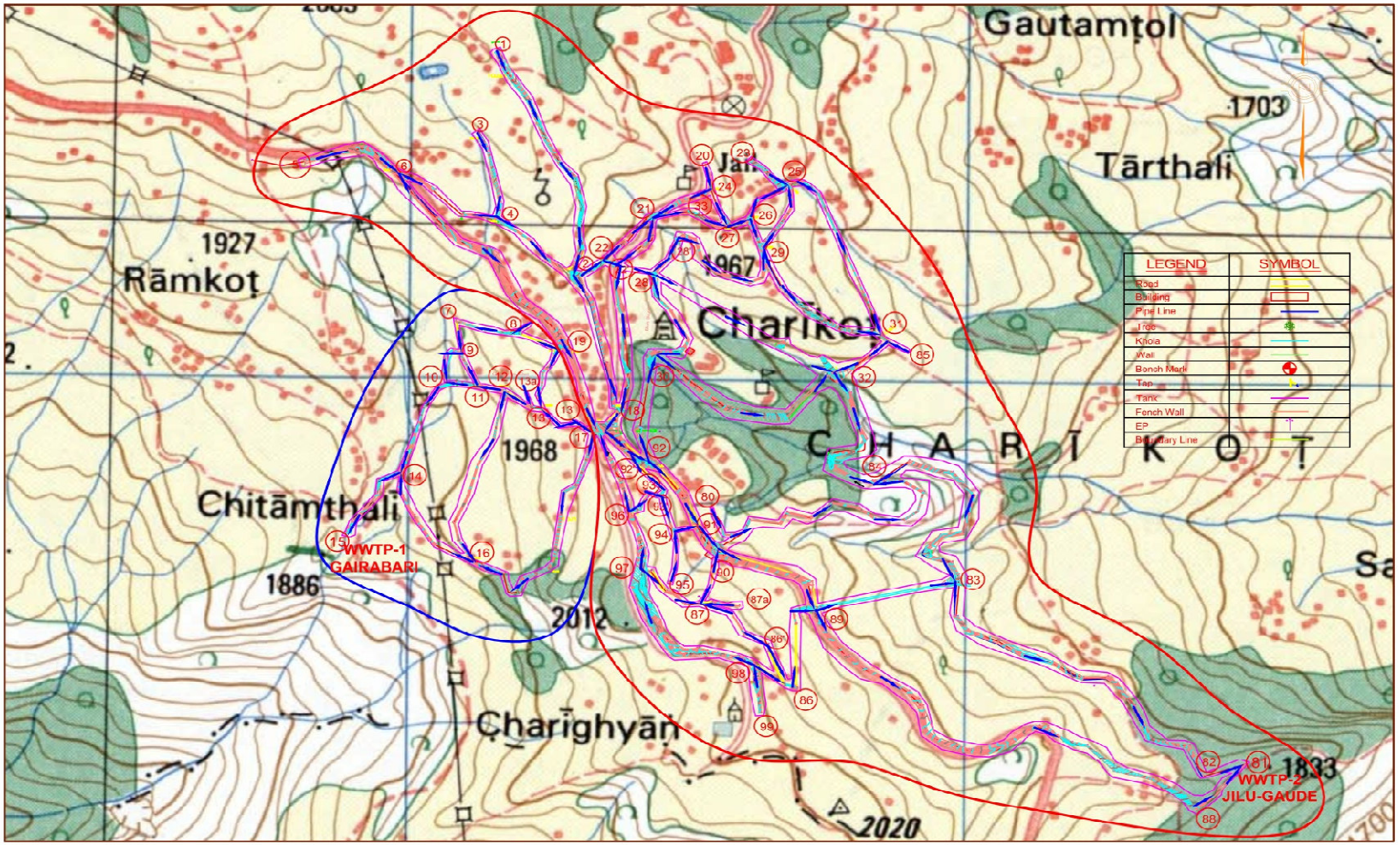
Gautamṭol
1703
Tārthali
1927
Rāmkoṭ
1967
Charikot
1968
C H A R I K O T
Chitāmthali
WWTP-1
GAIRABARI
1886
2012
Charighyāṇ
2020
1833
WWTP-2
JILU-GAUDE
LEGEND
SYMBOL
Road
Building
Pipe Line
Tree
Khola
Wall
Bench Mark
Tap
Tank
Fench Wall
EP
Boundary Line

Figure IV-X: Overall Sewerage Network

D. Sludge Management Plan

146. Haphazard Disposal of Dried sludge is not acceptable in regard to the future environmental implications. The dried sludge can be applied for multiple uses. Prior to this, the sludge needs to be properly processed and dewatered to avoid odor nuisance. Sludge accumulated in Septic Tank (Settler) &Hydrocycloneis sent to the Sludge Drying Bed in the periodical basis. Sludge Drying Bed provide the simplest method of dewatering. The sludge is kept for drying by natural drainage process and heat from the sunlight on the sludge drying bed till the sludge cake can be removed by shovel. Drying takes place by a combination of evaporation and gravity drainage through the sand. After about six weeks of drying, the sludge cake may have solid content of about 40 percent. It can then be removed from the sludge drying bed with a shovel. This removed sludgeistaken to the sludge storage yard for storage. There is provision of 35HP capacity boom type tractor for loading and transportation of sludge to the sludge storage yard. The sludge storage yard gives the retention period for the dried sludge, supports in reducing moisture and helps in reducing pathogens.

147. After certain duration of storage, the treated sludge from the sludge storage yard needs to be disposed off finally. Normally, the final disposal point of the treated sludge is the land. Dewatered sludge can be buried underground in a sanitary landfill. It can also be spread on agricultural land in order to use it as a fertilizer. But, for this, availability of sufficient space must be ensured. This treated sludge can also be used for the production of biogas, charcoal, biodiesel, powdered industrial fuel and electricity.As the responsibility of operation & maintenance of this proposed project is of the Municipality, the final disposal process of the treated sludge and its location will be confirmed by the municipality. Also, its application either as fertilizer or on the underground of sanitary landfill site or other multiple uses as mentioned above shall be decided by the municipality itself.

E. Salient Features of the Proposed DEWATS

148. The salient features of the proposed DEWATS are tabulated below:

Table IV-X: Salient Features of DEWATS

Descriptions	Values (Gairabari)	Values (Jilu/ Gaude)
Wastewater Type	Municipal Wastewater	Municipal Wastewater
Average daily Flow	241.92 m^3/day	1451.52 m^3/day
Design BOD_5- inlet	450 mg/Lit	450 mg/Lit
Design COD - inlet	446 mg/Lit	560 mg/Lit
Design TSS - inlet	152 mg/Lit	330 mg/Lit
Temperature	18^oC	18^oC
BOD_5- Outlet	<50 mg/Lit	<50 mg/Lit
COD - Outlet	<250 mg/Lit	<250 mg/Lit
TSS - Outlet	<50 mg/Lit	mg/Lit
Gross Land Area	3670.76m^2	4783.96 m^2
Structure Foot Print	**1406.99**m^2	**3382.81**m^2

Source: DEDR, Charikot DEWATS Project, 2020

F. Land Requirement for the proposed components of DEWATS

149. The land requirement for the proposed components of DEWATSis tabulated below:

Table IV-XI: Land Requirement

S.N.	Description	Gairabari WWTP		Jilu/ Gaude WWTP	
		Nos.	Foot Print (Sq. m.)	Nos.	Foot Print (Sq. m.)
1	Screen Chamber	1	6.19	1	6.20
2	Diversion channel	1	3.20	1	6.45
3	Cyclone with DI valve chamber	1	15.65	2	31.32
4	Equalization Tank	1	28.12	1	131.12
5	Septic Tank	2	417.96	8	603.17
6	Anaerobic Baffle Reactor (ABR)	2	372.51	8	998.87
7	Horizontal Flow Constructed Wetlands (HFCW)	2	241.58	8	1145.68
8	Polishing Pond (PP)	1	18.08	2	97.80
9	Sludge Drying Bed (SDB)	2	224.4	2	282.90
10	Staff quarter	1	38.46	1	38.46
12	Sludge Storage Yard	1	40.84	1	40.84
Total Area			**1406.99**		**3382.81**

Source: DEDR, Charikot DEWATS Project, 2020

150. As per DDR report, the available land at Gairabari WWTP and Jilu WWTP areas are 2543.22$m^2$and 9155.59m^2respectively. Similarly, as per the *Table IV-XI*given above, the area of the land required for the construction of Gairabari WWTP and Jilu WWTP are 1406.99m^2 and 3382.81m^2respectively. Hence, this shows the proposed sites have sufficient space for all the WWTP components including buffer zones and possible future expansion.

G. Salient Features of the Project

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

Table IV-XII: Salient Features of the Project

SN	Items	Description		
1	**Name ofProject**	Charikot Sewerage (DEWATS) Project		
2	**Type**	Sanitary (separate) Sewer and Wastewater Treatment Plant		
3	**StudyLevel**	Detailed Engineering Design		
4	**Location Area**			
	Province	Bagmati		
	District	Dolakha		
	Municipality	Bhimeshwor Municipality		
	Ward	Partial area of Ward No 3, 6 and 4		
5	**AvailableFacilities**			
	Road	On the Lamoshanghu- Jiri Highway		
	Water SupplySystem	Existing system operating by several WUSCs and ongoing Water Supply and Sanitation Project implementation under UWSSP.		
	Drainage	Few location		
	Electricity	Available		
	Communication	Available		
	HealthServices	Available		
	Banking Facilities	Available		
6	Social Status (based on water supply)	For WWTP-1/ (Gairabari)	For wwTP-2 (Jilu/ Gaude)	Total
	Present HHs Numbers (2016)	216	1,378	1,594
	Present Population (2016)	1,163	7,392	8,555

SN	Items	Description		
	Design Year Population (2038)	1,959	12,454	14,413
	Average HHS size	5.38		
	Weighted Growth Rate % (GR)	2.4		
	Projected HHs in Design Year (based on GR)	364	2,314	2,678
	Hotels bed	78	657	735
7	Waste Water Discharge (MLD) during design year (2038)	0.242	1.451	1.693
8	WWTP Designed discharge, lps	2.80	16.80	19.60
9	DEWATS			
	Wastewater Type	Municipal Wastewater	Municipal Wastewater	
	Average daily Flow	241.92 m^3/day	1451.52 m^3/day	
	Design BOD_5- inlet	450 mg/Lit	450 mg/Lit	
	Design COD – inlet	560 mg/Lit	560 mg/Lit	
	Design TSS – inlet	330 mg/Lit	330 mg/Lit	
	Design Temperature	18°C	18°C	
	BOD_5- Outlet	<50 mg/Lit	<50 mg/Lit	
	COD – Outlet	<250 mg/Lit	<250 mg/Lit	
	TSS – Outlet	<50 mg/Lit	<50 mg/Lit	
	Gross Land Area	3670.76m^2	4783.96 m^2	
	Structure Foot Print	**1406.99** m^2	**3382.81** m^2	
10	**TypeofStructures**			
10.1	Circular drain (NP-3)			
	200mm dia	1,205.89		
	250mm dia	6,926.32		
	300mm dia	1,879.17		
	350mm dia	1,634.24		
	400mm dia	1,191.35		
	450mm dia	0.00		
	500mm dia	1626.74		
	Total	**2,378.04**	**12,085.67**	**14,463.71**
10.2	Manhole (no),			
	Bricks upto 2.5m height for light traffic road			
	Dia.=1.2m, Height=1.5m	5		
	Dia.=1.2m, Height=2.0m	32		
	Dia.=1.5m, Height=2.5m	32		
	RCC upto 2.5m height for light traffic			
	L=1.4m, B=1.4m, Height=1.5m	2		
	L=1.4m, B=1.4m, Height=2.0m	5		
	L=1.6m, B=1.6m, Height=2.5m	4		
	L=1.6m, B=1.6m, Height=3.0m	47		
	L=1.6m, B=1.6m, Height=3.5m	41		
	L=1.6m, B=1.6m, Height=4.0m	51		
	L=1.6m, B=1.6m, Height=4.5m	33		
	RCC for all height upto 4.5m for heavy load traffic			
	L=1.4m, B=1.4m, Height=1.5m	2		
	L=1.4m, B=1.4m, Height=2.0m	10		

SN	Items	Description		
	L=1.6m, B=1.6m, Height=2.5m	12		
	L=1.6m, B=1.6m, Height=3.0m	21		
	L=1.6m, B=1.6m, Height=3.5m	18		
	L=1.6m, B=1.6m, Height=4.0m	20		
	L=1.6m, B=1.6m, Height=4.5m	11		
	Total Manhole	**346**		
10.3	RCC Chamber more than depth of manhole more than 4.5m			
	L=0.65m, B=0.65m	356		
10.4	HH sewer collection chamber (nos)			
	Type 1: For 7 connection	692		
	Type 2: for 4 connection	346		
	Type 3: For 3 connection	346		
10.5	Pipe length from HH collection chamber to Manhole, (m)			
	160mm dia	5536		
	200mm dia	5536		
10.6	HDPE pipe for the manhole depth >4.0m (m)	1602		
10.7	Crossing (nos)			
	For small crossing	7		
	RCC slab upto 5.7m span	1		
	Steel Truss upto 15m	2		
	Steel truss upto 23m	5		
10.8	Sewer collection chamber/ Manhole WWTP inlet	1	1	2
10.9	WWTP components			
	Screen Chamber	1	1	2
	Diversion Channel	1	1	2
	Cyclone with DI valve chamber	1	2	3
	Equalization Tank	1	1	2
	Settler	1	8	9
	Anaerobic Baffle Reactor (ABR)	1	8	9
	Horizontal Flow Constructed Wetlands (HFCW)	1	8	9
	Polishing Pond (PP)	1	3	4
	Sludge Drying Bed (SDB)	1	1	2
	Staff quarter/ Guard house	1	1	2
	Lab house		1	1
10.10	Sludge drying bed			
10.11	Sewer disposal pipe from WWTP outlet, HDPE, (m)	100	2,500	2600
10.12	Road Reinstatement Works, (m)			
	Asphalt Concrete Road	2800		
	Gravel Road including access road to the treatment plant	4000		
	Reinforced Concrete Road	800		
11	**Environment**			
	ADBCategory	B, Only IEE necessary		
	IEE finding	No significantadverse impact.		
12	**Project Cost of Sanitary Sewerage with DEWATS (NRs), incl. contingencies (15%) and VAT 13%**	**161,057,074.22**	**741,344,690.26**	**902,401,764.48**
	GONContribution(85%)	136,898,513.09	630,142,986.72	767,041,499.81

SN	Items	Description		
	Local Authority /Users' Contribution (15 %)	24,158,561.13	111,201,703.54	135,360,264.67
13	**Per Capita Cost for DEWATS (Overall)**			
	Per Capita Cost (for survey year pop.)	138,484.16	100,290.14	105,482.38
	Per Capita Cost (for design year pop.)	82,213.92	59,526.63	62,610.27

Source: DEDR, Charikot DEWATS Project, 2020

V. DESCRIPTION OF THE EXISTING ENVIRONMENT

A. Physical Environment

a) Landforms & Topography

152. The project area is located in Bhimeshwor Municipality, which is situated in Dolakha district of Province 3 of Nepal. It lies between 27º37' 58" N to 27º44' 42" N latitude to 85º05' 12" E to 85º59' 31" E longitude. The municipality is in a hilly region with an altitude ranging between 950 to 2560 m above mean sea level with an average altitude of 1554 meters.

153. The project area comprises of extensive terraces and steep gorges.

b) Geology & Soils

154. Dolakha District is characterized by Ulleri and Seti formations of the Midland Group. In the project area, rocks of the Ulleri Formation are represented by augen gneiss and feldspathic schist whereas the rocks of the Seti Formation are mainly composed of grey to greenish-grey phyllites and quartzite. Colluvial deposits and rocks are predominantly found on the surface. The project area also has weathered rocks of phyllite to gneiss and colluvium to alluvium deposits. Thickness of colluvial range 2 to 5 m and alluvial deposits more than 5 m.

c) Land Use Pattern

155. The municipality covers 58.59 km^2 out of which most of the land is coverd by forest & agricultural land. About 53% of land is covered by forest while 40% of land is covered by agricultural land. The land in this project town is in moderate to very steep slope. More than 50% of land in the municipality is steeper than 30º. The land use pattern is determined by topography, climate and soils. Generally, lands with gentle slopes are used for settlements.

Table V-I: Land-use pattern

S.No.	Land use	Area (km2)	Area (%)
1	Agriculture	23.06	39.63
2	Forest	30.56	52.52
3	Residential area	2.75	4.72
4	Others	1.82	3.13
Total		**58.19**	**100**

Source: DEDR, Charikot DEWATS Project, 2020

d) Climate

156. The Municipality has a subtropical to a temperate climate and is heavily influenced by the monsoon (June-September) with an average annual rainfall of about 1710 mm.

157. The average temperature in Charikot, Dolakha ranges from 7.5 °C during January (the coldest month of a year) and 19.3 °C during July (the hottest month of a year). Similarly, the average rainfall in Charikot, Dolakha ranges from the driest month of January with 10mm to the wet month of July with 543 mm.

e) Water Resources

158. The project district, Dolakha is rich in water resources, particularly on account of the existence of TamaKoshi River and other various rivulets. Hence, this area has been used by various hydropower development projects like Upper Tamakoshi, Second Tamakoshi and other hydro projects. Similarly, people of the project area have been consuming water from the various existing water supply system that has been using water from various water

resources like Hattichhahara, Odare, Jhapre Khola, Kagate Khola, Dund Khola, Gairi Khola, Pani Ghatta, Charnawati River etc.

f) Air Quality

159. There is no air quality monitoring station established in Charikot by the Government of Nepal. So, no exact data can be collected from department of environment under MoFE. However, as per *weather.com*, the air quality data of Charikot town is obtained from the nearby air quality stations by interpolation which is as follows:

Table V-II: Air Quality Data of Charikot Town

S. No.	Pollutants	Values (µg/m^3)
A.	Primary Pollutants	
1.	$PM_{2.5}$(Primary Pollutant)	21
B.	Additional Pollutants	
1.	NO_2	1
2.	O_3	91
3.	SO_2	1
4.	PM_{10}	31
5.	CO	204

Source: weather.com

160. As per the above given table, the air quality of Charikot town is found to be satisfactory. Though the general public is not likely to be affected, the concentration of PM2.5 may be harmful to sensitive groups.

161. The field observation also shows that Air pollution is generally caused by fugitive dust from the 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. Air emissions also come from household cooking, open burning, and moving vehicles. Emissions from these sources are scattered regarding both locations and timing. However, the magnitude of air quality problems in the project town is not that severe.

g) Acoustic Environment

162. The sources of noise in the Project area are from the construction activities, vehicle movements etc. The anthropogenic noise is confined in few clustered settlements and market places only in the daytime.

h) Waste Water Quality

To assess the waste water quality, the sampling process has been carried out from the Gairabari & Jiludanda Treatment Site Outlet. The sampling site has been selected by the local authority. The samples were collected continuously for 12 hours at the interval of 1 hour. After the collection of samples at 12 hours interval, all the 12 samples were mixed in equal proportion based on discharge to make a composite sample. The purpose of 12-hour sampling

was to make a representative composite sample. A composite sample is many grab samples that have been collected and mixed together to form a single sample. It is accomplished by collecting samples of equal size keeping the time interval between the grab samples typically constant. The following given table shows brief details on sampling process:

Table V-III: Wastewater Sample Collection Location

S. No.	Sample Site	Location	Collection and Analysis time	
			Within 24 hours of sample collection	After 24 hours of sample collection
1	Site no. 1	Gairabari treatment site outlet	pH, DO (BOD), discharge, Microbiological parameters	Total Solids, Total Suspended Solids. Total Volatile Suspended Solids, Total Dissolved Solids, Oil and Grease, BOD, COD, Total Nitrogen, Total Kjeldahl Nitrogen, Nitrate, Ammonical Nitrogen, Total Phosphate, Sulphide, Total Alkalinity, Chloride. Potassium, Mercury, Arsenic, Selenium, Hexavalent Chromium, Nickel, Cadmium, Zinc, Copper, Lead, Silver
2.	Site no. 1	Gairabari treatment site outlet	pH, DO (BOD), discharge, Microbiological parameters	Total Solids, Total Suspended Solids. Total Volatile Suspended Solids, Total Dissolved Solids, Oil and Grease, BOD, COD, Total Nitrogen, Total Kjeldahl Nitrogen, Nitrate, Ammonical Nitrogen, Total Phosphate, Sulphide, Total Alkalinity, Chloride. Potassium, Mercury, Arsenic, Selenium, Hexavalent Chromium, Nickel, Cadmium, Zinc, Copper, Lead, Silver

Source: DEDR, Charikot DEWATS Project, 2020

163. The test reports of these waste water sample taken is attached in *Appendix 6*.

B. Biological Environment

a) Flora & Fauna

Flora

164. Dolakha District is blessed with natural beauty of floral diversity. The site specific vegetation types are described below. The major plant life forms available in the project area are given in *Table V-IV*.

Table V-IV: Major Plant Life Forms of the Project Area

S.No.	Scientific Name	Local Name	Species
1	*Rubus ellipticus*	Ainselu	Shrub
2	*Emblica offficinalis*	Amala	Tree
3	*Pieris ovalifolia*	Angeri	Shrub
4	*Lagerstroemia reginae*	Ashare phul	Shrub
5	*Adhatoda vasica*	Asuro	Shrub
6	*Melia azedarach*	Bakaino	Tree
7	*Ficus bengalensis*	Bar	Tree
8	*Terminalia bellirica*	Barro	Tree
9	*Aegle marmelos*	Bel	Tree
10	*Rhus wallichii*	Bhalayo	Tree
11	*Populus ciliate*	Bhote Pipal	Tree
12	*Lagerstroemia parviflora*	Bot Dhayaro	Tree

S.No.	Scientific Name	Local Name	Species
13	*Schima wallichii*	Chilaune	Tree
14	*Bassia butyracea*	Chyuri	Tree
15	Berberis aristata	Chutro	Shrub
16	*Debregeasia salicifolia*	Daar	Shrub/Small Tree
17	*Garuga pinnata*	Dabdabe	Tree
18	*Mussaenda macrophylla*	Dhobeni	Tree
19	*Colebrookea oppositifolia*	Dhusure	Shrub
20	*Dioscorea bulbifera* L.	Githa	Vine
21	*Callicarpa macrophylla*	Guyanlo	Shrub
22	*Lannea coromandelica*.	Hallunde	Tree
23	*Terminalia chebula*	Harro	Tree
24	*Syzygium cumini*	Jamun	Tree
25	*Phoebe lanceolata*	Jhankri syaula	Tree
26	*Ficus lacor*	Kabro	Tree
27	*Anthocephalus chinensis*	Kadam	Tree
28	*Myrica esculenta*	Kafal	Tree
29	*Adina cordifolia*	Karam	Tree
30	*Acacia catechu*	Khayar	Tree
31	*Ficus semicordata*	Khanayo	Tree
32	*Sapium insigne*	Khirro	Tree
33	*Morus alba*	Kimbu	Tree
34	*Litsea monopelata*	Kutmiro	Tree
35	*Duabanga grandiflora*	Laampate	Tree
36	*Engelhardtia spicata*	Mauwa	Tree
37	*Erythrina stricta*	Phaledo	Tree
38	*Ficus religiosa*	Pipal	Tree
39	*Pinus roxiburghii*	Sallo	Tree
40	*Terminalia tomentosa*	Saj	Tree
41	*Bombax ceiba*	Simal	Tree
42	*Vitex negundo*	Simali	Tree
43	*Mallotus philippensis*	Sindure	Tree
44	*Albizia chinensis*	Siris	Tree
45	*Dalbergia sisoo*	Sisoo	Tree
46	*Bauhinia vareigata*	Tanki	Tree
47	*Cedrealla toona*	Tuni	Tree
48	*Alnus nepalensis*	Uttis	Tree

Source: IEE Field Visit Survey, 2019

Fauna

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

Table V-V : Mammals of the Project Area

S. No.	Scientific Name	English Name	Local Name	Status
1	*Felis chaus/Prionailurus bengalensis*	Jungle cat	Ban Dhade	LC
2	*Macacaassamensis*	Assam Macaque	Bandar	NT*
3	*Hipposideros cineraceus*	Least Leaf Nosed Bat	Chamero	LC

S. No.	Scientific Name	English Name	Local Name	Status
4	*Pantherapardus*	Common Leopard	Chituwa	VU*
5	*Hystrixhodgsoni (Brachyura)*	Malayan Porcupine	Dumsi	LC
6	*Vulpesbengalensis*	Bengal Fox	Fyauro	LC
7	*Funambuluspennantii*	Five Stripped Palm Squirrel	Paanch Dharke Lokharke	LC
8	*Semnopithecus schistaceus*	Nepal Grey Langur	Dhedu	LC
9	*Martes flavigula*	Yellow Throated Marten	Malsapro	LC
10	*Mos hosmour*	Hill Mouse	Musa	LC
11	*Gangetica canisaureus*	Golden Jackal	Syaal	LC

Source: IEE Field Visit Survey, 2020

166. Some of the birds reported in the forest areas are listed in *Table V-VI.* The status of these birds is as per IUCN & IBAT reports.

Table V-VI: List of Birds in the project area

S. No.	Scientific Name	English Name	Local Name	Status
1	*Tyto alba*	Common Barn Owl	Gothe Latokosero	LC
2	*Ictinaetus malaiensis*	Black Eagle	Dronak Chil	LC
3	*Psilopogon asiaticus*	Blue Throated Barbet	Basanta	LC
4	*Eudynamys scolopaceus*	Common Koel	Koili	LC
5	*Arborophila torqueola*	Common Hill Patridge	Piura	LC
6	*Acridotheres tristis*	Common Myna	Dangre Rupi	LC
7	*Coturnix coturnix*	Common Quail	Battai	LC
8	*Streptopelia sp*	Dove	Dhukur	LC
9	*Bubo bubo*	Eurasian Eagle Owl	Hapsilo	LC
10	*Psilopogon (Megalaima) virens*	Great Barbet	Nyauli	LC
11	*Cuculus micropterus*	Indian Cuckoo	Kafal Pakyo	LC
12	*Corvus macrorhynchos*	Large Billed Crow	Kaalo Kaag	LC
13	*Caprimulgus macrurus*	Large Tailed Night Jar	Lapuchhre Chaite Chara	LC
14	*Psittacula cyanocephala*	Plum Headed Parakeet	Tuisi Suga	LC
15	*Passer domesticus*	Sparrow	Bhangera	LC
16	*Bubo nipalensis*	Spot Bellied Eagle Owl	Mahakaushik	LC
17	*Lophura leucomelanos*	Kalij Pheasant	Kalij	LC
18	*Pellorneum ruficeps*	Puff Throated Babbler	Thople Bhyakur	LC

Source: IEE Field Visit Survey, 2020

167. The commonly found Herpito-fauna observed in the project area are presented in *Table V-VII*.

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

S. No.	Scientific Name	English Name	Local Name	Status
1	*Calotes versicular*	Garden lizard	Chheparo	LC
2	*T. albolabris*	Green Pit Viper	Haryau	LC
3	*Hemidactylus brookii*	Common lizard	Mausuli	LC

S. No.	Scientific Name	English Name	Local Name	Status
4	*Bufo melanostictus/Duttaphrynus Himalayanus*	Common toad	Bhyaguto	LC
5	*Ovophis monticola*	Mountain Pit Snake	A(a)ndho Sarpa/Gurube/Chhirbire Sarpa	LC
6	*Ptyas mucosus*	Rat Snake	Dhaman	
7	*Rana cyanophylectis*	Stream Frog	Bhyaguto	LC*

Source: IEE Field Visit Survey, 2020

168. Similarly, the commonly found fishes in the project area are given in *Table V-VIII.* These species are found in the nearby water bodies of the project area that includes Chharange Khola, Hattichhahara Khola and Other minor water bodies like Odare,Jhapre Khola, Dund Khola etc.The status of these fishes are as per IUCN & IBAT reports.

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

S. No.	Scientific Name	English Name	Local Name	Status
1	*Schizothoraichthys sp*	Trout	Asala	LC
2	*Garra* annandalei	Annandale Garra	Chuche Buduna	LC
3	*Barilius vagra*	Vagra Baril	Faketa	LC
4	*Neolissocheilus hexagonolepis*	Copper mahseer	Katle	LC
5	*Glyptothorax indicus*	Catfish	Mungri	LC
6	*Heteropneustes fossilis*	Stinging Catfish	Singhi	LC
7	*Nemacheilidae(Schistura Multifasciata)*	Stone Loach	Gadela	LC
8	*Psilorhynchus pseudecheneis*	Stone Carp	Tite	LC
9	*Channa gachua*	Dwarf Snakehead	Hile	LC
10	*Tor tor*	Tor Mahseer/Tor barb	Sahar	Not Known

Source: IEE Field Visit Survey, 2020

b) Protected Areas

169. Gauri-Shankar Conservation Area that falls under IUCN Category V-VI is located in the district of the subproject area. Apart of this, no other ecologically sensitive areas is located in the subproject area. The location of this conservation area is shown in the figure given below:

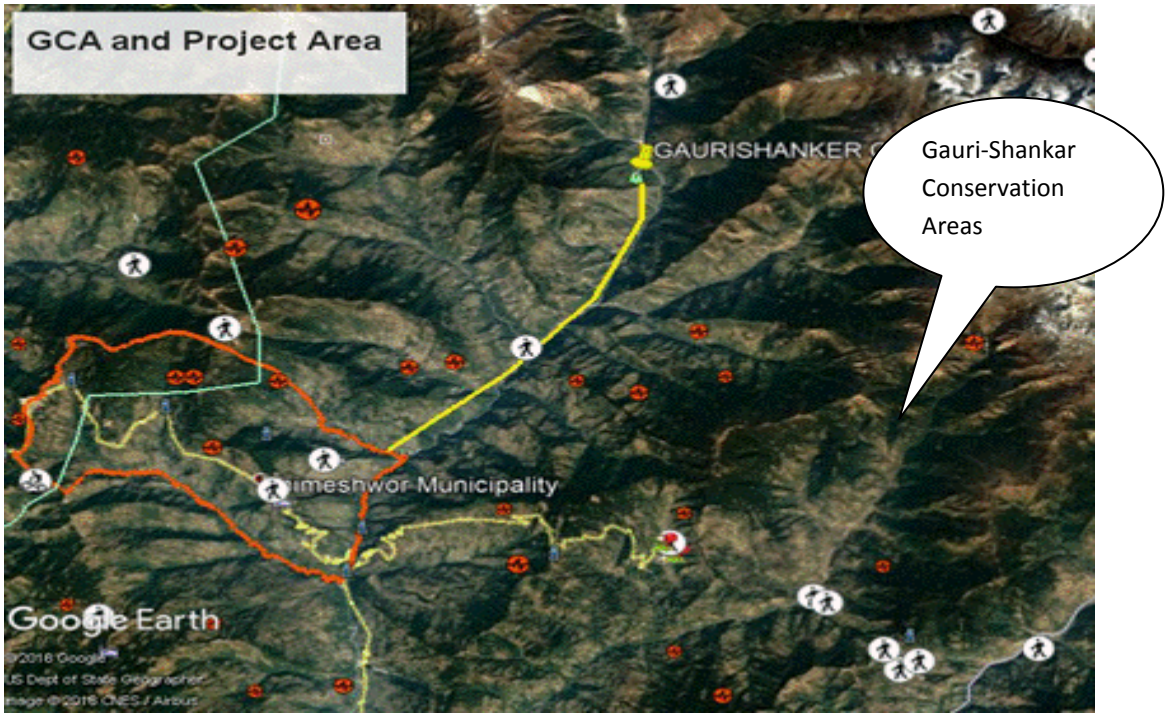

Figure V-I: Google Earth Map showing Location of Subproject and Gauri-Shankar Conservation Area

170. The location of Gauri-Shankar Conservation Area does not indicate that the protected area will be affected by the proposed subproject. Its distance from the subproject area confirms its vulnerability. The proximity report generated by the Integrated Biodiversity Assessment Tool report shows that this conservation area lies within 10 km from the Charikot town. However, the analysis on google earth shows that the subproject municipality is about 20.3 km far from the conservation area. It is illustrated in the above given *Figure V-I*. Similarly, the subproject site is downstream of the protected area. Hence, this confirms that the proposed subproject activies will not affect the protected area.

c) Forest Areas

171. There are various community forests nearby the project area. However, there is only one community forest that is intervened by the project. The WWTP for Jilu system has been proposed within the Shree Gaude Community Forest.

172. The concerned WUSC has already got written consent from the concerned Community Forest Users Groups (CFUGs) and Bhimeshwore Municipality.

C. Socio-economic & Cultural Environment

a) Demographic Features

i. Settlement Pattern

173. Our field observation shows that the spatial distribution pattern of settlements in Bhimeshwor Municipality is found to be scattered in the agricultural village areas and agglomerated in the accessible commercial areas, tended to be clustered in the main road area. There is a dense linear settlement in the main Charikot Bazaar. The rural area of the project area is gradually shifting towards the urban area with emerging market along the main roads and settlements; however such urban growth has been hindered by limited population growth and steep terrain of the area. Most of the government and non-government offices are

located in wards 9 & 10, which is the most densely populated area of the service area. Nevertheless, the settlement pattern of the other wards is scattered.

ii. Population Distribution

174. Astheallofthe service area lies intheformermunicipalityboundary,totalpopulationof historicaltimeof formermunicipalityhad been used forthe population assessments of the area.

Table V-IX: Population of the former Bhimeshwore Municipality

Year	Population
1981	16,761
1991	19,261
2001	21,916
2011	22,537

Source: DEDR,WS Project, 2018

175. However, the Municipality hasincreasedit judiciaryboundary more than double folds during March 2017 by incorporatingadjoiningformerVDCs.Theformationofthenew municipalityhas been described inearlier (section1.2). Therefore,thepresent populationassessmentofnewlyformedmunicipalityhasbeen carried outbysummingupneighboringVDCs'populationdata.Thewardwisepopulation oftheprojecttown according to the census, 2001 and 2011hasbeen presentedbelow:

Table V-X: Population of the Project Town

Ward	W. Area	Census 2001			Census 2011			Growth Rate
	Ha	HHs	Pop	P.Densities	HHs	Pop	P.Densities	
1	2,178	746	3547	1.63	864	3437	1.58	-0.31
2	1,189	1123	4672	3.93	984	3571	3.00	-2.65
3	499	662	3036	6.08	1134	4330	8.68	3.61
4	501	397	1861	3.71	644	2448	4.89	2.78
5	1,629	925	4216	2.59	1140	4198	2.58	-0.04
6	533	854	3559	6.68	1312	4626	8.68	2.66
7	2,157	948	4572	2.12	862	3364	1.56	-3.02
8	1,793	772	3706	2.07	775	2793	1.56	-2.79
9	2,771	830	4508	1.63	924	3713	1.34	-1.92
Total	**13,250**	**7257**	**33677**	**2.54**	**8639**	**32480**	**2.81**	**-0.36**

Source: CBS 2001 & 2011

176. The above given table shows that thetotalpopulation of BhimeshworMunicipality asperthecensusof 2011 A.D. is32,480. Thepopulation ofthe municipality in 2001 A.D. was 33,677. The analysis of the census population shows that the overallannual growthrateofthemunicipality isdeclining by0.36%.Mostofthewardshave haddeclining population growthratein lastdecade.ThedecliningpopulationgrowthrateattributedtotheMaoist insurgencyduring early 2000 AD.

177. However,Ward no 3, 4 and 6of the municipality (formerward no 1, 5, 7 and 12 of BhimeshworMunicipality or main Charikot area) have positive growth rate. The population densities of these wards are comparatively high.

178. AsthesocialsurveyshavebeencarriedoutbeforetheformationofpresentBhimeshworMuni cipality,all thesocialinformation has been collected and presented intermsofformerwards.The

servicearea of the proposedCharikotWaterSupplyandSanitationSubprojectcomprisespartialwardareaofformerward nos.2,3,4,5, 6,8,9,12and13andcompleteareaofformerwardnos.1,7and 10oftheformer Bhimeshwormunicipality.Theprojectareahasbeendelineated inconsultationwith WUSCandthe local community.Theconsultantsconductedasocioeconomicsurveyin2016A.D. oftheproposedservicearea. The survey shows that thetotalpopulationof the service areais 21,909.The wardwise household number and population of the service area is given in the table given below:

Table V-XI: Households & Population of Beneficiaries

Former Ward	Present WardNumberof Bhimeshwor Municipality	HHS	TotalPopulation
1	CompleteAreaofWN 3	937	6,214
2	PartialAreaof WN2	211	938
3		72	303
4		68	393
5	PartialAreaof WN4	220	1,056
6	PartialAreaof WN5	344	1,570
7	PartialAreaof WN4	305	1,408
8	PartialAreaof WN5	241	1,043
9		32	136
10	CompleteAreaof WN3	843	5,984
12	CompleteAreaof WN7	287	1,607
13		282	1,257
Total		**3842**	**21,909**

Source: Socio-economic Survey, 2015

b) Caste/Ethnic Groups

179. The composition of the community by caste/ethnic is heterogeneous. Therefore, the diversity of cultures, customs, traditions, norms, and values exists in the project area. The household survey of the subproject area also reflects the cross-section of major ethnic groups of the country.

180. The survey revealed that Brahmin/Chhetri are the major caste group of the project area comprising about 48.59% (1867) of the total 3842 households whereas the Janajati comprises about 41.25% (1585). Similarly, the Dalits and other caste groups (Mushalman and Madheshi etc.) are 9.94% (382) and 0.21% (8) respectively.

c) Economic Activities

181. The economy of the municipality is extensively agrarian although most of the households in the project area depend on more than one occupation. During the household survey of the project area, the detailed data has been collected regarding the major occupation and economic activities of each household of the project town. The survey shows that out of 3842 households, the highest number of population, i.e., 35.92% (1380) are engaged in Agriculture, 23.97% (921) population depend on the business, 26.68% (1025) are engaged in services, 6.98% (268) were abroad for foreign employment and 1.48 % (57) are engaged in running industries. Similarly, about 2.86% (110) and 2% (77) of household head are dependent upon labor and other miscellaneous works respectively. The survey also shows that the lowest (0.10%) of the households are dependent.

182. There are four public and private banks proving banking services to the people of the municipality. Similarly some cooperatives are also in operation in the service area.

d) Education & Skills

183. The institutional data shows that there are 12 educational institutions including two Multiple Campus one Nursing campus, eight higher secondary level schools as well as one children home was recorded in service area with 5363 people including students, staffs and teachers. The study also shows that most of the educational institutions are depending on both tap and springs water source.

184. The survey also revealed that about 9.27% (356) of households head are illiterate. Whereas, just literate ratio is 33.78% (1298) and only 6.77% have graduated or reached above graduate level.

e) Health & Sanitation

185. Medical facilities for diagnosis and treatments are available in the service area. There are seven medical institutions including three hospitals, four Health post and polyclinic with 49 bed capacities was recorded.. Similarly, there is also facility of some polyclinics, pharmaceutical stores and medical shops in the project town.

186. Thesurveyrevealedthatcasesofwaterbornediseasessuchasdiarrhea,dysentery,stomachac hesand skindiseaseetc.arefoundtobeveryfew.Similarly,casesofmortalitybywaterrelateddiseasesarenil. The information related to water borne and communicable disease was crossed checked by visiting hospital and health posts within the service area. Accordingtothesurvey,there is record of4.87% (889) people that sufferedfromdiarrheaand 4% (735) thatsufferedfrom dysentery.Similarly,about2.58% (472) people were known to be sufferedfrom otherdiseasessuchasskin diseases, stomach pains, feveretc.

f) Existing Water Supply

187. There are severalpiped water supply systems constructed under various programmeby different agencies indifferentyear.Thereareabout17majorsystem operatedby17different WUSC.Thedetailofeach systemwith regardof name of source,numberof tapsand storagetanks hasbeen shown intable given below:

Table V-XII:Name list of WUSC and Its Details

S.No.	Nameof WUSC	Source	No.of Taps	No.x Cumof RVT
1	CharikotWUSC BNP	DundKhola,GairiKhola,Arupatein WN13,Odare1,2, 3WN 9, Jhule KholaWN 10andSuspaWN 6all areinBNP	707	1-200,2-95, 3-130,1-100
2	ChothangWUSC BNP-10	JhuleKhola	60-65	1
3	MaidaneWUSC BNP-10	Beesauna	40-50	N
4	KholeWUSC BNP-12	Local spring	20	
5	TaknagiWUSC BNP-10	Tagnagi	60	No
6	Ramkot WUSC BNP-10	Ramkot spring	75	No
7	GauriSwora ThapaGroupBNP-10	Mulkharka	95	3x10
8	PuranoBazarWUSC BNP-1	Darfeko JungleTundikhel	125	1x100
9	DolakhaWUSC BNP2&3	Gautam Tole,	500	1x20,2x50,&1x90
10	HattiCharaCharighangManedanda BNP	Hattichara,		18
11	JiluBhatmaseBNP7	Jhulekhola	80	1x200

S.No.	Nameof WUSC	Source	No.of Taps	No.x Cumof RVT
12	UpperMattiWUSC BNP8	ThuloDharo,Sano&ThuloPokhari	125	3x10
13	MiddleMattiWUSC BNP8	Banpaleand TrishulMuhan	200	1x10,3x20&1-25
14	JungeChanseWUSC BNP6	ChanseMuhan	200	
15	JiluWUSC BNP5&7		200	
16	Khanepani WUSC(Dolakha)	Darfe Jungle	155PVT. +35P	2x20,1x50&1x90
17	DolakhaWUSC	Teekhatal&Chakthali	110PVT&3P	1x20&1x40

Source: DEDR, 2020

188. Similarly, a new water supply system , Charikot Water Supply & Sanitation Project under UWSSP is under construction.

g) Septage Management

i. Status of Household Latrine

189. The survey revealed that about 23.19% household have pour flush latrines whereas 34.36% households have ventilated pit latrines. Similarly, 38.37% have pit latrinesand only 0.23% of households are using Cistern flush type of latrines. The detailed information is given in the table given below:

Table V-XIII: Number and Type of Household Latrine

Type of toilet	1	2	3	4	5	6	7	8	9	10	12	13	Grand Total	%
No toilet	36	31	10	11	4	5	4	6	0	22	12	7	148	3.85
Pit Latrine	76	21	10	9	214	338	299	232	0	21	175	79	1474	38.37
V. Pit	462	156	50	48	2	1	2	1	32	270	100	196	1320	34.36
Pour flush	357	3	2	0	0	0	0	2	0	527	0	0	891	23.19
Cistern flush	6	0	0	0	0	0	0	0	0	3	0	0	9	0.23
Grand Total	**937**	**211**	**72**	**68**	**220**	**344**	**305**	**241**	**32**	**843**	**287**	**282**	**3842**	100

Source: Socio-economic Survey 2016

ii. Status of Septic Tank

190. The survey revealed that 57% of total 3842 households have septic tanks whereas 43 % of households do not have septic tank so far. Generally, most of the households have constructed permanent type of septic tanks and the size of septic tanks varies within the service area. Some households are also using concrete ring so far.

iii. Willingness for Septage Improvement

191. Almost the entire respondent has shown willingness towards the improvement of septage with in the community. The sampled survey shows that about 99% households have shown willingness to improvement of septage management whereas only 1% has shown unwillingness toward it. The details are presented in the table given below:

Table V-XIV: Willingness for Septage Management

Willingness to improve Septage Management	Service Area										Grand Total	%
	1	2	5	6	7	8	9	10	12	13		
No	1	1	0	0	0	0	0	0	0	0	2	1.0
Yes	30	8	15	16	17	10	1	57	28	8	190	99.0
Grand Total	**31**	**9**	**15**	**16**	**17**	**10**	**1**	**57**	**28**	**8**	**192**	**100**

Source: Sampled Household Survey 2016

iv. Willingness for Improvement of Septage Management by Type of Activities

192. The sampled survey revealed that almost all the respondents have shown willingness towards the improvement of septage management within the community. According to the sampled survey, 13% of the total 192 householdsare willing for the connection of household latrines with community septage system whereas 48.4% of total households are willing to improve the septic tank and household latrines so far. Likewise, 38.5% of the respondents have shown willingness toward the Improvement in existing septic tank. The details are presented in the table given below:

Table V-XV: Willingness for Improvement of Septage Management by Type of Activities

Things to Improve Septage Management	Ward										Grand Total	%
	1	2	5	6	7	8	9	10	12	13		
Installation Septic Tank	26	9	11	11	5	10	1	14	6	0	93	48.4
Improvement in Existing Septic Tank/Latrine Pit	3	0	4	3	12	0	0	26	22	4	74	38.5
Community Septage System Adjoining to Latrine	2	0	0	2	0	0	0	17	0	4	25	13.0
Grand Total	**31**	**9**	**15**	**16**	**17**	**10**	**1**	**57**	**28**	**8**	**192**	**100.0**

Source: Sampled Household Survey 2016

v. Willingness for Investment for the Improvement of Septage Management

193. The survey team has collected data regarding the willingness for investment to improvement of Septage management in service area. According to the findings 100% of households are shown their willingness to spend for septage management. About 32.29% of total household are willing to invest less than NRs.1500. Similarly, the remaining households are willing to invest fromNRs. 1500 to above NRs.15000. The detailed information is given in the tablegiven below:

Table V-XVI: Willingness for Investment to Improvement of Septage Management

Investment Range	Service Area										Grand Total	%
	1	2	5	6	7	8	9	10	12	13		
>Rs.15000	0	0	0	0	0	0	0	7	0	0	7	3.65
Rs.9001-Rs.15000	1	0	1	1	4	0	0	10	0	2	19	9.90
Rs.6001-Rs.9000	2	0	2	4	12	0	0	2	2	2	26	13.54
Rs.3001-Rs.6000	1	0	1	0	1	0	0	9	0	0	12	6.25
Rs.1501-Rs.3000	18	9	3	2	0	0	1	26	4	3	66	34.38
<Rs.1500	10	0	9	7	0	10		2	22	2	62	32.29
Grand Total	**32**	**9**	**16**	**14**	**17**	**10**	**1**	**56**	**28**	**9**	**192**	**100.00**

Source: Sampled Household Survey 2016

vi. Septage Management Practice in Service Area

194. The survey revealed that about 64.58% of total 192 households hire person for cleaning the septage whereas 0.52% of household hire the concerned service company. Similarly, only 34.9% of household are found to be cleaning the sepatge by themselves. The detailed information is presented in the table given below:

Table V-XVII: Existing Septage Management Practice in Service Area

Cleaning of Septic Sludge	1	2	5	6	7	8	9	10	12	13	Grand Total	%
Self-Cleaning	8	9	3	6	4	10	0	21	4	2	67	34.90
Hire Cleaning Person	22	0	12	10	13		1	36	24	6	124	64.58
Use Service of Management Company	1	0	0	0	0	0	0	0	0	0	1	0.52
Grand Total	**31**	**9**	**15**	**16**	**17**	**10**	**1**	**57**	**28**	**8**	**192**	**100.00**

Source: Sampled Household Survey 2016

vii. Place of Septage Disposal within Service Area

195. The survey team has collected data regarding the practices of disposal of septage waste within the service area. According to the findings, 34.9% of total 1925 sampled households are disposing septage in the agricultural land & field, whereas negligible 0.5% households are disposing in forest/public places. About 64.6% are disposing in river/streams whereas no practice has been observed to be adopted todispose the septagealong theside of road or wherever possible. The detail information is given in the below table:

Table V-XVIII: Place of Septage Disposal in Service Area

Management of Septic Sludge	Ward										Grand Total	%
	1	2	5	6	7	8	9	10	12	13		
Land/Fields	8	9	3	6	4	10		21	4	2	67	34.9
River/Streams	22	0	12	10	13	0	1	36	24	6	124	64.6
Forest/Publ;ic Places	1	0	0	0	0	0	0	0	0	0	1	0.5
Side of Roads	0	0	0	0	0	0	0	0	0	0	0	0
Easy Way	0	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	**31**	**9**	**15**	**16**	**17**	**10**	**1**	**57**	**28**	**8**	**192**	**100.0**

Source: Sampled Household Survey 2016

viii. Willingness for Cost Contribution to Septage Cleaning Activity

196. The survey team has collected data regarding the willingness to contribute the cost for cleaning of septage within the service area. According to the findings, 8.33% of total 192 sampled households are willing to spend up to Rs. 2000 whereas 75% are willing to spend more than Rs. (2001-10000). About 16.6% household are willing to invest more than 10,001 so far. The detail information is given in the below table:

Table V-XIX: Willingness for Cost Contribution to Septage Cleaning Activity

Range of Investment	Ward										Grand Total	%
	1	2	5	6	7	8	9	10	12	13		
< Rs.2000	1	3	0	1	2	0	0	3	6	0	16	8.33
Rs.2001-Rs.10000	26	6	13	12	15	10	0	34	22	6	144	75.00
>Rs. 10001	4	0	2	3	0	0	1	20	0	2	32	16.67
Grand Total	**31**	**9**	**15**	**16**	**17**	**10**	**1**	**57**	**28**	**8**	**192**	**100**

Source: Sampled Household Survey 2016

197. Hence, this shows that the positive response towards the willingness to pay for Septage management as well as Septage claeaning activity indicates the enthusiasm of people residing in the project town for the proposed project.

h) Existing Institutions Involved in Water Supply & Sanitation Sector

i. Existing Institutional Situation

198. The main institutions involved in water supply and sanitation sector in the project area are Bhimeshwor Municipality, Water Supply and Sanitation Division Office (WSSDO), Charikot Water Users and Sanitation Committee, other WUSC Committees and some NGOs. WSSDO, Dolakha has been actively supporting most of the WUSCs to operate the existing water supply system and carry out different WASH activities in the project area. It has been providing both financial and technical support for large-scale maintenance and providing pipes, bleaching powder and human resource as and when needed basis.

199. DWSSM through WSSDO constructed and then rehabilitated the water supply systems. The WUSCs have been managing the existing water supply systems. However, in regard to sewerage system, there are no such institutions involved in the sewerage management system.

ii. Water Supply & Sanitation User's Association

200. Charikot Water Supply Users & Sanitation Committee has been formed as WUSC by integrating the fifteen major existing WUSCs.This Integrated Charikot WUSC consists of eight members that represents the recently merged WUSCs and clusters within the service area. The executive committee consists of six male and two female members and two male members are in key positions of chairperson, vice chairperson and secretary whereas one female member is appointed as treasurer. According to the caste/ethnicity status of WUSC body, six members are from Brahman/Chhetri and 2 female members are from Janajati(Newar Community) groups respectively.This WUSC is now involved in management and improvement of the water supply system in Charikot Bazaar.The name list and position of the memebers of this integrated WUSC are given in table below:

Table V-XX: MembersofCharikot Water Supplyand Sanitation Users Committee

S.No.	Name	Position	Remarks
1	Mr. Ram Krishna K.C	Chairperson	
2	Mr. Krishna Bahadur Khadka	Vice Chairperson	
3	Mr. Dhurba Bashnet	Secretary	
4	Ms. Anita Shrestha	Treasurer	
5	Mr. Moti Prasad Chaulagai	Members	
6	Mr. Ram Saran Thapa	Members	
7	Ms. Kamala Maharjan	Members	
8	Mr. Ram Sharan Thapa	Members	

Source: Socio-economic survey, 2015

i) Other Utilities

i. Transportation

201. The Lamosanghu-Jiri road passes through the Bhimeshwor Municipality. Lamosanghu is located on the Arniko Highway (also referred as Kodari Rajmarga). The project area is approximately 139 km from Kathmandu. Regular local and express bus

services are available from Kathmandu. The nearest airport is the Jiri airport, 20 km far from Charikot; however, this airport is not in operation. Apart of this, other nearest airports are Phaplu Airport, Rumjatar Airport and Lukla Airport.

ii. Communication & Electricity

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

iii. Other Development Activities

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

204. **Agricultural Development:** The areas adjoining the project area even within the municipal boundary are good for agriculture. The survey report shows that around 35.92% population of the project area is dependent upon the agriculture.

iv. Cultural &Religious Sites

205. This project town is famous for popular temple Dolakha Bhimsen which is one of the popular religious sites of Nepal. However, the project activities will not encroach into this religious site. Apart of this, there are no other remarkable cultural and religious sites near the project area.

VI. ANTICIPATED IMPACTS OF THE PROPOSED PROJECT ON ENVIRONMENT

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

207. The impacts shall be characterized as (i) low, high & medium regarding magnitude, (ii) long term, short term & medium term regarding duration and (iii) site-specific, local & regional/national regarding extent. These anticipated impacts are stated below but not necessarily limited to:

A. Beneficial Impacts

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

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

a) Impact on Socio-economic Environment

i. Construction Phase

I. Employment Generation

210. The project will generate direct employment opportunities to the local people of the area. The construction activities of the proposed project will offer the locals a grand opportunity to be engaged in the proposed project activities as either skilled or non-skilled workers in terms of their proficiency. The main target group for this benefit is People relying on daily wages and those who are still unemployed. The socioeconomic survey shows thatout of total 3842HHs, only 2.86% depend upon labor/daily wages and the lowest i.e.,0.10% are unemployed. Hence, this project can be beneficial to this 2.86% and 0.10%, out of total 3842HHs.

211. Though the number of the available human resources is minimal, they can however be benefitted by involving in this project as the amount of money earned somehow increasestheir level of income thereby reducing the chances of seasonal migration of the local people depending upon daily wages works to survive.

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

213. The enhancement measures for this impact include;

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

II. Skill Enhancement

214. The construction of the project will not only provide direct employment opportunities but also ensure the transfer of skills and technical proficiency to the local workforce. The construction of project components like drains, manholes etc. will provide transferable skills. In future, these skills will be a plus point for the locals in any relevant work as such. Hence, this benefit is targeted to the local people relying on daily wages (2.86% of total 3842 HHs) of this proposed project area if they are made involved in the proposed construction works.

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

216. The enhancement measures for this impact include;

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

III. Local Trade & Business Opportunity

217. The proposed project will directly add in building business opportunity within the area. As the construction work involves a lot of human resources, some grocery stores and, agriculture and livestock product will gain a momentum in the vicinity of the construction site. This will boost the local trade and business sector. Similarly, procurement of locally available construction materials will also help to improve the local trade and business opportunity. The main target group for this beneficial impact is local people involved in local business sector.The socioeconomic survey shows that about 23.97% (921) and only 1.48% (57) of total 3842 HHs is involved in business and industry sector respectively. Though the target group quantity is not so significant, the enhancement of local trade & business opportunity will be somehow fruitful to these people. This may further boost the local trade & economy.

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

219. The enhancement measures for this impact include;

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

ii. Operation Phase

I. Improved Health & Hygiene

220. a) Insufficient space for the existing septic tanks in majority of HHs; b) Difficulty in access for inspection and de-sludging of the septic tanks and c) Poor performance of the existing septic tanks leading towards risk of fecal contamination into groundwater indicates

the prevailing inefficiency in the existing sewerage system of the project town. Ineffective sanitationsystemis one of the mainreasons behind the outbreak of waterborne communicable diseases leading human health & hygiene towards deterioration. After the implementation of this project, the project town will have well managed sewerage system. This will improve the sanitation behaviorof people of the project town. This leads to improved health & hygiene condition of the project town.

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

222. The enhancement measures for this impact include;

- Regular maintenance of the sewerage components to operate the project smoothlyand to make the benefits intact.

II. Social Comfort

223. The existing septage management system of the project town is not satisfactory and inefficient too. After the implementation of this project, the project town will have well managed and improved septage management. This provides social comfort to the beneficiaries giving freedom from the existing disorganized sewerage management.

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

225. The enhancement measures for this impact include;

- Regular maintenance of the sewerage components to operate the project smoothlyand to make the benefits intact.

III. Increased Urban Aesthetic Value

226. In regard to the existing septage management, it has been observed that it is quite troublesome to desludge the septic tank and transport the septage to the final disposal site. During transportation, it may create nuisance and spread bad odor to the surroundings. Similarly, the untreated sludge at the disposal point may create nuisance surroundings.Implementation of Sewerage (DEWATS) system reduces this problem as the wastewater is treated, reused or disposed at close vicinity to its source. This makes the surroundings well organized & clean and enhances the urban aesthetic value.

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

228. The enhancement measures for this impact include;

- Regular maintenance of the sewerage components to operate the project smoothlyand to make the benefits intact.

IV. Beneficial Reuse of Effluent & Sludge

229. As it has already been mentioned that the effluent from the HFCW is collected into the polishing pond for disinfection of pathogens by UV radiation from direct sunlight. The water in the polishing pond can be reused for gardening and flushing of water closet. Similarly, the dried sludge can either be converted into briquette that can be used as fuel or can be used as organic fertilizer.

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

231. The enhancement measures for this impact include;

- Regular maintenance of the sewerage components to operate the project smoothlyand to make the benefits intact.

V. Increased Land Value

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

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

234. The enhancement measures for this impact include;

- Ensuring regular inspection of the operation of sewerage components
- Promoting urbanization through proper land development activities in the area.

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

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

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

Beneficial Impacts	Impact Rating				
	Nature	Magnitude	Extent	Duration	Rating
Construction Phase					
Employment Generation	D	H (60)	L (20)	ST (5)	Very Significant (85)
Skill Enhancement	ID	M (20)	L (20)	LT (20)	Significant (60)
Local Trade and Business	D	M (20)	L (20)	LT (20)	Significant (60)
Post Construction Phase					
Improved Health and Hygiene	D	H (60)	L (20)	LT (20)	Very Significant (100)
Social Comfort	D	H (60)	L (20)	LT (20)	Very Significant (100)
Beneficial Reuse of Effluent & Sludge	D	H (60)	L (20)	LT (20)	Very Significant (100)
Increased Urban Aesthetic Value	D	H (60)	L (20)	LT (20)	Very Significant (100)
Increased Land Value	ID	L (10)	L (20)	LT (20)	Significant (50)

Source: National EIA Guidelines,1993 & IEE Study 2019/20

Note: Scoring is done based on following;

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

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

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

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

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

Significance of Impact

Total Score: More than 75 : Very Significant

50-75 : Significant

Less than 50 : Insignificant

B. Adverse Impacts

a) Impact on Physical Environment

i. DesignPhase

I. Soil Erosion and Slope Instability

237. As the project town is a hilly area, there is possibility of Soil Erosion & Slope Instability during project construction. Though this impact will be perceptible during construction phase only, this should also be considered during design phase.

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

239. The mitigation measures for this impact include;

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

II. Traffic Interference

240. During construction works at Charikot Bazaar area, the traffic flow may be disturbed and may affect the normal schedule of the passer by and the vehicles. This impact will be noticed during construction works only, however; this has to be taken into consideration during design phase.

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

242. The mitigation measures for this impact include;

- Prepare &Incorporate Traffic Management Plan in final design

ii. Construction Phase

I. Soil Erosion and Land Surface Disturbances

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

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

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

246. The mitigation measures for this impact include;

- Protecting the foundation from damage during backfilling
- Using the right backfill materials
- Compacting the backfill
- Final finishing the subgrade to ensure that water drains away from the foundation
- Adoption of Drainage Plan & Measures incorporated in final design

II. Spoil Disposal & Gully Erosion

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

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

249. The mitigation measures for this impact include;

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

III. Air Pollution

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

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

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

253. The mitigation measures for this impact include;

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

IV. Noise Pollution

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

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

256. The mitigation measures for this impact include;

- Restricting noisy activities to daytime and overtime work to avoid using noisy equipment;
- Prohibit the use of pressure horn by transportation vehicles
- Conduct noise level test once a year during peak construction stage at location near school, hospital and settlements especially at certain locations of Charikot Core Bazaar Area like Near Health Posts, Near Schools areas and Residential Areas.
- Avoid noise generating activities like excavation works, dismantling for excavation works, loading & unloading of construction materials, noise of material transportation vehicles etc. during school time and at hospital area if any.
- Regular inspection & maintenance of construction/transportation vehicles to ensure the use of Vehicles complying with NVMES,2069 B.S.
- Regular inspection & maintenance to ensure the use of equipments/machinery that comply with applicable emission standards of GoN i.e., National Noise Standard Guidelines, 2012
- Regular inspection & maintenance to ensure the use of Diesel Generators complying with National Diesel Generator Emission Standard,2012

V. Generation of Solid Waste & Waste Water from construction sites and worker's camp

257. During construction phase, generation of solid waste & waste water from the construction sites and workers camp are likely to create nuisance in the surroundings. Soil

runoff from the construction site may lead to off-site contamination (particularly during rainy season). Similarly, improper disposal of construction debris may lead to off-site contamination of water resources. Unmanaged solid waste &effluent from workers camp may contaminate the surroundings.This will affect the construction workers, people residing in this area and the passers-by.

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

259. The mitigation measures for this impact include;

a) Construction Wastes

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

b) Solid Wastes, Wastewater and Sewage from labour camp

- Adopt Segregation of Solid Waste (3R Concept) based on being biodegradable or non-biodegradable. It is because decomposers cannot break down non-biodegradable wastes and their disposal poses a big problem.
- Management of biodegradable wastes that includes food waste, paper waste, biodegradable plastic, etc. by any suitable processes that include Composting & Incineration. If these two processes are not possible then, the wastes shall be managed either by handing over these wastes to the municipality waste collectors who will finally dispose those wastes to the landfill sites of the project town or by disposing those wastes to the burial pits at suitable place.
- Non-biodegradable wastes like glass, plastics & metals shall be managed by reusing them for site use or selling them to scrap dealers instead of disposing them
- Strict Prohibition on open incineration of solid wastes & use of plastic materials to minimize the quantity of plastic wastes.
- Construction of the temporary latrines with temporary soak pits & septic tanks within the campsite for proper disposal of sewage.
- Provide temporary but proper drainage system for proper outlet of waste water generated from cooking practices adopted by the workers
- Employ local people from nearby villages to maximum extent possible. It will minimize the number of workers residing at worker's camp. Lesser the number of people, lesser will be the solid waste & effluent generated. However, it cannot be

made mandatory because availability of local people with required skills will not be ensured at the time of construction

VI. Accidental Leakage or Spillage of Stored/Fuel Chemicals

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

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

262. The mitigation measures for this impact include;

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

VII. Impact on Land Use Pattern

263. The construction of the proposed project components will occupy significant area of the land within the core area. This will affect the current land use pattern as the land to be used for the construction of these components could be used for other purposes like agricultural, residential etc. This effect will be direct in nature.

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

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

266. The mitigation measures for this impact include;

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

VIII. Haphazard Disposal of Dismantled Debris

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

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

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

270. The mitigation measures for this impact include;

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

b) Impact on Biological Environment

i. Construction Phase

I. Impact on Flora & Fauna

271. The proposed project will have impact on floral diversity of the project area. The field study shows that the proposed project requires small area of land of Shree Gaude Community forest for which there is requirement of cutting down of around 25 trees of Pine trees (*Pinus roxburghii*), locally known as *Sallo*. However, the project will avoid tree felling as far as possible. Similarly, for the construction of WWTP-1 at Gairabari, there is requirement of clearing of some bushes and shrubs only. Similarly, during pipe laying works, some of the top soil may be lost.

272. Similarly, the construction works may induce noise that will create discomfort to the faunas existing in those areas.

273. Haphazard site clearing, parking, movement of construction vehicles, use of various equipment, stockpiling, illegal harvesting of forest resources as fuel (NTFP) for cooking by workers and hunting of animals by workers will result in unnecessary loss of vegetation & fauna beyond Project footprints.

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

275. The mitigation measures for this impact include:

- Plantation of 250 tree saplings for the felling of 25 trees in and around the project area as EPR 2077 B.S. (2020 A.D.) obliges compensatory plantation in the ratio 1:10 for every tree felled.
- Replace the excavated top soil to its original position after the completion of pipe laying works

- Re-vegetating disturbed slopes and grounds, as applicable
- Awareness programs regarding conservation of existing flora & fauna, to the workers and the community;
- Adopt the suitable mitigation measures proposed to minimize noise pollution as mentioned above in *Sub Section IV of Section B-a-(ii).*
- Regular Monitoring by DSMC & PMO

II. Impact on Aquatic Life

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

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

278. The mitigation measures for this impact include: i) Strict Monitoring on the daily activities of workers ; ii) Provision of temporary but well equipped toilets; iii) Restriction to workers from fishing; iv) Adopt measures mentioned above in section *Sub Section V of Section B-a-(ii)* for the solid waste management.

ii. Operation Phase

I. Impact on Aquatic Life

279. As per the design, there is provsion of discharge of treated waste water into the nearby water bodies. The entry of waste water into the water bodies may be detrimental to aquatic lives.

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

281. The mitigation measures for this impact are as follows:

- Construction of Polishing Pond as the design concept includes provision of polishing pond to which waste water is collected via HFCW where the pathogens existing in waste water are killed using ultra violet rays from the sunlight. The waste water discharged from the polishing pond may not contain harmful constituents as for assurance there is also provision of laboratory set up before the final discharge.
- Regular Inspection & Maintenance

c) Impact on Chemical Environment

i. Construction Phase

I. Impact on Water Quality of Nearby Water Bodies

282. During construction phase, nearby water bodiesmay get polluted due to the chance of disposal of solid wastes by the workers and poor sanitation behaviour of the workers. This will lower the water quality of those water bodies.Polluted water bodies will be detrimental to aquatic life as well as to the health of people relying mainly on the river and streams as sources of water for drinking and other domestic uses.

283. Similarly, sewerage pipeline may cross small water bodies, exposing these resources to risks of pollution caused by poorly managed construction sediments, wastes and hazardous substances**.**

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

285. Mitigation measures will be implemented before the construction stage to prevent the contamination of drinking water source and other environmental receptors from worker camps and construction site toilets septage. The mitigation measures include;

- Appropriate design of septage disposal will minimize the risks to public health. The appropriate design of toilets includes septic tanks that are designed as per national standards and codes to allow for maximum retention of septage. This includes ensuring septic tanks are sealed and watertight. Septage disposal pit will be designed and constructed in accordance with international best practice and acceptable standards. This will include, locating disposal pits at least 300 m away from the nearest dwelling and 30 m downstream of the drinking water source, the pits will be installed on relatively flat land with no more than 8 % slope and sites selected for locating of pits will not be where food crops are grown. The sanitation condition will be maintained to deter flies, mosquito breeding, free from odor. The septage disposal site will ensure no disturbances to nearby community forests.

286. In additional to this, other mitigation measures include

- disposing of spoils or excess soils as free filling materials as soon as possible;
- locating temporary storage areas on flat grounds and away from main surface drainage routes;
- shielding temporary storage areas with sandbags
- adopt measures mentioned above in the *Sub Section V of Section B-a-(ii)*for the solid waste management
- implementing eco-friendly solid and hazardous waste management, disposing them promptly;
- providing adequate water supply and sanitation facilities at work sites.
- Strict supervision on the behaviour of workers for the waste management as well as sanitation behaviour and monitoring the workers to manage the wastes properly.

ii. Operation Phase

I. Impact on Surface Water Bodies

287. The dried sludge from sludge drying bed needs to be properly disposed. But, ifthis dried sludge is directly disposed into the nearby water bodies,this may degrade the water quality of the river.

288. Similarly, the treated waste water is finally collected in polishing pond. There is also provision of discharge of waste water from polishing pond into the nearby water bodies.

There is greater chance of waste water getting partially treated and if those partially untreated water is discharged in to the water bodies, this may lower the quality of the water bodies.

289. This impact will be more troublesome during dry season when the flow will be less and self-cleansing capacity of the river will be less.

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

291. The mitigation measures for this impact are as follows:

- Implementation of Sludge Management plan as mentioned in Section D of Chapter IV.
- Regular monitoring of effluent characteristics at the proposed laboratory set up.
- Regular monitoring of the operation of WWTP to avoid carelessness in treatment.

II. Groundwater Pollution

292. There is also possibility of laying of some of the sewer lines below the groundwater table as sometimes it cannot be avoided at all and during rainy season, the ground water table may be raised to such level that groundwater may find its way into the proposed sewer line through the leaked sewer pipes if any. This could result in groundwater pollution.

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

294. The mitigation measures for this impact are as follows:

- Regular Inspection of the sewer system to avoid leakage in sewer pipes and if such leakage is recognized, immediate repair & maintenance of leaked sewer pipe

d) Impact on Socio-economic Environment

i. Design Phase

I. Structural Instability

295. This Bhimeshwore municipality is also seismic prone zone area as it was also highly affected by the massive earthquake that shook various parts of Nepal in April 25, 2015. If certain seismic activity again occurs in the future, this may result in Cracking of structure that leads to facility failure and public discomfort. Though this impact will be experienced during operation phase, this should be considered during design phase so that such possibility of structural failure can be reduced to greater extent through safe design of earthquake resistant structures.

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

297. The mitigation measures for this impact include:

- Proper Design of earthquake resistant structures as per standard and code of practice.

II. Health & Safety of Community & Workers

298. During design phase, the design concept of project componentsmay not emphasize the health & safety of community &workers. Thismay affect health & safety of community & workers during construction.

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

300. The mitigation measures for this impact include:

- Incorporate concept of health & safety in the final design.

III. Damage to the existing utilities

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

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

303. The mitigation measures for this impact include:

- Budget Allocation for restoration/replacement of damaged utilities.

ii. Construction Phase

I. Community Health & Safety Hazards

304. Overall, the communitymaybe exposed to cross-cutting threats from the impact on air & water quality, ambient noise level; mobility of people/goods/services; access to properties/economic activities/social services; service disruptions, etc. Communicable and transmittable diseases may potentially be brought into the community by construction workers.

305. Beyond the abovementioned anticipated threats, currently,the ongoing pandemic i.e. **COVID-19** that has been spreading widely throughout the world could be the biggest threat to community health & safety during construction phase. As there are no proven vaccines or specific treatments for COVID-19 yet, though several are in development, it is either difficult or even impossible to speculate the ending of this pandemic with any degree of certainty. Hence, this pandemic may show its existence during project constructon activities too. This disease spreads most often when people are physically close.It spreads very easily and sustainably through the air, primarily via small droplets and sometimes in aerosols, as an infected person breathes, coughs, sneezes, talks, or sings. It may also be transmitted via contaminated surfaces, although this has not been conclusively demonstrated. Hence, there is possibility of spreading of this pandemic within the community through the construction workers as the workers may not belong to their community and may be infected with this disease.

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

307. The mitigation measures for this impact include:

- Contractor's implementation of EMP
- Adequate lighting, temporary fence, reflecting barriers and signage at active work sites;
- Contractor's preparedness in emergency response;
- Adequate dissemination of GRM and Contractor's observance/implementation of GRM
- The mitigation measures to deal with COVID issues as mentioned above includes: i) Coordination & Monitoring; ii) Preventive Measures like Frequent Hand Wash, Use of Sanitizers, Social Distancing, Use of Face Masks (N95 Masks) or Cloth Face Coverings etc; iii) Provision of Quarantine for the infected ones; iv) Prohibitory Measures like Prohibition on entryinto the construction sites and labor camps for the outsiders or those who are not concerned with the project construction activities, Prohibiting workers to get mingled within the community etc.

II. Workers' Health & Safety Hazards

308. Workers may also be exposed to the cross-cutting threats of the impacts during construction. Inadequate supply of safe/potable water and inadequate sanitation facilities to the worker's camp; poor sanitation practices on site; poor housing conditions; the handling and operation of construction equipment; handling of hazardous substances; exposure to extreme weather and non-observance of health and safety measures, pose additional threats to the health and safety of construction workers.

309. Construction workers may also be potentially exposed to various infectous diseaseswithin the workforce. Like, Dengue, a mosquito-borne viral disease is a rapidly emerging disease in Nepal. The largest ever outbreak of this disease was reported in 2019 A.D., claiming lives of six people. Hence, dengue has been identified as one of the youngest emerging infectious diseases in Nepal. This virus is transmitted to humans through the bites of infected female mosquiotes primarily, the *Aedes aegypti* mosquito. This disease is seen mostly during monsoons as and even during summers.

310. Besides this dengue, other infectous diseases like Scrub Typhus, Influenza (H5N1)-Bird Flu Virus and Influenza (H1N1) –Swine Flu Virus are also emerging in Nepal. Here, Scrub Typhus is spread to people through the bites of infected chiggers (larval mites). As this is emerging in Nepal, this may pose threats to workers health as the workers may require to work in forest areas as well as grasslands where those chiggers may be lurking. In regard to influenza viruses, it is said that in terms of transmission, human infections with these viruses though rare, have been reported sporadically. Human infections are primarily acquired through direct contact with infected animals or contaminated environments, but do not result in efficient transmission of these viruses between people. However, we cannot deny the fact there may be the chance of spreading this influenza virus within the work force. This may even pose serious threats to their lives.

311. The project town is also highly susceptible to seismic events. If such seismic events occur during the construction period, this may pose threats to the occupational (worker's) health & safety.

312. The effects of COVID-19 pandemic may also pose serious threats to the worker's health & safety during project construction. The workers need to work in group to carry out

various construction activities during which there is high chance of workers getting infected with this disease if any of them is already infected ones.

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

314. The mitigation measures for this impact include:

- Comply Labor Act,2074 B.S. (2017 A.D.) of GoN
- Submission of Simple OHS plan for employer's approval that involves appropriate health & safety arrangement that includes minimum requirements for various activities like Excavation works, Works within the confined spaces, use of warning signs, boards & signage, Use of PPE, Accident & Emergency Response and Monitoring & Reporting.
- Preparation of COVID Response Plan and Immediate Action in its implementation. Here, the COVID Response Plan includes i) Coordination & Monitoring; ii) Information Delivery to workers in regard to COVID issues prior to the construction; iii) Preventive Measures like Frequent Hand Wash, Use of Sanitizers, Social Distancing, Use of Face Masks (N95 Masks) or Cloth Face Coverings etc.; iv) Provision of Quarantine for the infected ones; v) Prohibitory Measures like Prohibition on entry into the construction sites and labor camps for the outsiders or those who are not concerned with the project construction activities, Prohibiting workers to get mingled within the community etc.; vi) Emergency Health Services like Swab Collection Service for COVID test and its Report Collection, Availability of Medicines etc. ; vii) Use of PPE to avoid infection if required; vii) Provision of proper fooding & lodging facilities
- Train all the site personnel regarding environmental health and safety issues.
- Provide Personal Protective Equipment (PPEs)to workers that includes protective clothing, helmets, goggles, boots and other equipment designed to protect the wearer’s body from injury or infection and ensure their effective usage
- Require workers to wear high visibility clothes
- Maintain hygiene within the labor camp as well as construction sites.
- Ensure no water stagnation either in construction site or in labor camp to get rid of the breeding grounds for the mosquitoes to prevent dengue outbreak.
- Provision of mosquito netting to the workers during sleep hours.
- Make the workers to dress with the full body covered clothing.
- Prohibit the workers to prepare or eat raw or undercooked poultry products.
- Recommend workers to avoid contact with the chiggers while working within the forest areas to reduce the risk of getting scrub typhus.
- Ensure availability of health care facilities for diagnosis and testing if any symptoms of Dengue/Scrub Typhus or Influenza H5N1 or H1N1 are seen.
- Ensure immediate availability of treatment facilities if those suspected cases of Dengue/Scrub Typhus or Influenza H5N1 or H1N1 comes out to be positive.
- Maintain accident reports and records.
- Make first aid kits readily available
- Maintain hygienic accommodation in work camps
- Ensure uncontaminated water for drinking, cooking, and washing,

- Assure clean eating areas
- Make sure sanitation facilities are readily available
- Provide adequate space and light to the camp site
- Adequate supply of potable water to the camps and good sanitation within camps
- Provide medical insurance coverage for workers
- Ensure moving equipment is outfitted with audible backup alarms;
- Hearing protection equipment enforced in noisy environment
- Chemical and Material storage areas need to be marked clearly
- Implementation of Emergency Preparedness Response Plan to be prepared for the earthquake risks that includes i) Reporting of Incidents; ii) Investigation of incidents and iii) Prepared for availability of Stretchers, Life buoys, first aiders, first aid kits etc.

III. Traffic Hindrance

315. The core Charikot bazaar area may be susceptible to traffic congestion during construction of sewerage line as the road of this area is a bit narrower that may provide discomfort to the passer-by & shopkeepers and may obstruct their normal daily routine activities.

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

317. This impact cannot be avoided because the structure of the bazaar area is very congested. However, this impact can be mitigated as follows;

- Backfilling the trench immediately followed by compaction right after completion of pipe laying works.
- Provision of signage at appropriate locations indicating available alternate access routes to minimize traffic disruptions.
- Provision of simple wooden walkways to ensure access to shops and residences.
- The contractor shall follow the Traffic Management Plan especially at Charikot Bazaar Area, the sample of which has been attached in ***Annex 2D***.

IV. Public Protests

318. Due to the interruption of traffic flow along the proposed sewerage lines especially along Charikot Bazaar Road, there is high chance of protests by the local people. This may provide discomfort the passer by and the people living in that area.

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

320. The mitigation measures for this impact include:

- Public Consultation at various stages & locations as per requirement.
- Implementation of Grievance Redress Mechanism

- Pre-notification to the public regarding the construction works that may hinder their daily activities and Coordinate with them properly

V. Disruption of Local Vendor's Business

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

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

323. The mitigation measures for this impact include:

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

VI. Disturbance to the School Nearby the Proposed WWTP Site

324. There is a school named Bhimeshwore Bahiraa Adhaarbhoot Vidhyalaya located en route to the proposed WWTP within Gaunde Prakritik Community Forest Area. The mobility of vehicles may create disturbances to the students and school while commuting to and for the school. This may disrupt their normal daily activities.

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

326. The mitigation measures for this impact include:

- Establishing coordination with school administration by construction team prior to the construction.
- Fixing the material transportation schedule in relevance to the school operation time. Like, Generally, the school hour is from 10am to 4pm. Hence, the most suitable time for material transportation is before 8am and after 5pm.
- Hard Barricading around the school area

327. Mobilization of Child Labor

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

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

330. The mitigation measures for this impact include:

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

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

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

331. **Impacts on Sustainability of Works**

332. Nepal is a seismic prone country. It is the geographical location of Nepal that makes it extremely susceptible to seismic activity from the nearby Indian and Tibetan plates. Historically, Nepal has been prone to significant disasters resulting mass destruction and claiming thousands of lives. Most recently, on 25 April 2015, a 7.8 magnitude earthquake struck in Gorkha district that resulted in the loss of life of thousands of people. As per *Nepal Disaster Management Reference Handbook (2017).Center for Excellence in Disaster Management and Humanitarian Assistance,* this devastating earthquake affected over 50 districts in Nepal. Dolakha, the project district could not remain untouched from this disaster. Nepal is still experiencing repeated but random tremors of various magnitudes. Hence, we cannot ignore the fact that there is high possibility of occurrence of such seismic events in the future that will be experienced in the project town also. If this occurs during the construction period of the proposed project, this may cause damage to the unsettled/unfinished/uncured and/or completed structures affecting their structural integrity.

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

334. The mitigation measures for this impact include:

- Engineering investigation of built structures and Immediate implementation of the necessary corrective actions after every seismic event

335. **Damage to the existing facilities**

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

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

338. The mitigation measures for this impact include:

- Rehabilitation & Restoration Works

iii. OperationPhase

I. Blocking & Clogging of Sewer Line

339. There is higher possibility of sewer pipes being blocked as well as clogged due to the illegal entry of foreign objects like Oil/Grease, Hair, Menstrual Pads, Sanitary Napkins, and Diapers etc. This in turn provides discomfort to the public themselves.

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

341. The mitigation measures for this impact include:

- Information delivery regarding the prohibition of disposing the foreign objects into the sewer line to all the beneficiaries prior to the operation of this proposed sewerage system by the municipality along with the coordination of WUSC through orientation programs.
- Regular cleaning & flushing of the constructed sewer lines to prevent entry of those foreign objects through provision of Sewer Cleaning Machine

II. Odor Nuisance to Neighboring Areas

342. The periodic cleaning of settler is necessary for the smooth operation of WWTP. Bad odour is produced while cleaning the settler. This may spread nuisance to the neighbouring areas. Similarly, this nuisance may also be felt if there is leakage in sewer line. This type of impact is also felt at the time of drying of sludgeas it releases foul smell to the environment due to formation of ammonia as well as methane gas.

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

344. The mitigation measures for this impact include:

- Nuisance odor produced by cleaning the settler is temporay one and Cleaning of settler cannot be skipped either. Hence, instead of avoiding this, cleaning activities should be prompt without any delay.
- Regular inspection & maintenance of the sewer lines to avoid the nuisance that may be produced by the leakage.
- The location of sludge drying bed is far from the settlement area,thus, there will be no issue of discomfort to the surroundings due to release of foul smell at the time of drying of sludge.

III. Overflow Flooding

345. Due to various reasons like Heavy Rainfall Events, Power Failure, Component Malfunction, Blockage & Clogging etc., if the sewerage collections system cannot manage the volume of wastewater, the overflow flooding of wastewater occurs. This in turn poses the risks of spreading nuisance odour as well as health hazards to the surroundings.

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

347. The mitigation measures for this impact include:

- Regular inspection & maintenance of the sewerage system.

IV. Health & Safety Hazards to Workers

348. Workers involved in cleaning & maintenance of treatment plant and sewerage system are prone to exposure to contaminated waste water. This can result in serious health & safety hazards to workers.

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

350. The mitigation measures for this impact include:

- Submission of Simple OHS plan for employer's approval that involves appropriate health & safety arrangement that includes minimum requirements for various activities like Excavation works, Works within the confined spaces, use of warning signs, boards & signage, Use of PPE, Accident & Emergency Response and Monitoring & Reporting.
- Comply Labor Act,2074 B.S. (2017 A.D.) of GoN
- Train all site personnel regarding environmental health and safety as like in design phase by PMO &DSMC
- Provision of Personal Protective Equipment (PPEs)to the workers that includes protective clothing, helmets, goggles, boots and other equipment designed to protect the wearer's body from injury or infection and ensure their effective usage
- Provision of medical insurance coverage for workers
- Implementation of Emergency Preparedness Response Plan to be prepared forany accidental cases that includes i) Reporting of Incidents; ii) Investigation of incidents and iii) Prepared for availability of Stretchers, Life buoys, first aiders, first aid kits etc.

V. Clogging & Overloading of Sludge Drying Bed

351. Clogging & Overloading of Sludge Drying Bed may occur if enough efforts are not made for sludge management. This in turn blocks the smooth operation of Sludge Drying Bed creating public discomfort.

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

353. The mitigation measures for this impact include:

- Emptying a single batch on the bed in each cycle to allow sludge to dry and be removed before the next load is received.
- Periodic Cleaning of Sludge Drying Bed

VI. Non-sustainability of Services or Completed Works

354. As it has already been mentioned that the project town is prone to seismic events as according to the past seismic event records, this area was highly affected one. Hence, the sustainability of the proposed system may be susceptible to risk as there is high chance of occurrence of seismic events. These issues will be more intense with the Operator's disregard of the impacts of seismic events during inspection & maintenance.

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

356. The mitigation measures for this impact include:

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

- Strengthening Institutional Capacity and Policy Compliance through various project related capacity building programs

- Regular inspection & maintenance with effectiveness through proper management of municipality along with strong coordination with WUSC

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

Table VI-II: Summary of Impact Matrix of Adverse Issues

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

Adverse Issues	Impact Rating				
	Nature	Magnitude	Extent	Duration	Rating
Water Bodies					
Groundwater Pollution	D	M (20)	L (20)	ST (5)	Insignificant (45)
D) Impacts on Socio-economic Environment					
i) Design Phase					
Structural Instability	D	M (20)	L (20)	LT (20)	Significant (60)
Health & Safety of Community & Workers	ID	M (20)	L (20)	LT (20)	Significant (60)
Damage to the existing facilities	D	M (20)	L (20)	ST (5)	Insignificant (45)
ii) Construction Phase					
Community Health and Safety Hazards	ID	M (20)	L (20)	ST (5)	Insignificant (45)
Workers' Health and Safety Hazards	ID	M (20)	L (20)	ST (5)	Insignificant (45)
Traffic Hindrance	D	M (20)	L (20)	ST (5)	Insignificant (45)
Public Protests	D	M (20)	L (20)	ST (5)	Insignificant (45)
Disruption to local vendor's business	D	M (20)	L (20)	ST (5)	Insignificant (45)
Disturbances to the school	D	M (20)	L (20)	ST (5)	Insignificant (45)
Mobilization of Child Labor	ID	M (20)	L (20)	LT (20)	Significant (60)
Impacts on the sustainability of works	D	H (60)	L (20)	ST (5)	Very significant (85)
Damage to the existing facilities	D	M (20)	L (20)	ST (5)	Insignificant (45)
iii) Operation Phase					
Blocking & Clogging of Sewer Line	D	M (20)	L (20)	ST (5)	Insignificant (45)
Odor Nuisance to Neighboring Areas	D	M (20)	L (20)	ST (5)	Insignificant (45)
Overflow Flooding	D	H (60)	L (20)	ST (5)	Very Significant (85)
Health & Safety Hazards to Workers	D	M (20)	L (20)	LT (20)	Significant (60)
Clogging & Overloading of Sludge Drying Bed	D	M (20)	L (20)	ST (5)	Insignificant (45)
Non-Sustainability of Services or Completed Works	ID	H (60)	L (20)	LT (20)	Very Significant (100)

Source: National EIA Guidelines, 1993 & IEE Study 2019/020

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

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

C. Significance of Impact Rating

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

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

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

VII. ALTERNATIVE ANALYSIS

A. With and Without Project Alternative

359. The alternative analysis of the project shall be considered as an integral part of the IEE study, which involves alternative ways of achieving the objectives of a proposed project in terms of environmental point of view. Alternative analysis will aim to attain suitable & feasible option of the proposed project, which shall be conducted during the study to minimize the possible negative environmental impacts. Primarily, this involves two alternatives that include "Without Project" or "Do-nothing" Alternative and "With Project" Alternative.

a) Without-Project or Do-nothing Alternative

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

361. The study shows that the new & effective sewerage system in the proposed town has become necessary. It may appear as a more serious problem to be addressed once the urbanization strides. Regarding this issue and the demand & priority of WUSC, this project has been proposed. Besides this, there are some issues regarding sewerage in the project town that are briefly discussed below:

- The existing septic tanks of the project town seem to be constructed without proper planning & design.
- The project town does not have ample space to make proper septic tank. Most of them constructed septic tanks underneath the houses because of land constrain which make difficult access for inspecting and de-sludging. Similarly, the existing septic tanks are often undersized and poorly constructed.
- The existing septic tanks are simply unlined earthen receptacles with poor performances in treating the sewer. Such designs serve as direct conduits to aquifers resulting in faecal contamination that can affect shallow groundwater.

362. 'Without Subproject' or 'Do-Nothing' alternative toughens the chance of ground water contamination and difficulty in inspection & de-sludging remains. This may result in immense losses to the people residing within this project town and physical environment. This also results in water pollution and environmental degradation. This will increase the risk of health hazards that may be caused by the improper sanitation behaviour that will obviously have impact on public health.

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

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

b) Without Project Alternative

365. With Project Alternative was also analysed by envisaging the likely benefits of the proposed project. The analysis shows that the proposed sub project is the best alternative to overcome the aforementioned threats that is likely to occur in the absence of this subproject. With the project8,555 populations (2016) will be benefitted from reliable and efficientsewerage system. In overall, the 'with subproject alternative' will bring about improved public health and living environment that will contribute to improved quality of life in the project municipality.

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

367. Along with this, the limitation of "Without Project" Alternatives regarding high demand of effective sewerage system to overcome the difficulty in inspection & de-sludging of the septic tank, susceptibility of groundwater contamination and improperly designed septic tanks leads to choose "With Project" Alternative. The proposed sub project is the best alternative to overcome the aforementioned threats that is likely to occur in the absence of this subproject.

With No Forest Option

368. As it has already been mentioned in *Sub Section c of Section B* of Chapter V that WWTP for Jilu system needs to be constructed within Shree GaudeCommunity Forest Area. During alternative analysis, 'With No Forest' option has also been considered so that occupying of forest area could be avoided for the construction of this proposed project. But, the technical study shows that there are no other possible options for the proposed project. This project is conceptualized as a unique system and this forest area cannot be avoided. Hence, this 'With No Forest' option seems inappropriate for the proposed project.

B. Alternatives Relative to Planning & Design

369. The system alternatives need to be developed to assess the most cost-effective, reliable and efficient system that can serve the design population. The decentralized system for the proposed sewerage system has been chosen because the proposed sewerage system was deliberately conceptualized as DEWATS as per ADB agreement. Similarly, the project town is hilly area due to which there is no requirement of pumping system. No pumping system refers to the low operation cost indicating cost effectiveness of the system in the long run. Similarly, the land for WWTP has been selected by the municipality itself and the sewer lines are proposed to follow the center line of the core bazaar areas. This means the location of sewerage omponents and the route of sewerage line have already been fixed.

370. Hence, there is no issue of selecting other possible alternative scenarios like system, location and cost effectiveness. This means there is no need of any other alternatives to be analyzed to make comsparison study to the proposed design concept.

371. The proposed project can be considered as unique system as there is no requirement of considering system layout, alternative technology, alternative materials and alternative sources in terms of technical, social and environmental aspects for the proposed project

VIII. ENVIRONMENTAL MANAGEMENT PLAN

A. Introduction

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

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

a) Institutional Arrangement

i. Executive and Implementing Agencies

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

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

Prior to construction:

376. MoW deputizes a qualified staff to act as the Environmental Safeguard Officer of the Project management office (PMO).

377. MoWS establishes the grievance redress mechanism, including setting up the Grievance Redress Committee.

378. The Water Supply and Environmental Division of the MoWS is responsible for reviewing and approval of the IEE Report.

379. DWSSM reviews the IEE Report prepared by the Design, Supervision and Management Consultant Team's Environmental Safeguard Expert (DSMC-ESE) before forwarding this to MoWS.

380. DWSSM prepares the ToRs for the Environmental Safeguard Specialist that engages to support PMO and for the Environmental Safeguard Specialists of the two Design, Supervision and Management Consultants that will be appointed to prepare the projects.

b) Safeguard Implementation Arrangement

i. Project Management Office (PMO)

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

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

ii. Regional Project Management Office (Eastern & Western PMOs)

382. The environmental officer assigned by DWSSM to the RPMOs receives support from (i) the PMO environmental officer, (ii) environmental specialist from PMQAC; and (iii) the environmental specialist and EMP monitors of the regional DSMCs to carry out the following:

- prepare new IEEs and EMPs in accordance with the EARF and government rules;
- include EMPs in bidding documents and civil works contracts;
- comply with all government rules and regulations;
- take necessary action for obtaining rights of way;
- oversee implementation of EMPs including environmental monitoring by contractors;
- take corrective actions when necessary to ensure no environmental impacts;

- submit monthly environmental monitoring reports to PMO; and
- Address any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs.

iii. PMQAC

383. The Project Management and Quality AssuranceConsultants (PMQAC) provides support to the PMO in the following areas:

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

iv. Regional DSMCs

384. The RDSMCs provides support to the RPMOs in the following areas:

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

v. Civil Works Contracts and Contractors

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

information on sexually transmitted diseases including HIV/AIDS to employees and local communities surrounding the project site.

vi. Capacity Building

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

- Environmental Safeguards
  - (a) sensitization on ADB's policies and guidelines on environment;
  - (b) introduction to environment and environmental considerations in water supply and wastewater projects;
  - (c) review of IEEs and integration into the project detailed design;
  - (d) improved coordination within nodal departments; and
  - (e) monitoring and reporting system. The contractors will be required to conduct environmental awareness programs and orientation to the workers prior to deployment to work sites.
- Social Safeguards
  - (a) sensitization on ADB's policies on Involuntary Resettlement and Indigenous People;
  - (b) introduction to social safeguards assessment and document requirements;
  - (c) Consultation and participations requirements;
  - (d) Project GRM and ADB's Accountability Mechanism (AM); and
  - (e) monitoring and reporting system.

vii. Local Authority/Municipality

387. The Municipality is the eventual operators of this Charikot Sewerage (DEWATS) Project. The key tasks and responsibilities of the local authority/municipality are, but not limited to:

Prior to construction

388. Facilitate public consultation and participation, information dissemination and social preparation.

389. Provide available data to the DSMC-ESS during the IEE study

390. Participate in the training program.

During construction

391. Assist in the observance of the grievance redress mechanism.

392. 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.

393. Facilitate public consultations, as necessary.

During operation

394. Implement the EMP.

395. Prepare the environmental monitoring report as per IEE.

396. Ensure observance of the grievance redress mechanism.

B. Environmental Management Plan (EMP) Matrix

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

Table VIII-I: EMP Matrix

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
A. Beneficial Impacts					
1.Impact on Socioeconomic Environment					
a) Construction Phase					
Income	Employment Generation	• Recommend contractor to employ local people by giving high priority to women and under privileged group as far as possible. • Ensure equity in provision of wages to both male as well as female labors.	DSMC, Contractor &Municipality	• Contractors Log Book • Number of local labors employed in project • DSMC Monitoring Report	During Project Construction
Personal Skills	Skill Enhancement	• Making a proper work plan and code of conduct during the construction period. • Provision of regular hands on training to the workers during the project construction period	DSMC, Contractor &Municipality	• Contractors Log Book • Hands on training Photographs • DSMC monitoring reports	During Project Construction
Local trade & business opportunity	Enhanced Local trade & business opportunity	• Recommend contractor to give priority to the local products during procurement of construction of materials. • Prioritize the local services like grocery stores, tea shops, hotel & restaurants etc. during the entire construction period.	DSMC, Contractor &Municipality	• Contractors Materials Log Book • News in regard to the enhancement of the local business nearby the construction site area, if any	During Project Construction
b) Operation Phase					
Health & Hygiene	Improved health & hygiene	• Regular inspection of the sewerage components to operate the project smoothly and to make the benefits intact and Immediate Repair & Maintenance whenever required	Municipality	• Photographs • Number of complaints received, if any • Municipality Inspection Reports	Monthly during Post Construction Phase
Improvement in Septage	Social Comfort	• Regular inspection of the sewerage components to operate the project smoothly and to make the	Municipality	• Photographs • Number of complaints	Monthly during Post Construction Phase

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Management		benefits intact and Immediate Repair & Maintenance whenever required		received, if any, by the people	
Reuse of Effluent & Sludge	Benefits of Treated Effluent & Sludge	• Regular maintenance of the sewerage components to operate the project smoothly and to make the benefits intact. • Regular follow up of Sludge Management Plan	Municipality	• Sludge Management Plan • Records of Sludge Storage to the Sludge Storage Yard and of its Disposal • Number of Compliments received if any in regard to beneficial reuse of sludge & effluent • Photographs • Number of complaints received, if any, in regard to haphazard disposal & discharge of sludge and effluent respectively	Monthly Basis duringOperation Phase
Aesthetic Beauty	Increased Urban Aesthetic Value	• Regular maintenance of the sewerage components to operate the project smoothly and to make the benefits intact.	Municipality	• Photographs • Number of Compliments received if any	Monthly during Post Construction Phase
Economy	Increased Land Value	• Ensuring regular inspection of the operation of sewerage components • Promoting urbanization through proper land development activities in the area	Municipality	• Photographs • Number of Compliments received if any • News Article regarding promotional activities	Monthly during Post Construction Phase
B. Adverse Impacts					
1. Impacts on Physical Environment					
a) Design Phase					
Topography/Geology	Soil Erosion & Slope Instability	• Incorporate measures and sites for handling excessive spoil materials • Incorporate drainage plan in final design	PMO, RPMO, & DSMC	Documents including Measures for handling excessive spoil materials and Drainage Plan	Before award of contract and During Detailed Design Phase
Traffic Flow	Traffic Interference	• Prepare & Incorporate Traffic Management Plan in final design	PMO, RPMO, & DSMC	Documents including Traffic Management Plan	Before award of contract and During Detailed Design Phase

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
b) Construction Phase					
Topography/Geology	Erosion & Land Surface Disturbance	• Protecting the foundation from damage during backfilling • Using the right backfill materials • Compacting the backfill • Final finishing the subgrade to ensure that water drains away from the foundation • Adoption of Drainage Plan & Measures incorporated in final design	Contractor	• Number of events of damages to the foundation, if any • Contractor's Log Book regarding the construction activities • Drainage Plan • Field Photographs	Weekly Basis During Construction Phase
Spoil Management	Inappropriate disposal of spoils from the construction activities may result in gullying and erosion of spoil tips especially when it is combined with unmanaged surface water runoff.	• Follow Spoil Management Plan as included in Appendix 2D. • Use of excess Spoil or Soil for filling depressed areas or borrow pits wherever possible. • Appropriate disposal of Spoil at the designated places. • Spoils should not be disposed on natural drainage paths, canals and other infrastructures. • Provision of toe walls and retaining walls to protect the erosion of disposed spoils. • Provision of proper drainage, vegetation and adequate protection against erosion at the Spoil Disposal Site.	Contractor	• Spoil Management Plan • Photographs • Construction of Spoil Disposal Site	During Construction Phase
Air Quality	Air Pollution	• Strict Prohibition of open burning of solid waste	Contractor	Written Notice/Code of Conduct	During award of contract
				Visible Emission	Weekly Basis During Construction
				Parameters related to monitoring of solid waste management	
		• Watering of dry exposed surfaces and stockpiles of aggregates at least twice daily, as necessary;	Contractor	Number of water Tank/s	Weekly Basis During Construction
				Capacity of Water Tank/s	
				Daily/Weekly Frequency/Timing of water spraying	
				Locations of water spraying	
		• if re-surfacing of disturbed roads cannot be done	Contractor	• Contractors Log Book of	Weekly Basis During

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		immediately, spreading of crushed gravel over backfilled surfaces;		Materials to ensure the use of crushed gravel • Photographs	Construction
		• Conduct Air Quality Test for dust nuisance (PM 10 and PM 2.5) at key settlement and market area, school, hospital at least once in a month during dry working season (Jan-June).	Contractor	• Air Quality Test Reports • Photographs	Monthly Basis
Air Quality	Air Pollution	• Use of Construction/ Transportation Vehicles complying with NVMES,2069	Contractor	Number and types of vehicles in use	During Construction
				Certifying documents for each vehicle	
		• Regular inspection & maintenance of construction/transportation vehicles	Consultant & Contractor	Contractor's/Consultant's log book of vehicle inspection & maintenance	Daily Basis/During Construction
		• Supply of clean cooking fuel to workers instead of allowing them to use firewood for cooking.	Contractor	Written Notice/Code of Conduct	Prior to construction
				Type of fuel supplied to camps	Weekly Basis during construction
				Quantity of fuel supplied to camps	Weekly Basis during construction
Acoustic Environment	Noise Pollution	• Restricting noisy activities to daytime and overtime work to avoid using noisy equipment;	Contractor	Written Notice	Prior to construction
		• Prohibit the use of pressure horn by transportation vehiles	Contractor	Written Notice/Code of Conduct	Daily Basis
				Number of vehicles fitted with pressure horns	
				Maximum Sound Level of Pressure Horn	
		• Conduct noise level test once a year during peak construction stage at location near school, hospital and settlements	Contractor	• Noise Level Test Reports • Photographs	Yearly Basis
		• Avoid noise generating activities like excavation works, dismantling for excavation works, loading & unloading of construction materials, noise of material transportation vehicles etc. during school time and at hospital area if any.	Contractor	• Number of complaints from the sensitive receptors • Contractor's Work Schedule	Monthly Basis
		• Regular inspection & maintenance of construction/transportation vehicles to ensure	Contractor	Contractor's/Consultant's log book of vehicle inspection & maintenance	Daily Basis

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		the use of Vehicles complying with NVMES,2069 B.S.			
		• Regular inspection & maintenance to ensure the use of equipments/machinery that comply with applicable emission standards of GoN i.e., National Noise Standard Guidelines, 2012	Contractor	Contractor's/Consultant's log book of equipment/machinery inspection & maintenance	Daily Basis
		• Regular inspection & maintenance to ensure the use of Diesel Generators complying with National Diesel Generator Emission Standard,2012	Contractor	Contractor's/Consultant's log book of equipment/machinery inspection & maintenance	Daily basis
Solid Waste	Haphazard Disposal of Wastes	**a) Construction Wastes**			
		• Adopt 3R (Reduce, Reuse & Recycle) concept	Contractor	• Daily/Weekly quantity/volume of reusable/recyclable SW collected	Daily basis
		• Ensure storage areas are secure, safe & weatherproof.	Contractor	• Locations of stockpiling sites	Daily basis
		• Management of reusable wastes	Contractor	• Number of cases of onsite reuses	Daily basis
		• Sale of Recyclable wastes to scrap dealer	Contractor	• Daily/Weekly quantity/volume of such wastes sold to or given to scrap vendors • Frequency of sale to scrap vendors	Daily basis
		• Final Disposal of Bio degradable solid wastes	Contractor	• Number/size of burial pits for final disposal of bio-degradable solid waste • Location of burial sites • Frequency of burials	Daily basis
		• Avoid over ordering of construction materials to the extent possible. This will be challenging as it requires strong coordination with the concerned contractors as it cannot be made mandatory. However, it is not impossible too to coordinate with the contractors in this regard. • Use standard size & quantity of construction materials.	Contractor	• Contractor's log book of construction materials	Daily basis
		• Construct garland drains to reduce the runoff	Contractor	• Location of construction	Daily basis

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		from the stockpiles.		sites	
Solid Waste	Haphazard Disposal of Wastes	**b) Solid Wastes, Wastewater and Sewage from labour camp**			
		• Adopt Segregation of Solid Waste (3R Concept) on the basis of being biodegradable or non-biodegradable. It is because non-biodegradable wastes cannot be broken down by decomposers and their disposal poses a big problem.	Contractor	• Number of Colored Bins to segregate wastes into biodegradable & non-biodegradable wastes	Daily basis during construction
		• Management of biodegradable wastes that includes food waste, paper waste, biodegradable plastic, etc. by any suitable processes that include Composting & Incineration. If these two processes are not possible then, the wastes shall be managed either by handing over these wastes to the municipality waste collectors who will finally dispose those wastes to the landfill sites of the project town or by disposing those wastes to the burial pits at suitable place	Contractor	• Daily/Weekly quantity/Volume of Biodegradable solid waste collected • Site Photographs • Contractor' Log Book	Daily basis during construction
		• Non-biodegradable wastes like glass, plastics & metals shall be managed by reusing them for site use or selling them to scrap dealers instead of disposing them	Contractor	• Daily/Weekly quantity/volume of such wastes sold to or given to scrap vendors • Frequency of sale to scrap vendors/dealers	Daily basis during construction
		• Strict Prohibition on open incineration of solid wastes & use of plastic materials to minimize the quantity of plastic wastes.	Contractor	• Written Notice	Prior to Construction & During Construction
		• Construction of the temporary latrines with temporary soak pits & septic tanks within the camp site for proper disposal of sewage.	Contractor	• Number of Complaints by the workers if latrine facilities are not provisioned • Photographs	Daily basis
		• Provide temporary but proper drainage system for proper outlet of waste water generated from cooking practices adopted by the workers	Contractor	• Number of Labor Camp Visit • Photographs	Daily basis
		• Employ local people from nearby villages to maximum extent possible. It will minimize the number of workers residing at worker's camp. Lesser the number of people, lesser will be the	Contractor	• Contractor's Workers Log Book	Prior to the construction

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		solid waste & effluent generated. However, it cannot be made mandatory because availability of local people with required skills will not be ensured at the time of construction.			
Handling of Fuels/Chemicals	Accidental Leakage or Spillage of Stored Fuel/Chemicals	• Provision of well managed storage site	Contractor	• Location of storage site	Weekly Basis during construction
		• Organize awareness programs for the workers responsible for handling fuel/chemicals	DSMC & Contractor	• Records of awareness programs in the form of minutes, photographs	Prior to the construction
		• Supervise workers to handle fuel/chemicals properly	DSMC & Supervisor of Contractor	• Records of any accidental spillage/leakage	Daily Basis During Construction
		• Use of spill kit materials to block flow and prevent discharge to nearby water bodies	Contractor	• Contractor's log book of materials procured for construction	Weekly Basis During Construction
		• Scatter the Sawdust, sand or dry soil over the area of spill and leave for few minutes to soak up the fuel/chemical. So, availability of saw dust, sand or dry soil should be ensured in the store	Contractor	• Frequency of use of saw dust, sand or dry soil	Weekly Basis During Construction
		• Regular Inspection Visit to the storage site to inspect the leakage of the stored container of fuel/chemical	DSMC & Contractor	• Complaints by the workers at the storage site • Photographs of Storage Site	Weekly Basis During Construction
Land Use Pattern	Change in land use pattern in haphazard manner	• Avoid the acquisition of private and agricultural land for the construction of project components	• PMO & DSMC	• Details of land ownership	• Prior to the construction
		• Monitoring on the haphazard land use & planning by the concerned authority.	• Municipality	• Land Use details kept by the municipality	• Monthly during construction
Dismantled Debris	Haphazard Disposal of Dismantled Debris	• Immediate Response on handling of dismantled debris	Contractor	• Photographs of the construction sites after the completion of dismantling works • Quantity of Dismantled Debris • Contractor's Work Log Book	Daily Basis After Construction and Prior to Operation

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		• Segregation of Dismantled Debris • Adopt 3R (Reduce, Reuse& Recycle) concept	Contractor	Number of Colored Bins	Daily Basis
		• Sale of Recyclable Wastes to Scrap Vendors/Dealers	Contractor	• Quantity/Volume of such wastes sold to or given away to scrap vendors • Frequency of sale to scrap vendors	Daily Basis
2. Impacts on Biological Environment					
a) Construction Phase					
Flora & Fauna	Loss of vegetation, Loss of habitat of faunas	• Plantation of 250 tree saplings for the loss of 25 trees in and around the project area as EPR 2077 B.S. (2020 A.D.) obliges compensatory plantation in the ratio 1:10 for every tree felled.	Contractor	• Photographs • Contractor's Work Log Book	Prior to the construction of WWTP and during site clearance
Flora & Fauna	Loss of vegetation, Loss of habitat of faunas	• Replace the excavated top soil to its original position after the completion of pipe laying work	Contractor	• Photographs before and after condition of the site	Daily Basis During Construction
		• Re-vegetating disturbed slopes and grounds, as applicable;	Contractor	• Photographs • Contractor's Work Log Book	Weekly Basis During Construction
		• Awareness programs regarding policy related to the conservation of existing flora & fauna, to the workers prior to the construction and the community during various meetings and discussion programs	PMO, DSMC & Contractor	Minutes & Photographs of Programs	Prior to Construction
		• Regular Monitoring	DSMC & RPMO	Contractor's Work Log Book	Daily Basis During Construction
Aquatic Life	Loss of habitat of aquatic life	• Strict Monitoring on the daily activities of workers	Contractor & DSMC	• Contractor's Work Log Book • Photographs of Labor Camp Visit	Weekly Basis
		• Provision of temporary but well-equipped toilets	Contractor & DSMC	Location of these temporary facilities	Weekly Basis
		• Restriction to workers from fishing	Contractor & DSMC	Written Notice	Daily Basis During Construction
		• Adopt measures mentioned above for the solid waste management	Contractor & DSMC	• Number of Colored Bins to segregate wastes • Daily/Weekly quantity/Volume of	Daily Basis During Construction

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
				Biodegradable solid waste collected	
b) Operation Phase					
Aquatic Life	Pollution of water bodies endangering aquatic lives	• Construction of Polishing Pond as the design concept includes provision of polishing pond to which waste water is collected via HFCW where the pathogens existing in waste water are killed using ultra violet rays from the sunlight. The waste water discharged from the polishing pond may not contain harmful constituents as for assurance there is also provision of laboratory set up before the final discharge. • Regular Inspection & Maintenance	Municipality	Notice & Information published by the municipality	Monthly
3. Impacts on Chemical Environment					
a) Construction Phase					
Water Quality	Pollution on water bodies by poor sanitation practices of the workers	• Appropriate Septage Disposal through construction of toilets with septic tanks	Contractor, DSMC	• Semi Annual Environmental Monitoring Report • Complaints by the workers in regard to dissatisfaction towards inappropriate septage management	Prior to Construction as well as During Construction
		• Disposing of spoils or excess soils as free filling materials as soon as possible	Contractor	• Spoil Management Plan • Location of Spoil Disposal Site • Photographs of Spoil Disposal Site with disposed spoils	During Construction
		• Locating temporary storage areas on flat grounds and away from main surface drainage routes; • Shielding temporary storage areas with sandbags	Contractor	• Temporary Storage Area Layout Plan • Photographs	Monthly Basis
		• Adopt measures mentioned above for the solid waste management	Contractor	• Number of Colored Bins to segregate wastes • Daily/Weekly quantity/Volume of Biodegradable solid	Daily Basis

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
				waste collected	
		• Providing adequate water supply and sanitation facilities at work sites. • Strict supervision on the behavior of workers for the waste management as well as sanitation behavior and monitoring the workers to manage the wastes properly.	Contractor	• Complaints by the worker's in regard to the WS & sanitation facilities • Photographs of Construction Sites & labor Camp	Weekly Basis
b) OperationPhase					
Water Quality	Pollution in nearby water bodies	• Follow Sludge Management Plan as per design according to which instead of disposing off those dried sludge randomly, reuse of dried sludge either as briquette or as organic fertilizer as the sludge contains carbon, nitrogen & phosphorus. • Instead of discharging that treated waste water (effluent) into water bodies, reuse of effluent either for gardening or for flushing of water closet • Regular monitoring of the operation of WWTP.	Municipality	• Sludge Management Plan • Records of Sludge Disposal • Records of Reuse of effluent • Number of Complaints by the people using surface water bodies	Monthly Basis
Quality of Ground Water	Groundwater Pollution	• Regular Inspection of the sewer system to avoid leakage in sewer pipes and if such leakage is recognized, immediate repair & maintenance of leaked sewer pipe	Municipality	• Records of events of any leakage in sewer pipes • Number of complaints by the people in regard to the groundwater contamination	Monthly Basis
4.Impact on Socio-economic Environment					
a) Design Phase					
Structural Instability	Structural Failure	• Proper Design of earthquake resistant structures as per standard and code of practice.	PMO, RPMO & DSMC	Final Design Report	During detailed design phase
Health & Safety of Community & Workers	Lack of provision will have impact during construction	• Incorporate concept of health & safety in the final design.	PMO, RPMO & DSMC	Final Design Report	During detailed design phase
Existing Facilities	Demolition of existing pavement	• Budget Allocation for restoration/replacement of damaged utilities.	DSMC, RPMO, PMO, Contractor	Approved BoQ	During detailed design phase
b) Construction Phase					

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Community Health & Safety	• Cross-cutting threats from construction's impacts on air and water quality, ambient noise level; mobility of people/goods/services; accesses to properties/economic activities/social services; service disruptions, etc. • Infectious, Communicable and transmittable diseases may potentially be brought into the community by construction workers.	• Contractor's implementation of EMP	Contractor, RPMO, DSMC	Contractor's EMP	Weekly Basis during Construction
		• Adequate lighting, temporary fence, reflecting barriers and signage at active work sites;	Contractor	• Photographs of construction site equipped with lighting, fencing and signage facilities. • Field Monitoring Reports	Monthly Basis during Construction Phase
		• Contractor's preparedness in emergency response;	Contractor	Emergency Response Plan	Weekly Basis during Construction
		• Adequate dissemination of GRM and Contractor's observance/implementation of GRM.	Contractor	• Grievance Redress Form • GRC Activities	Monthly Basis during Construction Phase
		• The mitigation measures to deal with COVID issues as mentioned above includes: i) Coordination & Monitoring; ii) Preventive Measures like Frequent Hand Wash, Use of Sanitizers, Social Distancing, Use of Face Masks (N95 Masks) or Cloth Face Coverings etc; iii) Provision of Quarantine for the infected ones; iv) Prohibitory Measures like Prohibition on entry into the construction sites and labor camps for the outsiders or those who are not concerned with the project construction activities, Prohibiting workers to get mingled within the community etc.	Contractor	• Grievance Redress Form • Field Monitoring Reports • Field Photographs	Weekly Basis during Construction
Workers Health &Safety	• There is invariably a safety risk when construction works such as excavation and earthmoving are conducted in urban areas. Workers need to be mindful of the occupational hazards, which can arise from working at height and	• Comply Labor Act,2074 B.S. (2017 A.D.) of GoN	Contractor	• Labor Act, 1992 •Contractor's Log Book	Prior to the start of the construction and Entire Construction Period
		• Submission of Simple OHS plan for employer's approval that involves appropriate health & safety arrangement that includes minimum requirements for various activities like Excavation works, Works within the confined spaces, Use of warning signs, boards & signage, Use of PPE, Accident & Emergency Response and Monitoring & Reporting	Contractor	• OHS Plan	Prior to the start of the construction

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	excavation works. • Construction workers may also be potentially exposed to various infectious, communicable & transmittable diseases within the workforce.	• Preparation of COVID Response Plan and Immediate Action in its implementation. Here, the COVID Response Plan includes i) Coordination & Monitoring; ii) Information Delivery to workers in regard to COVID issues prior to the construction; iii) Preventive Measures like Frequent Hand Wash, Use of Sanitizers, Social Distancing, Use of Face Masks (N95 Masks) or Cloth Face Coverings etc.; iv) Provision of Quarantine for the infected ones; v) Prohibitory Measures like Prohibition on entry into the construction sites and labor camps for the outsiders or those who are not concerned with the project construction activities, Prohibiting workers to get mingled within the community etc.; vi) Emergency Health Services like Swab Collection Service for COVID test and its Report Collection, Availability of Medicines etc. ; vii) Use of PPE to avoid infection if required; vii) Provision of proper fooding & lodging facilities	Contractor	• COVID response plan prepared by the Contractors • Field Visit by the consultant team and its reports • Field Photographs • Complaints by the workers • Contractor's Daily Log Book	Prior to the construction as well as during entire construction period
		• Train all site personnel regarding environmental health and safety as like in design phase by DSMC & Contractors • Provide **Personal Protective Equipment (PPEs)**to workersthat includes protective clothing, helmets, goggles, boots and other equipments designed to protect the wearer's body from injury or infection and ensure their effective usage • Require workers to wear high visibility clothes	Contractor	• Site –Specific H&S plan • Record of H&S orientation training like Photographs &Minutes • Availability of personal protective equipment at construction site • Environmental Site Inspection Report	• Visual inspection by RPMO (monthly) and DSMC-ESS on a weekly basis. • Frequency and sampling sites to be finalized during detailed design and final location of project components
		• Maintain hygiene within the labor camp as well as construction sites.		• Number of Complaints by the workers, if any • Field Visits • Photographs	Weekly Basis during construction
		• Ensure no water stagnation either in construction site or in labor camp to get rid of the breeding grounds for the mosquitoes to prevent dengue outbreak.		• Field Visits & Photographs	Weekly Basis during construction

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		• Provision of mosquito netting to the workers during sleep hours.		• Number of Complaints by the workers	Weekly Basis during construction
		• Make the workers to dress with the full body covered clothing.		• Photographs	Weekly Basis during construction
		• Prohibit the workers to prepare or eat raw or undercooked poultry products.		• Number of Complaints by the field supervisor in regard to the carelessness of workers on eating habits if any	Weekly Basis during construction
		• Recommend workers to avoid contact with the chiggers while working within the forest areas to reduce the risk of getting scrub typhus.		• Reports of infection if any • Number of Complaints by the field supervisor in regard to the carelessness of workers during construction works within the forest area if any	Weekly Basis during construction
		• Ensure availability of health care facilities for diagnosis and testing if any symptoms of Dengue/Scrub Typhus or Influenza H5N1 or H1N1 are seen.		• Number of Complaints by the workers • Photographs • Contractor's Log Book	Weekly Basis during construction
		• Ensure immediate availability of treatment facilities if those suspected cases of Dengue/Scrub Typhus or Influenza H5N1 or H1N1 comes out to be positive.		• Number of Complaints by the workers in regard to treatment facilities • Photographs	Weekly Basis during construction
		• Maintain accident reports and records.	Contractor	Number of accidents as per site records	Weekly Basis during construction
		• Make first aid kits readily available	Contractor	Equipped first-aid stations	Weekly Basis during construction
Workers Health &Safety		• Maintain hygienic accommodation in work camps • Ensure uncontaminated water for drinking, cooking, and washing, • Assure clean eating areas • Make sure sanitation facilities are readily available	Contractor	• Records of occurrence of events of any health issues • Photographs of Labor Camps • Number of Complaints by the labor in regard to	Monthly Basis during construction

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		• Provide adequate space and light to the camp site		sanitation facilities, space availability and lighting facilities	
		• Adequate supply of potable water to the camps and good sanitation within camps	Contractor	Records of supply of uncontaminated water	Weekly Basis during construction
		• Provide medical insurance coverage for workers	Contractor	Medical Insurance Documents	Prior to the construction
		• Ensure moving equipment is outfitted with audible backup alarms; • Hearing protection equipment enforced in noisy environment	Contractor	Contractor's Log Book of Machinery & Equipment	Weekly Basis during construction
		• Chemical and Material storage areas need to be marked clearly	Contractor	Clear Signage Board for Chemical Storage and Material Storage Area	Monthly Basis
		• Implementation of Emergency Preparedness Response Plan to be prepared for the earthquake risks that includes i) Reporting of Incidents; ii) Investigation of incidents and iii) Prepared for availability of Stretchers, Life buoys, first aiders, first aid kits etc.	Contractor	• Investigation Reports • Emergency Preparedness Response Plan • Contractor's Materials Log Book	Monthly Basis
Traffic Flow	Interference in the daily activities of people	• Backfilling the trench immediately followed by compaction right after completion of pipe laying works. • Provision of signage at appropriate locations indicating available alternate access routes to minimize traffic disruptions. • Provision of simple wooden walkways to ensure access to shops and residences. • Follow Traffic Management Plan	Contractor	• Site Visit and Photographs of Sites • Traffic Management Plan	Daily Basis
Public Protests	Public Discomfort	• Public Consultation at various stages & locations as per requirement. • Implementation of Grievance Redress Mechanism • Pre-notification to the public regarding the construction works that may hinder their daily activities and Coordinate with them properly	DSMC, PMO & Contractor	• Minutes of Public Consultations. • Pre notification through formal written notice or verbal (Miking)	Prior to the Construction
Local Vendor's Business	Disruption of normal business activities and Discomfort to the	• Adopt "zero soil" approach thorugh prompt backfilling right after completion of drain	Contractor	Field Visits and Contractor's Work Schedule	Weekly Basis

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	customers to get access to the shops	construction. In general, execution of excavation works is such that excavtion will be done in a few meters length i.e., 50m at a time followed by pipe laying, backfilling over the pipe and removal of all surplus material from the site.			
		• Provision of temporary access to the shops through provision of planks	Contractor	Photographs	Weekly Basis
		• Pre-notify the vendors regarding the construction works that may hinder their daily activities and Coordinate with them properly	Contractor	Written Notice or Miking	Prior to the construction
Disturbances to the students & Schools	Disruption to the daily school activities	• Establishing coordination with school administration by construction team prior to the construction. • Fixing the material transportation schedule in relevance to the school operation time. Like, Generally, the school hour is from 10am to 4pm. Hence, the most suitable time for material transportation is before 8am and after 5pm. • Hard Barricading around the school area	Contractor	• Minutes of Meetings between the contractor and School administration • Contractor's Work Schedule • Field Photographs	• Prior to the construction • During Construction
Deployment of Child Labor	Deprivation of Children's right to education, health, safety and moral development is deprived	• As the Child Labor Prohibition Act, 2000 states that "No Child having not attained the age of 14 years shall be engaged in works as a laborer" during mobilization, provision for the requirement of submission of the citizenship certificate of each labor,should be made.	Contractor & PMO	Citizenship Certificate of the workers	Prior to Construction
		• During contract agreement, the agreement by the contractor to follow Child Labor Prohibition Act, 2000 and Child Labour Prohibition Rules & Regulations,2006, should be made.	Contractor & PMO	Contract Document	During award of contract
Sustainability of Works	Damage to unsettled/unfinished/uncured and/or completed structures and affecting their structural integrity by anticipated flooding risks.	• Engineering investigation of built structures and Immediate implementation of the necessary corrective actions after every seismic event	Contractor	Monthly Progress Report and Contractor's Log Book	Construction Phase

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Existing Facilities	Damage to the existing road pavement creating discomfort to the people	• Rehabilitation & Restoration Works	Contractor, RPMO, DSMC	Bid Document & BoQ	During Construction Phase on Daily Basis
c) Post Construction Phase					
Blocking & Clogging of Sewer lines	Public Discomfort	• Information delivery regarding the prohibition of disposing the foreign objects into the sewer line to all the beneficiaries prior to the operation of this proposed sewerage system by the municipality along with the coordination of WUSC through orientation programs.	PMO, RPMO& DSMC	• Photographs • Minutes	Monthly Basis
		Regular cleaning & flushing of the constructed sewer lines to prevent entry of those foreign objects through provision of Sewer Cleaning Machine	Municipality	• Photographs	Yearly Basis
Social Discomfort	Nuisance to Neighboring Areas	• Nuisance odor produced by cleaning the settler is temporay one and Cleaning of settler cannot be skipped either. Hence, instead of avoiding this, cleaning activities should be prompt without any delay. • Regular inspection & maintenance of the sewer lines to avoid the nuisance that may be produced by the leakage. • The location of sludge drying bed is far from the settlement area,thus, there will be no issue of discomfort to the surroundings due to release of foul smell at the time of drying of sludge.	Municipality	Progress Status published by the municipality	Monthly Basis
Overflow Flooding	Nuisance Odor and Health Hazards to the surroundings	Regular inspection & maintenance of the sewerage system.	Municipality	Progress Status published by the municipality	Monthly Basis
Health & Safety	Health & Safety Hazards to Workers	Submission of Simple OHS plan for employer's approval that involves appropriate health & safety arrangement that includes minimum requirements for various activities like Excavation works, Works	Municipality	OHS Plan	Monthly Basis

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		within the confined spaces, use of warning signs, boards & signage, Use of PPE, Accident & Emergency Response and Monitoring & Reporting.			
		Comply Labor Act,2074 B.S. (2017 A.D.) of GoN		• Labor Act • Number of Complaints if any	Monthly Basis
		Train all site personnel regarding environmental health and safety as like in design phase by PMO & DSMC		• Photographs • Number of Complaints if any	Right after the construction
		Provision of Personal Protective Equipment (PPEs) to the workers that includes protective clothing, helmets, goggles, boots and other equipment designed to protect the wearer's body from injury or infection and ensure their effective usage		• Photographs	Every time of Cleaning & Maintenance
		Provision of medical insurance coverage for workers		• Medical Insurance Documents	Right after the construction and At the time of such accidental cases if any
		Implementation of Emergency Preparedness Response Plan to be prepared for any accidental cases that includes i) Reporting of Incidents; ii) Investigation of incidents and iii) Prepared for availability of Stretchers, Life buoys, first aiders, first aid kits etc.		Emergency Preparedness Response Plan	Right after the construction and At the time of such accidental cases if any
Clogging & Overloading of Sludge Drying Bed	Public Discomfort	Emptying a single batch on the bed in each cycle to allow sludge to dry and be removed before the next load is received. Periodic Cleaning of Sludge Drying Bed	Municipality	Photographs	At every time of cleaning
Non-Sustainability of Services or Completed Works	Disruption in water supply service by sudden seismic events or climate change	Engineering investigations of completed works and implementation of the necessary corrective actions without delay if any such events occur. This shall	Municipality	• WUSC Monitoring Report • Emergency Preparedneaa & Response Plan	• Immediate after any seismic events

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	droughts	involve preparation of Emergency Preparedness & Response Plan and Immediate Implementation of this plan after any seismic event.			
		• Strengthening Institutional Capacity and Policy Compliance through various project related capacity building programs	Municipality	• Photographs of capacity building programs • Minutes of such programs • WUSC Monitoring Report	Right after the construction
		• Regular inspection & maintenance with effectiveness through proper management of municipality along with strong coordination with WUSC	Municipality	WUSC Monitoring Report	Right after the completion of project construction period

Source: IEE Study 2019/020

C. Environmental Monitoring Program

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

(iv) Monitoring the development of project performance indicators by the PMO-ESS;
(ii) Monitoring implementation of mitigation measures by the Contractor; and

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

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

Table VIII-II: Environmental Monitoring Program

S.No.	Field	Stage	Parameters	Location	Frequency	Standards	Responsibility
1.	Air quality	Before construction to establish baseline Construction phase	PM10 SO2 NOx	Worksite locations Along sewerage line construction	24-hour monitoring once in a season (except monsoons) during the construction	National Ambient Air Quality Standards, 2003	Contractor
2.	Noise and vibration levels	Before construction to establish baseline Construction phase	Equivalent day and night time noise levels	Worksite locations Along sewerage line construction and Worker's Campsite locations	Once in a season (except monsoons) during construction	National Noise Standard Guidelines, 2012	Contractor

Source: IEE Study 2019/020

D. Institutional Capacity Development Program

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

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

Table VIII-III: Training Program for Environmental Management

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

Source: IEE Study 2019/020

E. Staffing Requirement and Budget

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

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

- Updating IEE, preparing and submitting reports and public consultation and disclosure;
- Application for environmental clearances; and

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

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

405. 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.

406. 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.

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

Table VIII-IV: Indicative Cost of EMP Implementation

S. No.	Particulars	Stages	Unit	TotalNumber	Rate (NRs.)	Cost (NRs.)	CostCoveredby
A.	**ConsultantsCosts**						
1.	Environmental safeguardspecialist (1person)	Project Implementation Period	personmonths	3	100,000	300,000.00	Costcovers onlyremuneration, whichtogether withbudgetfor travelcoveredin the PMQAC contract
2.	Social Safeguard Specialist	Entire Project Implementation Period	personmonths	3	100,000	300,000.00	Costcovers onlyremuneration, whichtogether withbudgetfor travelcoveredin theDSMC contract
3.	Support Staffs	Entire Project Implementation Period	personmonths	24	35,000	840,000.00	Costcovers onlyremuneration, whichtogether withbudgetfor travelcoveredin theDSMC contract
					Total Consultant Cost	**1,440,000.00**	
B.	**Local Level Monitoring & MitigationMeasures**						
a)	Local Level Monitoring Measures						
1.	Airquality monitoring	Pre-construction (baseline) Construction	No.of sampling activities	2	50,000	100,000.00	Civil works contract
2.	Noiselevels monitoring	Pre-construction (baseline) Construction	No.of sampling activities	2	25,000	50,000.00	Civilworks contract

S. No.	Particulars	Stages	Unit	TotalNumber	Rate (NRs.)	Cost (NRs.)	CostCoveredby
3.	WaterQuality	Pre-construction (baseline) Construction Operationand Maintenance(for watersupplyand wastewatertreatment subprojects)	No.of sampling activities	2	25,000	50,000.00	Civilworks contract
b)	Mitigation Measures						
1.	Protection Works for Soil Erosion & Land surface Disturbances that includes Prompt Backfilling, Construction of Gabion Wall, RRM, Drainage Structures	Construction					Civil works contract
3.	Watering of dry exposed surfaces and stockpiles of aggregates at least twice daily				50,000.00	50,000.00	
5.	Solid Waste Management	Construction			175,000.00	175,000.00	
	Accidental Leakage or Spillage of Stored Fuel/Chemicals				50,000.00	50,000.00	
6.	Re-vegetating disturbed slopes & grounds	Construction			50,000.00	50,000.00	
7.	Provision of temporary but well-equipped toilets	Construction			75,000.00	75,000.00	
8.	Provision of Spoil Disposal Site	Construction			20,000.00	20,000.00	
9.	Provision of Camp Site	Construction			200,000.00	200,000.00	

S. No.	Particulars	Stages	Unit	TotalNumber	Rate (NRs.)	Cost (NRs.)	CostCoveredby
10.	Provision of Stockpiling Site	Construction			50,000.00	50,000.00	
12.	Temporary Fencing, Use of Reflecting Barrier, Signage, Adequate Lighting	Construction			50,000.00	50,000.00	
13.	Hard Barricading around the school	Construction			50,000.00	50,000.00	
14.	COVID Response Plan	Construction			300,000.00	300,000.00	
15.	Measures to avoid other infectious diseases like Dengue,	Construction			150,000.00	150,000.00	
16.	Provision of Planks to provide access to shops & homes	Construction			30,000	30,000	
17.	Emergency Response Preparedness	Construction			150,000.00	150,000.00	
18..	Preparation of Emergency Response Plan and Immediate implementation of this plan	Operation			200,000.00	200,000.00	
19.	Engineering Investigations after any seismic event, if any	Operation			200,000.00	200,000.00	

S. No.	Particulars	Stages	Unit	TotalNumber	Rate (NRs.)	Cost (NRs.)	CostCoveredby
20.	Tree Plantation	Post Construction/Operation	PS				Civil works contract
	Total Cost of Local Level Monitoring & Mitigation Measures					**2,000,000.00**	
C.	**Capacity Building**						
1.	(i)Orientation workshopfor officialsinvolvedin theproject implementationon ADBSafeguard PolicyStatement, Governmentof Nepal environmentallaws andregulations, andenvironmental assessment process;	Module1-on environmental assessmentand reviewframework (EARF)and EMP implementationtobe conductedbyPMO-ESS(priortocontract of awardfor civilworks) Module2–Anytime afterModule1	Lumpsum			400,000	Coveredunder Output2- Improved Institutional Capacityand Project Implementation Platform

S. No.	Particulars	Stages	Unit	TotalNumber	Rate (NRs.)	Cost (NRs.)	CostCoveredby
	(ii)inductioncourse contractors, preparingthem on environmental managementplan (EMP) implementationand environmental monitoring requirements relatedto mitigation measures;and takingimmediate actionto remedy unexpected adverseimpactsor ineffective mitigationmeasures foundduringthe courseof implementation; and						
	(iii)lessonslearned informationsharing						
	Total Capacity Building Costs					**400,000.00**	
D.	**AdministrativeCosts**						
1.	Legislation,permits, andagreements	Permitforexcavation, tree-cuttingpermits etc.	Lumpsum				Theseconsents aretobe obtainedby contractorat his ownexpense.
		Environmental assessmentand environmental clearancesasper ECAandECR requirements	Lumpsum	1	500,000.00	500,000.00	Coveredunder the DSMC contract
	Total Administrative Costs					**500,000.00**	

S. No.	Particulars	Stages	Unit	TotalNumber	Rate (NRs.)	Cost (NRs.)	CostCoveredby
E.	**OtherCosts**						
1.	Publicconsultations and information disclosure	Informationdisclosure andconsultations during preconstructionand constructionphase, includingpublic awarenesscampaign throughmedia	Asper requirement	Lumpsum	350,000	350,000	Coveredunder PMObudget
2.	Grievanceredress mechanism(GRM) implementation	Costsinvolvedin resolvingcomplaints (meetings, consultations, communication,and reporting/information dissemination)	Asper requirement	Lumpsum	200,000	200,000	Coveredunder PMObudget
3.	Anyunanticipated impactduetoproject implementation	Mitigationof any unanticipatedimpact arisingduring constructionphase anddefectliability period		Lumpsum	Contractor's liability	Asper insurance requirement	Civilworks contract– contractor's insurance
					Other Costs	**550,000.00**	
					Total Indicative Cost of EMP Implementation	**4,890,000.00**	

Source: IEE Study 2019/020

408. The amount of **NRs. 2,000,000.00** has been estimated to execute all the necessary environmental mitigation measures. Including this amount, the total indicative cost of EMP implementation is NRs. 4,890,000.00

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

F. Implementation Schedule

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

Table VIII-V: Environmental Management Implementation Schedule

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

Source: IEE Study 2019/020

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

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

Source: IEE Study 2019/020

IX. INFORMATION DISCLOSURE, CONSULTATION & PARTICIPATION

A. Stakeholder Consultation & Participation

410. Stakeholder consultation and participation is an essential process in project preparation. It is also a part of information disclosure. It will disseminate as well as collect information regarding the proposed project by involving various stakeholders that includes Key Informant Interviews, Stakeholders Meetings, Focus Group Discussions (FGD), On-site discussions with WUSC and Random Field Interviews. The minutes of various meetings undertaken during field visits are also included in ***Appendix4.***

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

Table IX-I:Stakeholder Analysis & Mapping

S.No.	Stakeholders	Primary[3]	Secondary[4]	Stakeholders 'Role or Interest	Level of Influence
1.	Government of Nepal		✓	It is the executive and central body.	High
2.	Ministry of Water Supply (MoWS)		✓	It is the lead executive agency and is responsible for policy coordination, guidance, review of programs, ensuring that all aspects relevant to achieve the objective of the project and for sustaining the improved services to the required level.	High
3.	ADB		✓	It supports government of Nepal in improving and enhancing the existing water supply service.	Medium
4.	Department of Water Supply and Sewerage Management		✓	It is the lead-implementing agency and works under MoWS with the responsibility of planning, implementation, operation, repair & maintenance of the proposed project.	High
5.	DWASH-CC		✓	It provides coordination in the preparation of local WASH plans with inputs from WASH sector actors and in the effective implementation of the local plans related to this project.	High

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

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

S.No.	Stakeholders	Primary[3]	Secondary[4]	Stakeholders 'Role or Interest	Level of Influence
6.	UWSSP, PMO, RPMO & DRTAC		✓	It is responsible in successfully implementing the proposed project ctivities, establishing coordination with ADB & GoN and managing day to day activities at municipality levels.	High
7.	Town Development Fund (TDF)		✓	TDF will assist the project municipality conducting financial appraisal of the proposed project and advice DWSSM on its outcomes prior to the start of detailed design process.	High
8.	Local Bodies (Municipality & Ward Offices)		✓	It is responsible for establishing coordination with the implementing agency. Here, the municipality will be also responsible for policy compliance as well as for addressing public protests if any.	High
9.	Community Forest User's Group		✓	It is responsible for establishing coordination with the contractor during construction works within the community forest area.	High
10.	Forest Security Personnel		✓	It is responsible for establishing coordination with the contractor during construction works and for establishing harmony between locals and construction workers within the community forest area.	High
11.	DSMC		✓	It will assist PMO & RPMO in the overall planning, implementation and monitoring of the project activities regarding environmental & social safeguards requirements.	High
12.	Households (Families & Individuals)	✓		They are the main beneficiaries and are benefitted by the provision of effective storm water drainage system.	Low
13.	Contractors, Petty Contractors		✓	It is responsible for bidding for works and involved in the construction of the proposed project.	Low
14.	Local Technicians/Plumbers	✓		This group will be benefitted through the increased work opportunities related to construction works of the proposed project.	Low
15.	Unemployed Locals	✓		This group will be benefitted through the increased work opportunities related to construction works of the proposed project.	Low

S.No.	Stakeholders	Primary[3]	Secondary[4]	Stakeholders 'Role or Interest	Level of Influence
16.	Local Vendors	✓		This group will be affected by the drainage line construction along the road where the proposed drainage line is constructed.	Low
17.	Schools & Hospitals	✓		This group will be benefitted by the provision of enhanced and improved continuous water supply service.	Low
18.	Commercial Establishments (Private Enterprises)	✓		This group is benefitted by enhancing their business by supplying items to the construction employees regarding their basic needs.	Low
19.	Scrap Vendors	✓		This group will be benefitted by purchasing the recyclable wastes generated from the construction activities as well as from workers camp.	Low
20.	Local Leaders		✓	This group will facilitate to establish strong coordination between the local people and the project authority.	High

Source: IEE Study 2019/020

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

B. Major Issues Raised By the Stakeholders

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

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

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

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

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

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

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

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

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

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

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

X. GRIEVANCE REDRESS MECHANISM

A. Purpose of Grievance Redress Mechanism

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

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

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

B. Purpose of Grievance Redress Mechanism

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

421. 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);

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

and eligibility for entitlements, compensation and assistance; (ii) record grievances of APs, categorize and prioritize them and provide solutions within 15 days of receipt of complaint by WUA or local bodies; and (iii) ensure feedback to the aggrieved parties about developments regarding their grievances and decisions of the GRC.

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

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

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

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

423. The complainant will have to fill up Grievance Redress Form as shown in ***Appendix 2B*** to file the complaint. All paperwork (details of grievances) needs to be completed by the WUA member secretary assisted by RDSMC and circulated to the WUA Chairperson and members. At Municipality level, the RPMO Engineer will be responsible for circulation of grievances to the Regional Project Manager, 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 APs by the RPMO's SSO.

424. 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.

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

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

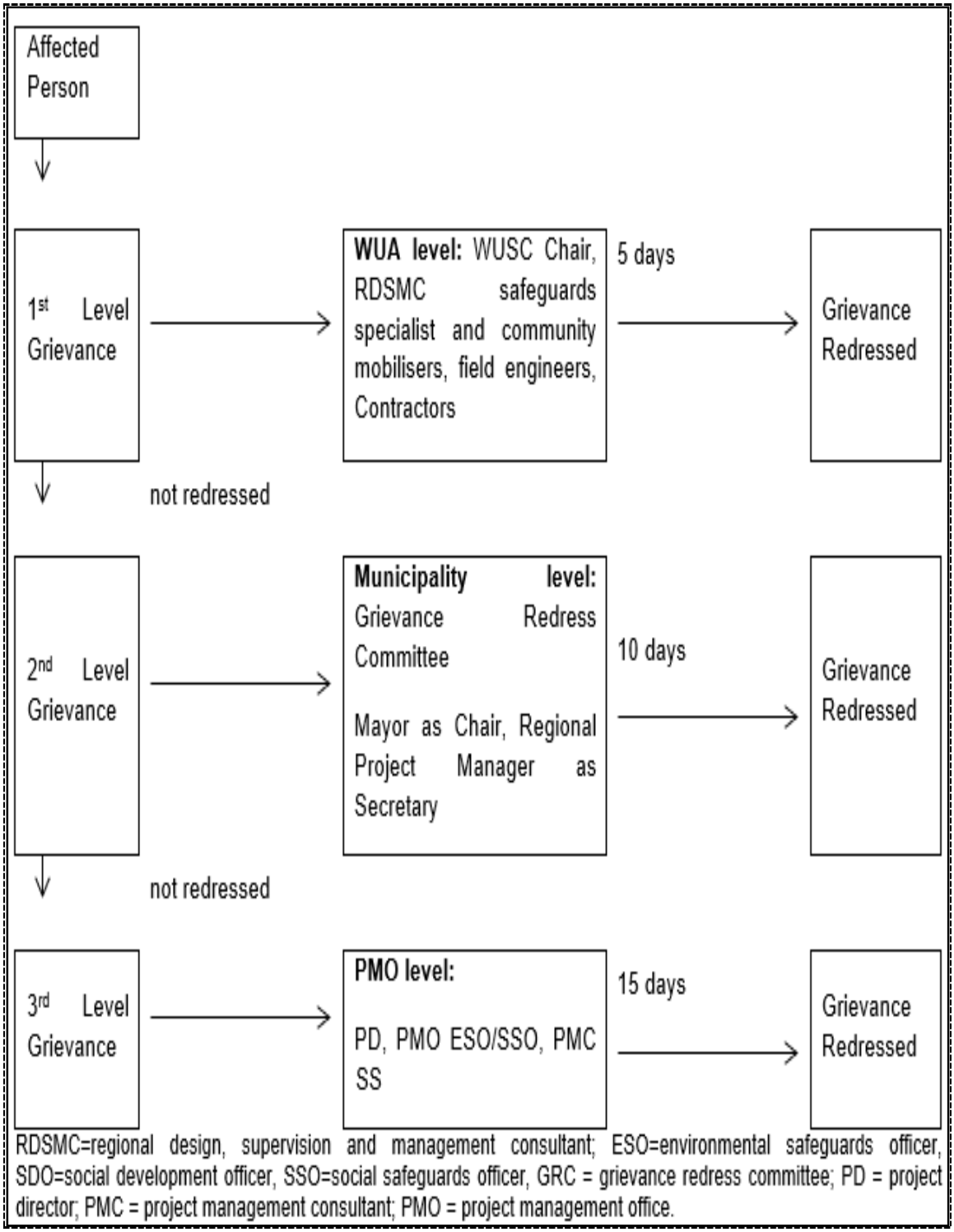

Figure X-I: Grievance Redress Mechanism (Formal Approach)

XI. MONITORING & REPORTING

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

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

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

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

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

XII. CONCLUSION

431. The IEE study indicates that:

432. The proposed project, its components, are not within or adjacent to environmentally sensitive areas.

433. The proposed project will reduce the increased risk of seepage problem resulting from the poor performance of the existing septic tanks.

434. This will also help to get rid of the problem due to insufficiency of the space for the construction of septic tank that has been bothering the residents for years.

435. The proposed project will bring about: (i) the benefits of improved waste water management; (ii) promotion of good hygiene and sanitation practices and reduced health and safety risks as positive impacts; and (iii) enhanced community health, improved quality of life and safe communities as outcomes.

436. Along with positive outcomes, the proposed project will also have negative impacts as discussed above in Chapter VI. As per our IEE study, four of the adverse impacts that include*Air Pollution*, *Noise Pollution, Impacts on Water Quality of nearby rivers and Impact on Sustainabilityof Works*are evaluated as "Very Significant". However, these impacts would not be problematic for the project implementation if the activities that stimulate this impact to occur are properly controlled through the mitigation measures.

437. Some of the adverse impacts are also evaluated as *Significant*. However, these will not be sufficient to threaten or weaken the surrounding resources. Mitigation measures, integral to socially and environmentally responsible construction practices, will be commonly used at construction sites and the contractors will be aware about it. Hence, mitigation measures would not be difficult to implement.

438. Similarly, Insignificant impacts can either be avoided or simply mitigated through the proposed mitigation measures.

439. The environmental management plan (EMP) as mentioned above in Chapter VIII, if duly considered, followed and implemented during project construction activities, then the environmental issues will not be issues to be worried about.

440. If the responsible body mentioned in the EMP matrix shown in the ***Table VIII-I***of Chapter VIII properly takes up the responsibility for the implementation of mitigation measures for the likely impacts resulting from the various activities of the project, then, the environment of the project area will be safe and less affected from the project activities.

441. Regular inspection & monitoring including prompt action on dysfunctionality of WWTP and other components if any; will lessen the risks of the ineffective implementation of the proposed project and will sustain the system.

442. None of the anticipated environmental impacts of the proposed project is significant enough to go for either detailed EIA study or further especial study.

443. As per ADB Categorization, the proposed project falls under "Category B". As per EPR 2077 B.S. (2020 A.D.), this IEE study fulfills the requirements of IEE criteria. This IEE thus fulfills the policy requirements of both the ADB and the GoN. This indicates that IEE study is sufficient for the effective implementation of Charikot Sewerage (DEWATS) Project.

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

445. Based on the above findings, the classification of the Charikot Sewerage (DEWATS) Project as "Category B" is confirmed, no further special study or detailed EIA needs to be undertaken and people of Bhimeshwore Municipality will be facilitated with proper sewerage (DEWATS) system such that the problem of managing household sewerage they have been experiencing for decades will end up as soon as the project gets implemented.

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APPENDIXES

Appendix1

Rapid Environmental Assessment Checklist &Preliminary Climate Risk Screening ChecklistforCharikot Sewerage (DEWATS) Project

Instructions:

(i) Theprojectteamcompletesthischecklisttosupporttheenvironmentalclassificationofaproject.Itist obeattachedtotheenvironmentalcategorizationformandsubmittedtotheEnvironmentandSafeguards Division(RSES)forendorsementbytheDirector,RSESandforapprovalbytheChiefComplianceOfficer.

(ii) Thischecklistfocusesonenvironmentalissuesandconcerns.Toensurethatsocialdimensionsareadequ atelyconsidered,referalsotoADB's(a)checklistsoninvoluntaryresettlementandIndigenousPeoples;(b)po vertyreductionhandbook;(c)staffguidetoconsultationandparticipation;and(d)genderchecklists.

Country/Project	NEP:UrbanWaterSupplyandSanitation (Sector)Project
Project Title	Charikot Sewerage (DEWATS) Project

S.No.	ScreeningQuestions	Yes	No	Remarks
A	**ProjectSiting**			
	Intheprojectarea			
1	Denselypopulated		√	Bhimeshwore Municipality has amoderatepopulationdensity.
2	Heavywithdevelopmentactivities		√	
3	Adjacent to or within any environmentally sensitiveareas		√	
4	Culturalheritagesites		√	
5	Protectedareas		√	
6	Wetland		√	
7	Mangrove		√	
8	Estuarine		√	
9	Bufferzone		√	
10	Specialareasforprotectingbio-diversity		√	
11	Bay		√	
B	**PotentialEnvironmentalImpacts**			
	Willtheprojectcause			
1	Impairment ofhistorical /cultural monuments/areas andloss/damagetothese sites		√	

S.No.	Screening Questions	Yes	No	Remarks
2	Interferencewithotherutilitiesandblockingof access to buildings, nuisance to neighboring areasduetonoise,smellandinfluxofinsects, rodentsetc.	√		Regarding the access to buildings and roadside shops, it may interfere to some extent, but it can be avoided by providing temporary access to buildings and shops.
3	Dislocationorinvoluntaryresettlementof people		√	
4	Disproportionate impactsonthepoor,women andchildrenindigenous peopleorother vulnerablegroups		√	
5	Impairmentofdownstreamwaterqualitydueto inadequate sewage treatment or release of untreatedsewage		√	
6	Overflowsandfloodingof neighboringproperties withrawsewage		√	
7	Environmental pollution due to inadequate sludge disposal orindustrialwastedischarges illegallydisposedinsewers	√		This can be avoided through regular monitoring.
8	Noiseandvibrationduetoblastingandothercivil works	√		EMP has provision of mitigation measures
9	Risksandvulnerabilities relatedtooccupational healthandsafetyduetophysical,chemical and biological hazardsduringproject construction andoperation	√		EMP has provision of mitigation measures
10	Dischargeof hazardous materialinto sewers, resultingindamagetosewersystemanddanger toworkers	√		It is possible but it can be avoided if mitigation measures are followed.
11	Inadequate bufferzonearoundpumpingand treatment plantstoalleviate noiseandother possiblenuisancesandprotectfacilities		√	
12	Roadblockingandtemporaryfloodingdueto landexcavationduringthe rainyseason	√		Road blocking problem may arise but it can be mitigated through precautionary measures.
13	Noiseanddustfrom constructionactivities	√		EMP has provision of mitigation measures
14	Trafficdisturbancesduetoconstruction material transportandwasters	√		EMP has provision of mitigation measures
15	Temporarysiltrunoffdueto construction	√		EMP has provision of mitigation measures
16	Hazardstopublichealthduetooverflowflooding andgroundwater pollutionduetofailureof seweragesystem	√		EMP has provision of mitigation measures
17	Deterioration ofwaterqualityduetoinadequate sludgedisposal ordirectdischarge ofuntreated sewagewater		√	This is likely to occur only if during post construction stage, regular monitoring is not carried out.

S.No.	Screening Questions	Yes	No	Remarks
18	Contaminationofsurfaceandgroundwaterdue tosludgedisposalon land		√	The proposed project has provision of sludge drying bed where the sludge is allowed to dry after which the dried is recommended to reuse as either briquette or organic fuel. So, no there is no possibility of contamination.
19	Healthandsafety hazardstoworkersfromtoxic gasesandhazardousmaterialswhichmay be contained inconfinedareas, sewage flowand exposureto pathogensinuntreatedsewageand un-stabilizedsludge	√		EMP provides mitigation measures
20	Large population increase during project constructionandoperationthatcausesincreased burden on social infrastructure (such as sanitationsystem)	√		EMP provides mitigation measures
21	Social conflictsbetweenconstructionworkersfrom otherareasandcommunityworkers?	√		Expected as low concern. Priority will be given to local workers.
21	Riskstocommunityhealthandsafetyduetothe transport, storageanduseand/ordisposalof materialssuchasexplosives, fuelandother chemicalsduringconstructionandoperation	√		EMP provides mitigation measures
22	Communitysafetyrisksduetobothaccidental andnaturalhazards, especially wherethe structuralelementsorcomponentsoftheproject andaccessible tomembersoftheaffected community orwheretheirfailurecouldresultin injurytothecommunity throughoutproject construction,operationanddecommissioning	√		EMP provides mitigation measures

Preliminary Climate Risk Screening Checklist for Proposed Project

Country/Project: Nepal/Urban Water Supply & Sanitation (Sector) Project
Title/ Sector: Charikot Sewerage (DEWATS) Project/Sanitation
Subsector: Sewerage
Division/Department: Department of Water Supply & Sewerage Management

	ScreeningQuestions	Score	Remarks[a]
Location and Designof project	Issitingand/or routingoftheproject (oritscomponents) likelytobeaffectedbyclimateconditionsincludingextreme weather relatedeventssuchasfloods,droughts, storms, landslides?	0	Investments in the proposed project will not likely be affected by any extreme weather events due to the siting of project.
	Wouldtheprojectdesign(e.g.theclearanceforbridges) needtoconsideranyhydro-meteorologicalparameters (e.g.,sea-level,peakriverflow,reliablewaterlevel,peak windspeedetc.)?	2	
Materials and Maintenance	Wouldweather, currentandlikely futureclimate conditions (e.g.prevailing humiditylevel,temperature contrast between hotsummerdaysandcoldwinterdays,exposure towindandhumidity,andhydro-meteorologicalparameters) affecttheselection ofprojectinputsoverthelifeofproject outputs(e.g.constructionmaterial)?	0	
	Would weather,currentandlikelyfutureclimateconditions, andrelatedextreme eventslikelyaffectthemaintenance (schedulingandcost)ofprojectoutput(s)?	0	
Performance ofproject outputs	Wouldweather/climate conditionsandrelatedextreme eventslikelyaffecttheperformance (e.g.annualpower production) ofprojectoutput(s)(e.g.hydro-power generationfacilities)throughouttheirdesign lifetime?	0	Regular inspection and maintenance will not allow this effect to occur

Options for answers and corresponding scores are given below.

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

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

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

Other comments:

_____

_____

Appendix 2: Environmental Standards, Sample Forms & Report Template

Appendix2A
Relevant Environmental Quality Standards

National Ambient Air Quality Standards for Nepal, 2003

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

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

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

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

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

National Noise Standard Guidelines, 2012

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

* Guidelines for Community Noise, WHO, 1999.

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

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

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

Appendix 2B
Sample Grievance Redress Form

Sample Grievance Redress Form

(TobeavailableinNepaleseandEnglish)

The _____Projectwelcomescomplaints,suggestions,queriesandcommentsregardingprojectimplementation.Weencouragepersonswithgrievancetoprovidetheirnameandcontactinformationtoenablesustogetintouchwithyouforclarificationandfeedback.Shouldyouchoosetoincludeyourpersonaldetailsbutwantthatinformationremainsconfidential,pleaseinformusbywriting/typing*(CONFIDENTIAL)*aboveyourname.Thankyou.

Date	Placeofregistration			
ContactInformation/personaldetails				
Name	Gender	*Male *Female	Age	
HomeAddress				
Place				
PhoneNo.				
E-mail				
Complaint/Suggestion/Comment/Question Pleaseprovidethedetails(who,what,whereandhow) ofyourgrievancebelow: Ifincludesasattachment/note/letter,pleasetickhere:				
Howdoyouwantustoreachyouforfeedbackorupdateon yourcomment/grievance?				

FOROFFICIALUSEONLY

Registeredby:(Namesofofficialregisteringgrievance)	
Modeofcommunication: Note/Letter E- mailVerbal/Telep	
Reviewedby:(Names/positionsofofficial(s)reviewinggrievance)	
ActionTaken:	
WhetherActionTakenDisclosed:	Yes No
MeansofDisclosure:	

Appendix2C
SAMPLE TRAFFIC MANAGEMENT PLAN

A. Principles

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

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

B. Operating Policies for TMP

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

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

C. Analyze the impact due to street closure

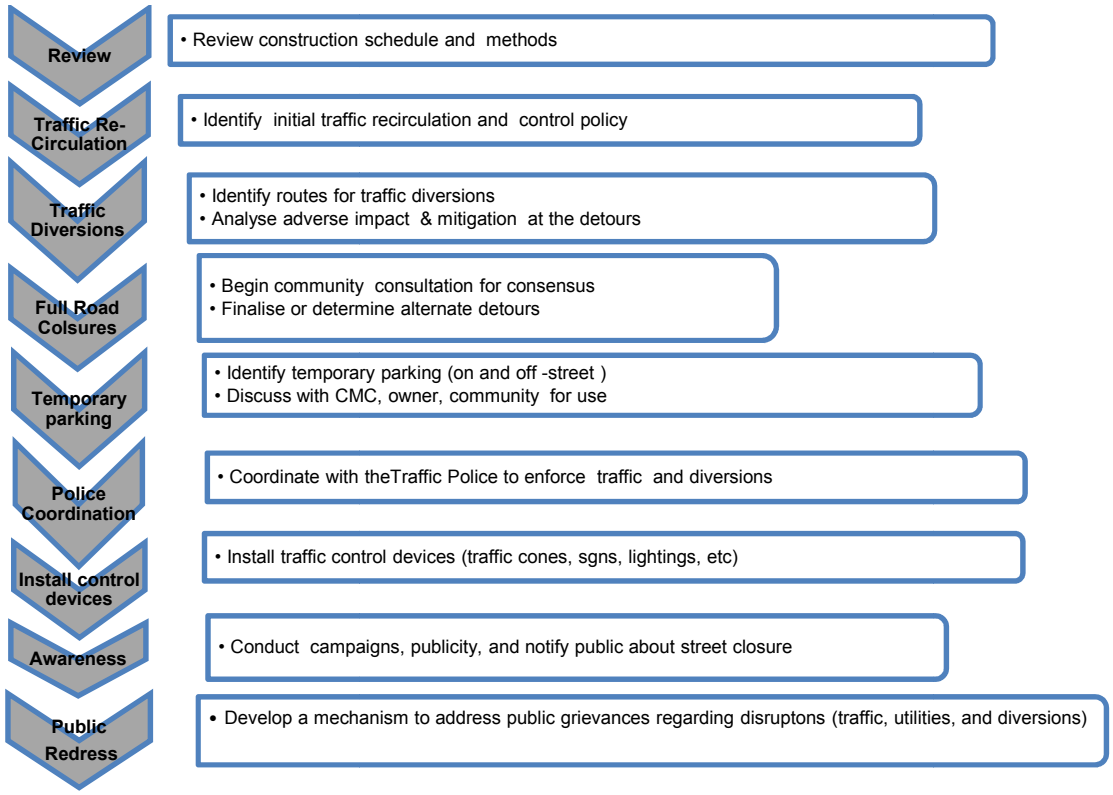
Apart from the capacity analysis, a final decision to close a particular street and divert the traffic should involve the following steps:

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

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

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

Figure A1: Policy Steps for the TMP



D. Public awareness and notifications

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

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

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

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

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

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

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

E. Vehicle Maintenance and Safety

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

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

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

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

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

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

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

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

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

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

Appendix2D
Spoil Management Plan

Purposeandapplication:SMPistodescribehow STWSSP willmanagethespoilgeneratedandreuserelatedtodesignandconstructionworks.ThisisanintegralpartofEMP .TheobjectiveofSMPistoreuseofspoilfromworksinaccordancewiththespoilmanagementhierarchyoutlinedi nthisdocument.

ObjectivesofSMP: TheobjectivesofSMPare:

- **A** Tominimizespoilgenerationwherepossible
- **B** Maximize beneficialreuseofspoilfromconstructionworksinaccordancewithspoilmana gementhierarchy
- **C** Mange onsitespoilhandlingtominimizeenvironmentalimpactsonresidentandotherreceivers
- **D** Minimizeanyfurthersitecontaminationofland,water,soil
- **E** Managethetransportationofspoilwithconsiderationoftrafficimpactsandtransportrelatedemiss ions

Structure of SMP:

Section1:IntroductionofSMP
Section2:Legalandotherrequirements
Section3:Rolesandresponsibilities
Section4:IdentificationandassessmentofspoilaspectsandimpactsSection 5:Spoilvolumes,characteristicsandminimization
Section6:Spoilreusesopportunities,identificationandassessment
Section 7:OnsitespoilmanagementapproachSection8:Spoiltransportationmethodology
Section9:Monitoring,Reporting,Review,andImprovements

Aspects and potential impacts

Thekeyaspectsofpotentialimpacts inrelationtoSMParelistedintablebelow:

Aspects	PotentialImpacts
AirQuality	Potentialforhighwindsgeneratingairbornedustfromthestock piles
Sedimentation	Potentialforsedimentladen site runoff from spoil stockpiles and potentialforspillageofspoil from truck on roads
Surface and groundwater	Contamination of surface and ground water
Noise	Associated with spoilhandlingandhaulageandstorage
Traffic	Impacts associated with spoil haulage
Land Use	Potentialforspoiltobetransportedtoareceivablesite that doesn't have permission for storage/disposal
Designspecifications	Limitationsonopportunitiestominimizespoilgeneration

Sustainability	Limited sites for storage reuse opportunities

Spoil volumes, Characteristics and Minimization

Spoilvolumecalculations: Estimate the volumes of spoilsproduced from each of theconstructionsites.

Characterizationofspoil: Basedonthetypeofspoil; characterization is done(sandstone,mudmixmaterials,reusablematerials

AdoptSpoil Reduce, ReuseOpportunities: An overviewoftheassessmentmethodologytobeusedismentionedbelow.

- Considerationoflikelyspoilcharacteristics
- Identificationofpossiblereusesites
- Screeningofpossiblereuseopportunities

Identificationofpossiblesafedisposalsitesforspoil: Thosespoils, which can't be reuse,shallbeproperlydisposedindesignatedareas,suchdisposalareasshouldbeidentifiedinproject locations.Suchdisposalareasshouldbesafefromenvironmentalaspects, there should not be any legal,andresettlementrelatedissues.Suchareasneedtobeidentifiedandpriorclientalapprovalshouldbeobtainedtouseitasspoildisposalarea.Thelocaladministrationmustbeconsultedandifrequired permissionshouldbeobtainedfromthem.

Storage and Stockpiling Transportation and Haulage route

Basedontheabove,thecontractorwillpreareaSMPasanintegralpartofEMPandsubmititttotheDSC fortheirreviewandapproval.

SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

Summaryoffollowuptime-boundactionstobetakenwithinasettimeframe

Appendixes

F Photos

G Summaryofconsultations

H Copiesofenvironmentalclearancesandpermits

I Sample of environmental site inspection Report

J Others

Appendix2E

Environmental Safeguards Compliance Monitoring Report Template

{Environmental and/or Social} Monitoring Report

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

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

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

CURRENCY EQUIVALENTS
(as of {Day Month Year})
{The date of the currency equivalents must be within 2 months from the date on the cover.}
Currency unit – {currency name in lowercase (Symbol)}

{Symbol}1.00 = ${ }
$1.00 = {Symbol_____}

ABBREVIATIONS

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

{WEIGHTS AND MEASURES}

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

{GLOSSARY}

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

NOTE{S}

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

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

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

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

{Read and delete:

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

Project Category	**Frequency of Reports**
Environment category A	• Semi-annual monitoring reports during project construction • Annual monitoring reports during project operation
Environment category B	• Periodic monitoring reports as deemed appropriate
Involuntary resettlement category A and B	• Semiannual monitoring reports

Indigenous peoples category A and B	• Semiannual monitoring reports
Highly complex and sensitive deemed by ADB	• Quarterly monitoring reports

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

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

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

Appendix2F
Sample Environmental Site Inspection Report

Project Name
Contract Number

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

WEATHER CONDITION:
_____

INITIAL SITE CONDITION:_____

CONCLUDING SITE CONDITION:

Satisfactory_____Unsatisfactory_____ Incident_____ Resolved _____ Unresolved _____

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

Resolution

Project Activity Stage	Survey	
	Design	
	Implementation	
	Pre-Commissioning	
	Guarantee Period	

Inspection

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

Site Restored to Original Condition Yes [ ] No [ ]

Signature
_____

Sign off

_____ _____

Name **Name**
Position **Position**

Appendix 3
Proximity Report on Charikot Town Generated by IBAT

ibat FOR BUSINESS
Integrated Biodiversity Assessment Tool

Proximity report generated by the Integrated Biodiversity Assessment Tool

Site name	Charikot Town, Dolokha
Latitude/Longitude	27° 40' 1" North, 86° 2' 51" East
Date generated	27th April 2018
Generated by	asiandb
Company	ADB

About this report

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

Data used to generate this report

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

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

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

Limitations

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

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

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

ibat FOR BUSINESS
Integrated Biodiversity Assessment Tool

Protected Areas and Key Biodiversity Areas

The following sites are found within the selected buffer distances:

Features within 1 km

There are no features within 1 km.

Features within 5 km

There are no features within 5 km.

Features within 10 km

National-level protected areas		
IUCN Category V-VI	Gauri-Shankar	221,473 ha

ibat FOR BUSINESS
Integrated Biodiversity Assessment Tool

IUCN RED LIST OF THREATENED SPECIES

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

Taxonomic group	Scientific Name	Common Name	IUCN Red List category
Amphibians	*Amolops formosus*		LC
Amphibians	*Amolops marmoratus*		LC
Amphibians	*Amolops monticola*		LC
Amphibians	*Amolops nepalicus*		DD
Amphibians	*Duttaphrynus himalayanus*	Himalayan Toad	LC
Amphibians	*Duttaphrynus stomaticus*		LC
Amphibians	*Fejervarya nepalensis*	Nepal Wart Frog	LC
Amphibians	*Fejervarya pierrei*	Pierre's Wart Frog	LC
Amphibians	*Hoplobatrachus crassus*	Jerdon's Bullfrog	LC
Amphibians	*Hoplobatrachus tigerinus*	Indian Bullfrog	LC
Amphibians	*Megophrys parva*	Concave-crowned Horned Toad	LC
Amphibians	*Microhyla ornata*	Ant Frog	LC
Amphibians	*Nanorana blanfordii*		LC
Amphibians	*Nanorana liebigii*		LC
Amphibians	*Nanorana parkeri*		LC
Amphibians	*Nanorana polunini*		LC
Amphibians	*Ombrana sikimensis*		LC
Amphibians	*Polypedates maculatus*	Himalayan Tree Frog	LC
Amphibians	*Polypedates taeniatus*		LC
Amphibians	*Rhacophorus maximus*		LC
Amphibians	*Scutiger boulengeri*		LC
Amphibians	*Scutiger sikimmensis*		LC
Amphibians	*Theloderma asperum*	Hill Garden Bug-eyed Frog	LC
Birds	*Abroscopus albogularis*	Rufous-faced Warbler	LC
Birds	*Abroscopus schisticeps*	Black-faced Warbler	LC
Birds	*Accipiter badius*	Shikra	LC
Birds	*Accipiter gentilis*	Northern Goshawk	LC
Birds	*Accipiter nisus*	Eurasian Sparrowhawk	LC
Birds	*Accipiter trivirgatus*	Crested Goshawk	LC
Birds	*Accipiter virgatus*	Besra	LC
Birds	*Acridotheres fuscus*	Jungle Myna	LC
Birds	*Acridotheres tristis*	Common Myna	LC
Birds	*Acrocephalus dumetorum*	Blyth's Reed-warbler	LC
Birds	*Actinodura egertoni*	Rusty-fronted Barwing	LC
Birds	*Aegithalos iouschistos*	Rufous-fronted Tit	LC
Birds	*Aegithalos iredalei*	Red-headed Tit	LC
Birds	*Aegithina tiphia*	Common Iora	LC

Birds	*Aegypius monachus*	Cinereous Vulture	NT
Birds	*Aerodramus brevirostris*	Himalayan Swiftlet	LC
Birds	*Aethopyga gouldiae*	Gould's Sunbird	LC
Birds	*Aethopyga ignicauda*	Fire-tailed Sunbird	LC
Birds	*Aethopyga nipalensis*	Green-tailed Sunbird	LC
Birds	*Aethopyga saturata*	Black-throated Sunbird	LC
Birds	*Aethopyga siparaja*	Crimson Sunbird	LC
Birds	*Agraphospiza rubescens*	Blanford's Rosefinch	LC
Birds	*Alauda gulgula*	Oriental Skylark	LC
Birds	*Alcedo atthis*	Common Kingfisher	LC
Birds	*Alcedo meninting*	Blue-eared Kingfisher	LC
Birds	*Alcippe nipalensis*	Nepal Fulvetta	LC
Birds	*Alectoris chukar*	Chukar	LC
Birds	*Amaurornis phoenicurus*	White-breasted Waterhen	LC
Birds	*Anas acuta*	Northern Pintail	LC
Birds	*Anas crecca*	Common Teal	LC
Birds	*Anser anser*	Greylag Goose	LC
Birds	*Anthipes monileger*	White-gorgeted Flycatcher	LC
Birds	*Anthracoceros albirostris*	Oriental Pied Hornbill	LC
Birds	*Anthus godlewskii*	Blyth's Pipit	LC
Birds	*Anthus hodgsoni*	Olive-backed Pipit	LC
Birds	*Anthus richardi*	Richard's Pipit	LC
Birds	*Anthus roseatus*	Rosy Pipit	LC
Birds	*Anthus rubescens*	Buff-bellied Pipit	LC
Birds	*Anthus rufulus*	Paddyfield Pipit	LC
Birds	*Anthus similis*	Long-billed Pipit	LC
Birds	*Anthus sylvanus*	Upland Pipit	LC
Birds	*Apus nipalensis*	House Swift	LC
Birds	*Apus pacificus*	Pacific Swift	LC
Birds	*Aquila chrysaetos*	Golden Eagle	LC
Birds	*Aquila fasciata*	Bonelli's Eagle	LC
Birds	*Aquila heliaca*	Eastern Imperial Eagle	VU
Birds	*Aquila nipalensis*	Steppe Eagle	EN
Birds	*Aquila rapax*	Tawny Eagle	LC
Birds	*Arachnothera magna*	Streaked Spiderhunter	LC
Birds	*Arborophila rufogularis*	Rufous-throated Partridge	LC
Birds	*Arborophila torqueola*	Hill Partridge	LC
Birds	*Ardea alba*	Great White Egret	LC
Birds	*Ardea cinerea*	Grey Heron	LC
Birds	*Ardeola grayii*	Indian Pond-heron	LC

Birds	*Arundinax aedon*	Thick-billed Warbler	LC
Birds	*Asio flammeus*	Short-eared Owl	LC
Birds	*Asio otus*	Northern Long-eared Owl	LC
Birds	*Athene brama*	Spotted Owlet	LC
Birds	*Athene noctua*	Little Owl	LC
Birds	*Aythya ferina*	Common Pochard	VU
Birds	*Aythya fuligula*	Tufted Duck	LC
Birds	*Aythya nyroca*	Ferruginous Duck	NT
Birds	*Blythipicus pyrrhotis*	Bay Woodpecker	LC
Birds	*Botaurus stellaris*	Eurasian Bittern	LC
Birds	*Brachypteryx cruralis*	Himalayan Shortwing	LC
Birds	*Brachypteryx leucophris*	Lesser Shortwing	LC
Birds	*Brachypteryx montana*	Javan Shortwing	LC
Birds	*Bubo bengalensis*	Rock Eagle-owl	LC
Birds	*Bubo nipalensis*	Spot-bellied Eagle-owl	LC
Birds	*Bubulcus ibis*	Cattle Egret	LC
Birds	*Buteo hemilasius*	Upland Buzzard	LC
Birds	*Buteo japonicus*	Japanese Buzzard	LC
Birds	*Buteo refectus*	Himalayan Buzzard	LC
Birds	*Cacomantis passerinus*	Grey-bellied Cuckoo	LC
Birds	*Cacomantis sonneratii*	Banded Bay Cuckoo	LC
Birds	*Calandrella acutirostris*	Hume's Lark	LC
Birds	*Callacanthis burtoni*	Spectacled Finch	LC
Birds	*Calliope calliope*	Siberian Rubythroat	LC
Birds	*Calliope pectoralis*	Himalayan Rubythroat	LC
Birds	*Caprimulgus affinis*	Savanna Nightjar	LC
Birds	*Caprimulgus asiaticus*	Indian Nightjar	LC
Birds	*Caprimulgus jotaka*	Grey Nightjar	LC
Birds	*Carduelis caniceps*	Eastern Goldfinch	LC
Birds	*Carpodacus erythrinus*	Common Rosefinch	LC
Birds	*Carpodacus pulcherrimus*	Beautiful Rosefinch	LC
Birds	*Carpodacus puniceus*	Red-fronted Rosefinch	LC
Birds	*Carpodacus rodochroa*	Pink-browed Rosefinch	LC
Birds	*Carpodacus rodopeplus*	Spot-winged Rosefinch	LC
Birds	*Carpodacus rubicilla*	Great Rosefinch	LC
Birds	*Carpodacus sipahi*	Scarlet Finch	LC
Birds	*Carpodacus subhimachalus*	Crimson-browed Finch	LC
Birds	*Carpodacus thura*	Himalayan White-browed Rosefinc	LC
Birds	*Carpodacus vinaceus*	Vinaceous Rosefinch	LC
Birds	*Centropus bengalensis*	Lesser Coucal	LC

Birds	*Centropus sinensis*	Greater Coucal	LC
Birds	*Cephalopyrus flammiceps*	Fire-capped Tit	LC
Birds	*Certhia discolor*	Sikkim Treecreeper	LC
Birds	*Certhia hodgsoni*	Hodgson's Treecreeper	LC
Birds	*Certhia nipalensis*	Rusty-flanked Treecreeper	LC
Birds	*Ceryle rudis*	Pied Kingfisher	LC
Birds	*Cettia brunnifrons*	Grey-sided Bush-warbler	LC
Birds	*Cettia castaneocoronata*	Chestnut-headed Tesia	LC
Birds	*Cettia major*	Chestnut-crowned Bush-warbler	LC
Birds	*Chalcophaps indica*	Grey-capped Emerald Dove	LC
Birds	*Charadrius alexandrinus*	Kentish Plover	LC
Birds	*Chelidorhynx hypoxanthus*	Yellow-bellied Fairy-fantail	LC
Birds	*Chloris spinoides*	Yellow-breasted Greenfinch	LC
Birds	*Chloropsis aurifrons*	Golden-fronted Leafbird	LC
Birds	*Chloropsis hardwickii*	Orange-bellied Leafbird	LC
Birds	*Chrysococcyx maculatus*	Asian Emerald Cuckoo	LC
Birds	*Chrysominla strigula*	Bar-throated Minla	LC
Birds	*Chrysophlegma flavinucha*	Greater Yellownape	LC
Birds	*Ciconia ciconia*	White Stork	LC
Birds	*Ciconia episcopus*	Asian Woollyneck	VU
Birds	*Ciconia nigra*	Black Stork	LC
Birds	*Cinclus cinclus*	White-throated Dipper	LC
Birds	*Cinclus pallasii*	Brown Dipper	LC
Birds	*Cinnyris asiaticus*	Purple Sunbird	LC
Birds	*Circaetus gallicus*	Short-toed Snake-eagle	LC
Birds	*Circus cyaneus*	Hen Harrier	LC
Birds	*Cissa chinensis*	Common Green Magpie	LC
Birds	*Cisticola juncidis*	Zitting Cisticola	LC
Birds	*Clamator coromandus*	Chestnut-winged Cuckoo	LC
Birds	*Cochoa purpurea*	Purple Cochoa	LC
Birds	*Columba hodgsonii*	Speckled Woodpigeon	LC
Birds	*Columba leuconota*	Snow Pigeon	LC
Birds	*Columba livia*	Rock Dove	LC
Birds	*Columba palumbus*	Common Woodpigeon	LC
Birds	*Columba pulchricollis*	Ashy Woodpigeon	LC
Birds	*Columba rupestris*	Hill Pigeon	LC
Birds	*Conostoma aemodium*	Great Parrotbill	LC
Birds	*Copsychus saularis*	Oriental Magpie-robin	LC
Birds	*Coracias benghalensis*	Indian Roller	LC
Birds	*Coracina macei*	Indian Cuckooshrike	LC

Birds	*Corvus corax*	Common Raven	LC
Birds	*Corvus macrorhynchos*	Large-billed Crow	LC
Birds	*Corvus splendens*	House Crow	LC
Birds	*Coturnix coturnix*	Common Quail	LC
Birds	*Cuculus canorus*	Common Cuckoo	LC
Birds	*Cuculus micropterus*	Indian Cuckoo	LC
Birds	*Cuculus poliocephalus*	Lesser Cuckoo	LC
Birds	*Cuculus saturatus*	Oriental Cuckoo	LC
Birds	*Culicicapa ceylonensis*	Grey-headed Canary-flycatcher	LC
Birds	*Cutia nipalensis*	Himalayan Cutia	LC
Birds	*Cyanecula svecica*	Bluethroat	LC
Birds	*Cyanoderma chrysaeum*	Golden Babbler	LC
Birds	*Cyanoderma pyrrhops*	Black-chinned Babbler	LC
Birds	*Cyornis poliogenys*	Pale-chinned Flycatcher	LC
Birds	*Cyornis rubeculoides*	Blue-throated Blue-flycatcher	LC
Birds	*Cyornis tickelliae*	Tickell's Blue-flycatcher	LC
Birds	*Cyornis unicolor*	Pale Blue-flycatcher	LC
Birds	*Delichon dasypus*	Asian House Martin	LC
Birds	*Delichon nipalense*	Nepal House Martin	LC
Birds	*Dendrocitta formosae*	Grey Treepie	LC
Birds	*Dendrocopos darjellensis*	Darjeeling Woodpecker	LC
Birds	*Dendrocopos hyperythrus*	Rufous-bellied Woodpecker	LC
Birds	*Dendrocopos macei*	Fulvous-breasted Woodpecker	LC
Birds	*Dicaeum chrysorrheum*	Yellow-vented Flowerpecker	LC
Birds	*Dicaeum erythrorhynchos*	Pale-billed Flowerpecker	LC
Birds	*Dicaeum ignipectus*	Fire-breasted Flowerpecker	LC
Birds	*Dicaeum melanozanthum*	Yellow-bellied Flowerpecker	LC
Birds	*Dicaeum minullum*	Plain Flowerpecker	LC
Birds	*Dicrurus aeneus*	Bronzed Drongo	LC
Birds	*Dicrurus annectens*	Crow-billed Drongo	LC
Birds	*Dicrurus hottentottus*	Hair-crested Drongo	LC
Birds	*Dicrurus leucophaeus*	Ashy Drongo	LC
Birds	*Dicrurus macrocercus*	Black Drongo	LC
Birds	*Dicrurus paradiseus*	Greater Racquet-tailed Drongo	LC
Birds	*Dicrurus remifer*	Lesser Racquet-tailed Drongo	LC
Birds	*Dryobates cathpharius*	Scarlet-breasted Woodpecker	LC
Birds	*Ducula badia*	Mountain Imperial-pigeon	LC
Birds	*Egretta garzetta*	Little Egret	LC
Birds	*Elanus caeruleus*	Black-winged Kite	LC
Birds	*Emberiza aureola*	Yellow-breasted Bunting	CR

Birds	*Emberiza lathami*	Crested Bunting	LC
Birds	*Enicurus immaculatus*	Black-backed Forktail	LC
Birds	*Enicurus maculatus*	Spotted Forktail	LC
Birds	*Enicurus schistaceus*	Slaty-backed Forktail	LC
Birds	*Enicurus scouleri*	Little Forktail	LC
Birds	*Eremophila alpestris*	Horned Lark	LC
Birds	*Erpornis zantholeuca*	White-bellied Erpornis	LC
Birds	*Erythrogenys erythrogenys*	Rusty-cheeked Scimitar-babbler	LC
Birds	*Eudynamys scolopaceus*	Western Koel	LC
Birds	*Eumyias thalassinus*	Verditer Flycatcher	LC
Birds	*Falco amurensis*	Amur Falcon	LC
Birds	*Falco cherrug*	Saker Falcon	EN
Birds	*Falco columbarius*	Merlin	LC
Birds	*Falco naumanni*	Lesser Kestrel	LC
Birds	*Falco peregrinus*	Peregrine Falcon	LC
Birds	*Falco severus*	Oriental Hobby	LC
Birds	*Falco subbuteo*	Eurasian Hobby	LC
Birds	*Falco tinnunculus*	Common Kestrel	LC
Birds	*Ficedula albicilla*	Red-throated Flycatcher	LC
Birds	*Ficedula erithacus*	Slaty-backed Flycatcher	LC
Birds	*Ficedula hodgsoni*	Pygmy Blue-flycatcher	LC
Birds	*Ficedula hyperythra*	Snowy-browed Flycatcher	LC
Birds	*Ficedula ruficauda*	Rusty-tailed Flycatcher	LC
Birds	*Ficedula strophiata*	Rufous-gorgeted Flycatcher	LC
Birds	*Ficedula superciliaris*	Ultramarine Flycatcher	LC
Birds	*Ficedula tricolor*	Slaty-blue Flycatcher	LC
Birds	*Ficedula westermanni*	Little Pied Flycatcher	LC
Birds	*Francolinus francolinus*	Black Francolin	LC
Birds	*Fringilla coelebs*	Common Chaffinch	LC
Birds	*Fringilla montifringilla*	Brambling	LC
Birds	*Fulica atra*	Common Coot	LC
Birds	*Fulvetta vinipectus*	White-browed Fulvetta	LC
Birds	*Gallicrex cinerea*	Watercock	LC
Birds	*Gallinago nemoricola*	Wood Snipe	VU
Birds	*Gallinago solitaria*	Solitary Snipe	LC
Birds	*Gallinula chloropus*	Common Moorhen	LC
Birds	*Gallus gallus*	Red Junglefowl	LC
Birds	*Garrulax albogularis*	White-throated Laughingthrush	LC
Birds	*Garrulax caerulatus*	Grey-sided Laughingthrush	LC
Birds	*Garrulax leucolophus*	White-crested Laughingthrush	LC

Birds	*Garrulax monileger*	Lesser Necklaced Laughingthrush	LC
Birds	*Garrulax ocellatus*	Spotted Laughingthrush	LC
Birds	*Garrulax pectoralis*	Greater Necklaced Laughingthrush	LC
Birds	*Garrulax rufogularis*	Rufous-chinned Laughingthrush	LC
Birds	*Garrulus bispecularis*	Plain-crowned Jay	LC
Birds	*Geokichla citrina*	Orange-headed Thrush	LC
Birds	*Geokichla wardii*	Pied Thrush	LC
Birds	*Glareola maldivarum*	Oriental Pratincole	LC
Birds	*Glaucidium brodiei*	Collared Owlet	LC
Birds	*Glaucidium cuculoides*	Asian Barred Owlet	LC
Birds	*Grammatoptila striata*	Striated Laughingthrush	LC
Birds	*Grandala coelicolor*	Grandala	LC
Birds	*Gyps bengalensis*	White-rumped Vulture	CR
Birds	*Gyps himalayensis*	Himalayan Griffon	NT
Birds	*Halcyon smyrnensis*	White-breasted Kingfisher	LC
Birds	*Haliaeetus leucoryphus*	Pallas's Fish-eagle	EN
Birds	*Harpactes erythrocephalus*	Red-headed Trogon	LC
Birds	*Hemiprocne coronata*	Crested Treeswift	LC
Birds	*Hemipus picatus*	Bar-winged Flycatcher-shrike	LC
Birds	*Hemitesia pallidipes*	Pale-footed Bush-warbler	LC
Birds	*Hemixos flavala*	Ashy Bulbul	LC
Birds	*Heterophasia capistrata*	Rufous Sibia	LC
Birds	*Heterophasia picaoides*	Long-tailed Sibia	LC
Birds	*Hieraaetus pennatus*	Booted Eagle	LC
Birds	*Hierococcyx sparverioides*	Large Hawk-cuckoo	LC
Birds	*Hirundapus caudacutus*	White-throated Needletail	LC
Birds	*Hirundapus cochinchinensis*	Silver-backed Needletail	LC
Birds	*Hirundo rustica*	Barn Swallow	LC
Birds	*Hirundo smithii*	Wire-tailed Swallow	LC
Birds	*Hodgsonius phaenicuroides*	White-bellied Redstart	LC
Birds	*Horornis brunnescens*	Hume's Bush-warbler	LC
Birds	*Horornis flavolivaceus*	Aberrant Bush-warbler	LC
Birds	*Hydrophasianus chirurgus*	Pheasant-tailed Jacana	LC
Birds	*Hypothymis azurea*	Black-naped Monarch	LC
Birds	*Hypsipetes leucocephalus*	Black Bulbul	LC
Birds	*Ibidorhyncha struthersii*	Ibisbill	LC
Birds	*Ictinaetus malaiensis*	Black Eagle	LC
Birds	*Iduna caligata*	Booted Warbler	LC
Birds	*Indicator xanthonotus*	Yellow-rumped Honeyguide	NT
Birds	*Ithaginis cruentus*	Blood Pheasant	LC

Birds	*Ixobrychus cinnamomeus*	Cinnamon Bittern	LC
Birds	*Ixos mcclellandii*	Mountain Bulbul	LC
Birds	*Jynx torquilla*	Eurasian Wryneck	LC
Birds	*Ketupa zeylonensis*	Brown Fish-owl	LC
Birds	*Lalage melanoptera*	Black-headed Cuckooshrike	LC
Birds	*Lalage melaschistos*	Black-winged Cuckooshrike	LC
Birds	*Lanius cristatus*	Brown Shrike	LC
Birds	*Lanius schach*	Long-tailed Shrike	LC
Birds	*Lanius tephronotus*	Grey-backed Shrike	LC
Birds	*Larus ridibundus*	Black-headed Gull	LC
Birds	*Larvivora brunnea*	Indian Blue Robin	LC
Birds	*Leiopicus auriceps*	Brown-fronted Woodpecker	LC
Birds	*Leiothrix argentauris*	Silver-eared Mesia	LC
Birds	*Leiothrix lutea*	Red-billed Leiothrix	LC
Birds	*Leptopoecile sophiae*	White-browed Tit-warbler	LC
Birds	*Leptoptilos dubius*	Greater Adjutant	EN
Birds	*Leptoptilos javanicus*	Lesser Adjutant	VU
Birds	*Leucosticte nemoricola*	Plain Mountain-finch	LC
Birds	*Limosa limosa*	Black-tailed Godwit	NT
Birds	*Linaria flavirostris*	Twite	LC
Birds	*Lioparus chrysotis*	Golden-breasted Fulvetta	LC
Birds	*Locustella certhiola*	Pallas's Grasshopper-warbler	LC
Birds	*Locustella lanceolata*	Lanceolated Warbler	LC
Birds	*Locustella tacsanowskia*	Chinese Grasshopper-warbler	LC
Birds	*Locustella thoracica*	Spotted Grasshopper-warbler	LC
Birds	*Lonchura punctulata*	Scaly-breasted Munia	LC
Birds	*Lonchura striata*	White-rumped Munia	LC
Birds	*Lophophanes dichrous*	Grey-crested Tit	LC
Birds	*Lophophorus impejanus*	Himalayan Monal	LC
Birds	*Lophotriorchis kienerii*	Rufous-bellied Eagle	LC
Birds	*Lophura leucomelanos*	Kalij Pheasant	LC
Birds	*Loriculus vernalis*	Vernal Hanging-parrot	LC
Birds	*Loxia curvirostra*	Red Crossbill	LC
Birds	*Machlolophus xanthogenys*	Black-lored Tit	LC
Birds	*Macropygia unchall*	Barred Cuckoo-dove	LC
Birds	*Mareca strepera*	Gadwall	LC
Birds	*Megaceryle lugubris*	Crested Kingfisher	LC
Birds	*Megalurus palustris*	Striated Grassbird	LC
Birds	*Melanochlora sultanea*	Sultan Tit	LC
Birds	*Mergus merganser*	Goosander	LC

Birds	*Merops leschenaulti*	Chestnut-headed Bee-eater	LC
Birds	*Microhierax caerulescens*	Collared Falconet	LC
Birds	*Micropternus brachyurus*	Rufous Woodpecker	LC
Birds	*Milvus migrans*	Black Kite	LC
Birds	*Minla ignotincta*	Red-tailed Minla	LC
Birds	*Mirafra assamica*	Bengal Bushlark	LC
Birds	*Monticola cinclorhyncha*	Blue-capped Rock-thrush	LC
Birds	*Monticola rufiventris*	Chestnut-bellied Rock-thrush	LC
Birds	*Monticola solitarius*	Blue Rock-thrush	LC
Birds	*Montifringilla nivalis*	White-winged Snowfinch	LC
Birds	*Motacilla alba*	White Wagtail	LC
Birds	*Motacilla cinerea*	Grey Wagtail	LC
Birds	*Motacilla citreola*	Citrine Wagtail	LC
Birds	*Motacilla maderaspatensis*	White-browed Wagtail	LC
Birds	*Muscicapa dauurica*	Asian Brown Flycatcher	LC
Birds	*Muscicapa ferruginea*	Ferruginous Flycatcher	LC
Birds	*Muscicapa sibirica*	Dark-sided Flycatcher	LC
Birds	*Mycerobas affinis*	Collared Grosbeak	LC
Birds	*Mycerobas carnipes*	White-winged Grosbeak	LC
Birds	*Mycerobas melanozanthos*	Spot-winged Grosbeak	LC
Birds	*Mycteria leucocephala*	Painted Stork	NT
Birds	*Myiomela leucura*	White-tailed Blue Robin	LC
Birds	*Myophonus caeruleus*	Blue Whistling-thrush	LC
Birds	*Myzornis pyrrhoura*	Fire-tailed Myzornis	LC
Birds	*Neophron percnopterus*	Egyptian Vulture	EN
Birds	*Niltava grandis*	Large Niltava	LC
Birds	*Niltava macgrigoriae*	Small Niltava	LC
Birds	*Niltava sundara*	Rufous-bellied Niltava	LC
Birds	*Nisaetus nipalensis*	Mountain Hawk-eagle	LC
Birds	*Nucifraga hemispila*	Southern Nutcracker	LC
Birds	*Numenius arquata*	Eurasian Curlew	NT
Birds	*Nycticorax nycticorax*	Black-crowned Night-heron	LC
Birds	*Oenanthe deserti*	Desert Wheatear	LC
Birds	*Oriolus kundoo*	Indian Golden Oriole	LC
Birds	*Oriolus tenuirostris*	Slender-billed Oriole	LC
Birds	*Oriolus traillii*	Maroon Oriole	LC
Birds	*Oriolus xanthornus*	Black-hooded Oriole	LC
Birds	*Orthotomus sutorius*	Common Tailorbird	LC
Birds	*Otus lettia*	Collared Scops-owl	LC
Birds	*Otus spilocephalus*	Mountain Scops-owl	LC

Birds	*Otus sunia*	Oriental Scops-owl	LC
Birds	*Parus major*	Great Tit	LC
Birds	*Parus monticolus*	Green-backed Tit	LC
Birds	*Passer cinnamomeus*	Russet Sparrow	LC
Birds	*Passer domesticus*	House Sparrow	LC
Birds	*Passer montanus*	Eurasian Tree Sparrow	LC
Birds	*Pavo cristatus*	Indian Peafowl	LC
Birds	*Pellorneum ruficeps*	Puff-throated Babbler	LC
Birds	*Pericrocotus brevirostris*	Short-billed Minivet	LC
Birds	*Pericrocotus cinnamomeus*	Small Minivet	LC
Birds	*Pericrocotus ethologus*	Long-tailed Minivet	LC
Birds	*Pericrocotus flammeus*	Scarlet Minivet	LC
Birds	*Pericrocotus roseus*	Rosy Minivet	LC
Birds	*Pericrocotus solaris*	Grey-chinned Minivet	LC
Birds	*Periparus ater*	Coal Tit	LC
Birds	*Periparus rubidiventris*	Rufous-vented Tit	LC
Birds	*Pernis ptilorhynchus*	Oriental Honey-buzzard	LC
Birds	*Phaenicophaeus tristis*	Green-billed Malkoha	LC
Birds	*Phalacrocorax carbo*	Great Cormorant	LC
Birds	*Phoenicurus coeruleocephala*	Blue-capped Redstart	LC
Birds	*Phoenicurus erythrogastrus*	White-winged Redstart	LC
Birds	*Phoenicurus frontalis*	Blue-fronted Redstart	LC
Birds	*Phoenicurus fuliginosus*	Plumbeous Water-redstart	LC
Birds	*Phoenicurus hodgsoni*	Hodgson's Redstart	LC
Birds	*Phoenicurus leucocephalus*	White-capped Water-redstart	LC
Birds	*Phoenicurus ochruros*	Black Redstart	LC
Birds	*Phoenicurus schisticeps*	White-throated Redstart	LC
Birds	*Phylloscopus affinis*	Tickell's Leaf-warbler	LC
Birds	*Phylloscopus burkii*	Green-crowned Warbler	LC
Birds	*Phylloscopus castaniceps*	Chestnut-crowned Warbler	LC
Birds	*Phylloscopus chloronotus*	Lemon-rumped Leaf-warbler	LC
Birds	*Phylloscopus fuligiventer*	Smoky Warbler	LC
Birds	*Phylloscopus fuscatus*	Dusky Warbler	LC
Birds	*Phylloscopus griseolus*	Sulphur-bellied Warbler	LC
Birds	*Phylloscopus humei*	Hume's Leaf-warbler	LC
Birds	*Phylloscopus inornatus*	Yellow-browed Warbler	LC
Birds	*Phylloscopus maculipennis*	Ashy-throated Warbler	LC
Birds	*Phylloscopus magnirostris*	Large-billed Leaf-warbler	LC
Birds	*Phylloscopus poliogenys*	Grey-cheeked Warbler	LC
Birds	*Phylloscopus pulcher*	Buff-barred Warbler	LC

Birds	*Phylloscopus reguloides*	Blyth's Leaf-warbler	LC
Birds	*Phylloscopus trochiloides*	Greenish Warbler	LC
Birds	*Phylloscopus whistleri*	Whistler's Warbler	LC
Birds	*Phylloscopus xanthoschistos*	Grey-hooded Warbler	LC
Birds	*Picoides canicapillus*	Grey-capped Woodpecker	LC
Birds	*Picoides nanus*	Indian Pygmy Woodpecker	LC
Birds	*Picumnus innominatus*	Speckled Piculet	LC
Birds	*Picus chlorolophus*	Lesser Yellownape	LC
Birds	*Picus guerini*	Black-naped Woodpecker	LC
Birds	*Pitta sordida*	Western Hooded Pitta	LC
Birds	*Plegadis falcinellus*	Glossy Ibis	LC
Birds	*Ploceus philippinus*	Baya Weaver	LC
Birds	*Pnoepyga albiventer*	Scaly-breasted Cupwing	LC
Birds	*Pnoepyga immaculata*	Nepal Cupwing	LC
Birds	*Pnoepyga pusilla*	Pygmy Cupwing	LC
Birds	*Pomatorhinus ruficollis*	Streak-breasted Scimitar-babbler	LC
Birds	*Pomatorhinus schisticeps*	White-browed Scimitar-babbler	LC
Birds	*Pomatorhinus superciliaris*	Slender-billed Scimitar-babbler	LC
Birds	*Porphyrio porphyrio*	Purple Swamphen	LC
Birds	*Prinia crinigera*	Striated Prinia	LC
Birds	*Prinia hodgsonii*	Grey-breasted Prinia	LC
Birds	*Prinia socialis*	Ashy Prinia	LC
Birds	*Procarduelis nipalensis*	Dark-breasted Rosefinch	LC
Birds	*Prunella fulvescens*	Brown Accentor	LC
Birds	*Prunella immaculata*	Maroon-backed Accentor	LC
Birds	*Prunella rubeculoides*	Robin Accentor	LC
Birds	*Prunella strophiata*	Rufous-breasted Accentor	LC
Birds	*Psarisomus dalhousiae*	Long-tailed Broadbill	LC
Birds	*Psilopogon asiaticus*	Blue-throated Barbet	LC
Birds	*Psilopogon franklinii*	Golden-throated Barbet	LC
Birds	*Psilopogon lineatus*	Lineated Barbet	LC
Birds	*Psilopogon virens*	Great Barbet	LC
Birds	*Psittacula alexandri*	Red-breasted Parakeet	NT
Birds	*Psittacula cyanocephala*	Plum-headed Parakeet	LC
Birds	*Psittacula eupatria*	Alexandrine Parakeet	NT
Birds	*Psittacula himalayana*	Slaty-headed Parakeet	LC
Birds	*Pteruthius aeralatus*	White-browed Shrike-babbler	LC
Birds	*Pteruthius melanotis*	Black-eared Shrike-babbler	LC
Birds	*Pteruthius rufiventer*	Black-headed Shrike-babbler	LC
Birds	*Pteruthius xanthochlorus*	Green Shrike-babbler	LC

Birds	*Ptyonoprogne rupestris*	Eurasian Crag Martin	LC
Birds	*Pycnonotus cafer*	Red-vented Bulbul	LC
Birds	*Pycnonotus flaviventris*	Black-crested Bulbul	LC
Birds	*Pycnonotus jocosus*	Red-whiskered Bulbul	LC
Birds	*Pyrrhocorax graculus*	Yellow-billed Chough	LC
Birds	*Pyrrhocorax pyrrhocorax*	Red-billed Chough	LC
Birds	*Pyrrhoplectes epauletta*	Gold-naped Finch	LC
Birds	*Pyrrhula erythaca*	Grey-headed Bullfinch	LC
Birds	*Pyrrhula erythrocephala*	Red-headed Bullfinch	LC
Birds	*Pyrrhula nipalensis*	Brown Bullfinch	LC
Birds	*Rallina eurizonoides*	Slaty-legged Crake	LC
Birds	*Regulus regulus*	Goldcrest	LC
Birds	*Rhipidura albicollis*	White-throated Fantail	LC
Birds	*Riparia chinensis*	Asian Plain Martin	LC
Birds	*Sarcogyps calvus*	Red-headed Vulture	CR
Birds	*Saroglossa spilopterus*	Spot-winged Starling	LC
Birds	*Sasia ochracea*	White-browed Piculet	LC
Birds	*Saxicola caprata*	Pied Bushchat	LC
Birds	*Saxicola ferreus*	Grey Bushchat	LC
Birds	*Saxicola insignis*	White-throated Bushchat	VU
Birds	*Saxicola torquatus*	Common Stonechat	LC
Birds	*Schoeniparus castaneceps*	Rufous-winged Fulvetta	LC
Birds	*Scolopax rusticola*	Eurasian Woodcock	LC
Birds	*Sibia nipalensis*	Hoary-throated Barwing	LC
Birds	*Sitta cinnamoventris*	Chestnut-bellied Nuthatch	LC
Birds	*Sitta frontalis*	Velvet-fronted Nuthatch	LC
Birds	*Sitta himalayensis*	White-tailed Nuthatch	LC
Birds	*Siva cyanouroptera*	Blue-winged Minla	LC
Birds	*Spatula clypeata*	Northern Shoveler	LC
Birds	*Spilopelia senegalensis*	Laughing Dove	LC
Birds	*Spilopelia suratensis*	Western Spotted Dove	LC
Birds	*Spilornis cheela*	Crested Serpent-eagle	LC
Birds	*Spinus thibetanus*	Tibetan Siskin	LC
Birds	*Stachyris nigriceps*	Grey-throated Babbler	LC
Birds	*Sterna aurantia*	River Tern	NT
Birds	*Streptopelia decaocto*	Eurasian Collared-dove	LC
Birds	*Streptopelia orientalis*	Oriental Turtle-dove	LC
Birds	*Strix leptogrammica*	Brown Wood-owl	LC
Birds	*Sturnia malabarica*	Chestnut-tailed Starling	LC
Birds	*Sturnia pagodarum*	Brahminy Starling	LC

Birds	*Surniculus dicruroides*	Fork-tailed Drongo-cuckoo	LC
Birds	*Suthora fulvifrons*	Fulvous Parrotbill	LC
Birds	*Sylviparus modestus*	Yellow-browed Tit	LC
Birds	*Tachybaptus ruficollis*	Little Grebe	LC
Birds	*Tachymarptis melba*	Alpine Swift	LC
Birds	*Tadorna ferruginea*	Ruddy Shelduck	LC
Birds	*Tadorna tadorna*	Common Shelduck	LC
Birds	*Tarsiger chrysaeus*	Golden Bush-robin	LC
Birds	*Tarsiger cyanurus*	Orange-flanked Bush-robin	LC
Birds	*Tarsiger hyperythrus*	Rufous-breasted Bush-robin	LC
Birds	*Tarsiger indicus*	White-browed Bush-robin	LC
Birds	*Tarsiger rufilatus*	Himalayan Bush-robin	LC
Birds	*Tephrodornis pondicerianus*	Common Woodshrike	LC
Birds	*Tephrodornis virgatus*	Large Woodshrike	LC
Birds	*Terpsiphone paradisi*	Indian Paradise-flycatcher	LC
Birds	*Tesia cyaniventer*	Grey-bellied Tesia	LC
Birds	*Tetraogallus himalayensis*	Himalayan Snowcock	LC
Birds	*Threskiornis melanocephalus*	Black-headed Ibis	NT
Birds	*Tichodroma muraria*	Wallcreeper	LC
Birds	*Tickellia hodgsoni*	Broad-billed Warbler	LC
Birds	*Timalia pileata*	Chestnut-capped Babbler	LC
Birds	*Tragopan satyra*	Satyr Tragopan	NT
Birds	*Treron apicauda*	Pin-tailed Green-pigeon	LC
Birds	*Treron bicinctus*	Orange-breasted Green-pigeon	LC
Birds	*Treron curvirostra*	Thick-billed Green-pigeon	LC
Birds	*Treron phoenicopterus*	Yellow-footed Green-pigeon	LC
Birds	*Treron sphenurus*	Wedge-tailed Green-pigeon	LC
Birds	*Tringa totanus*	Common Redshank	LC
Birds	*Trochalopteron affine*	Black-faced Laughingthrush	LC
Birds	*Trochalopteron erythrocephalum*	Chestnut-crowned Laughingthrush	LC
Birds	*Trochalopteron lineatum*	Streaked Laughingthrush	LC
Birds	*Trochalopteron squamatum*	Blue-winged Laughingthrush	LC
Birds	*Trochalopteron subunicolor*	Scaly Laughingthrush	LC
Birds	*Trochalopteron variegatum*	Variegated Laughingthrush	LC
Birds	*Troglodytes troglodytes*	Northern Wren	LC
Birds	*Turdoides striata*	Jungle Babbler	LC
Birds	*Turdus albocinctus*	White-collared Blackbird	LC
Birds	*Turdus atrogularis*	Black-throated Thrush	LC
Birds	*Turdus boulboul*	Grey-winged Blackbird	LC
Birds	*Turdus maximus*	Tibetan Blackbird	LC

Birds	*Turdus rubrocanus*	Chestnut Thrush	LC
Birds	*Turdus ruficollis*	Rufous-throated Thrush	LC
Birds	*Turdus unicolor*	Tickell's Thrush	LC
Birds	*Turnix suscitator*	Barred Buttonquail	LC
Birds	*Turnix sylvaticus*	Common Buttonquail	LC
Birds	*Turnix tanki*	Yellow-legged Buttonquail	LC
Birds	*Tyto alba*	Common Barn-owl	LC
Birds	*Upupa epops*	Common Hoopoe	LC
Birds	*Urocissa erythroryncha*	Red-billed Blue Magpie	LC
Birds	*Urocissa flavirostris*	Yellow-billed Blue Magpie	LC
Birds	*Vanellus cinereus*	Grey-headed Lapwing	LC
Birds	*Vanellus vanellus*	Northern Lapwing	NT
Birds	*Yuhina flavicollis*	Whiskered Yuhina	LC
Birds	*Yuhina gularis*	Stripe-throated Yuhina	LC
Birds	*Yuhina nigrimenta*	Black-chinned Yuhina	LC
Birds	*Yuhina occipitalis*	Rufous-vented Yuhina	LC
Birds	*Zapornia fusca*	Ruddy-breasted Crake	LC
Birds	*Zoonavena sylvatica*	White-rumped Spinetail	LC
Birds	*Zoothera dauma*	Scaly Thrush	LC
Birds	*Zoothera dixoni*	Long-tailed Thrush	LC
Birds	*Zoothera major*	Amami Thrush	NT
Birds	*Zoothera marginata*	Dark-sided Thrush	LC
Birds	*Zoothera mollissima*	Alpine Thrush	LC
Birds	*Zoothera monticola*	Long-billed Thrush	LC
Birds	*Zosterops palpebrosus*	Oriental White-eye	LC
Fishes	*Acanthocobitis botia*	Striped Loach	LC
Fishes	*Anguilla bengalensis*	Indian Mottled Eel	NT
Fishes	*Badis badis*		LC
Fishes	*Bagarius yarrelli*		NT
Fishes	*Bangana ariza*	Ariza Labeo	LC
Fishes	*Channa gachua*	Dwarf Snakehead	LC
Fishes	*Channa marulius*		LC
Fishes	*Cirrhinus mrigala*	Mrigal	LC
Fishes	*Cirrhinus reba*	Reba Carp	LC
Fishes	*Esomus danrica*	Flying barb	LC
Fishes	*Garra annandalei*	Annandale garra	LC
Fishes	*Gibelion catla*	Catla	LC
Fishes	*Glossogobius giuris*	Bareye Goby	LC
Fishes	*Glyptothorax indicus*	Catfish	LC
Fishes	*Heteropneustes fossilis*	Stinging catfish	LC

Fishes	*Labeo angra*	Angra Labeo	LC
Fishes	*Lepidocephalus guntea*	Peppered Loach	LC
Fishes	*Mastacembelus armatus*	Spiny eel	LC
Fishes	*Nandus nandus*		LC
Fishes	*Nangra nangra*	Kosi Nangra	LC
Fishes	*Neolissochilus dukai*		DD
Fishes	*Neotropius atherinoides*		LC
Fishes	*Notopterus notopterus*		LC
Fishes	*Oreichthys cosuatis*		LC
Fishes	*Parachiloglanis hodgarti*	Torrent Catfish	LC
Fishes	*Pseudapocryptes elongatus*		LC
Fishes	*Pseudecheneis crassicauda*		DD
Fishes	*Psilorhynchus nepalensis*		LC
Fishes	*Psilorhynchus pseudecheneis*	Stone Carp	LC
Fishes	*Rasbora daniconius*	Slender Barb	LC
Fishes	*Schistura multifasciata*		LC
Fishes	*Schizothorax progastus*	Dinnawah snowtrout	LC
Fishes	*Setipinna phasa*	Gangetic Hairfin Anchovy	LC
Fishes	*Silonia silondia*	Silong Catfish	LC
Fishes	*Sperata aor*	Long-whiskered Catfish	LC
Fishes	*Trichogaster fasciata*		LC
Fishes	*Wallago attu*		NT
Invertebrates	*Aciagrion hisopa*		LC
Invertebrates	*Aciagrion pallidum*		LC
Invertebrates	*Acisoma panorpoides*	Grizzled Pintail	LC
Invertebrates	*Agriocnemis clauseni*		LC
Invertebrates	*Agriocnemis lacteola*		LC
Invertebrates	*Agriocnemis pygmaea*	Wandering Midget	LC
Invertebrates	*Amphiallagma parvum*		LC
Invertebrates	*Anaciaeschna jaspidea*		LC
Invertebrates	*Anax ephippiger*	Vagrant Emperor	LC
Invertebrates	*Anax guttatus*	Lesser Green Emperor	LC
Invertebrates	*Anax indicus*		LC
Invertebrates	*Anax nigrofasciatus*	Blue-spotted Emperor	LC
Invertebrates	*Angulyagra oxytropis*		LC
Invertebrates	*Anisopleura comes*		LC
Invertebrates	*Anisopleura subplatystyla*		LC
Invertebrates	*Bayadera indica*		LC
Invertebrates	*Bellamya bengalensis*		LC
Invertebrates	*Bithynia cerameopoma*		LC

Invertebrates	*Bithynia pulchella*		LC
Invertebrates	*Brachydiplax chalybea*		LC
Invertebrates	*Brachydiplax farinosa*		LC
Invertebrates	*Brachydiplax sobrina*		LC
Invertebrates	*Brachythemis contaminata*		LC
Invertebrates	*Brotia costula*		LC
Invertebrates	*Calicnemia eximia*		LC
Invertebrates	*Calicnemia pulverulans*		LC
Invertebrates	*Caliphaea confusa*		LC
Invertebrates	*Camacinia gigantea*		LC
Invertebrates	*Camptoceras lineatum*		LC
Invertebrates	*Cephalaeschna acutifrons*		DD
Invertebrates	*Cephalaeschna viridifrons*		LC
Invertebrates	*Cercion malayanum*		LC
Invertebrates	*Ceriagrion azureum*		LC
Invertebrates	*Ceriagrion coromandelianum*		LC
Invertebrates	*Ceriagrion fallax*		LC
Invertebrates	*Ceriagrion olivaceum*		LC
Invertebrates	*Cherax cainii*	Smooth Marron	LC
Invertebrates	*Chloropetalia selysi*		VU
Invertebrates	*Clenchiella microscopica*		LC
Invertebrates	*Clithon reticularis*		LC
Invertebrates	*Copera marginipes*		LC
Invertebrates	*Copera vittata*		LC
Invertebrates	*Corbicula striatella*		LC
Invertebrates	*Cratilla lineata*		LC
Invertebrates	*Cratilla metallica*		LC
Invertebrates	*Cristaria plicata*		DD
Invertebrates	*Crocothemis erythraea*	Broad Scarlet	LC
Invertebrates	*Diplacodes trivialis*		LC
Invertebrates	*Erhaia banepaensis*		DD
Invertebrates	*Erhaia chandeshwariensis*		DD
Invertebrates	*Erhaia sugurensis*		DD
Invertebrates	*Euphaea ochracea*		LC
Invertebrates	*Ferrissia baconi*		LC
Invertebrates	*Ferrissia verruca*		LC
Invertebrates	*Gabbia orcula*		LC
Invertebrates	*Gabbia stenothyroides*		LC
Invertebrates	*Gyraulus barrackporensis*		LC
Invertebrates	*Gyraulus convexiusculus*		LC

Invertebrates	*Gyraulus euphraticus*		LC
Invertebrates	*Gyraulus labiatus*		LC
Invertebrates	*Himalayapotamon emphyseteum*		LC
Invertebrates	*Indoplanorbis exustus*		LC
Invertebrates	*Intha umbilicalis*		LC
Invertebrates	*Ischnura forcipata*		LC
Invertebrates	*Lamellidens consobrinus*		LC
Invertebrates	*Lamellidens corrianus*		LC
Invertebrates	*Lamellidens jenkinsianus*		LC
Invertebrates	*Lamellidens marginalis*		LC
Invertebrates	*Lamellidens narainpirensis*		LC
Invertebrates	*Lestes dorothea*		LC
Invertebrates	*Libellago lineata*		LC
Invertebrates	*Lymnaea acuminata*		LC
Invertebrates	*Lymnaea andersoniana*		LC
Invertebrates	*Lymnaea luteola*		LC
Invertebrates	*Lymnaea persica*		LC
Invertebrates	*Macrobrachium nepalense*		DD
Invertebrates	*Macromia flavocolorata*		LC
Invertebrates	*Maydelliathelphusa lugubris*		LC
Invertebrates	*Melanoides pyramis*		LC
Invertebrates	*Melanoides tuberculata*		LC
Invertebrates	*Mieniplotia scabra*		LC
Invertebrates	*Musculium goshaitanensis*		DD
Invertebrates	*Neurobasis chinensis*		LC
Invertebrates	*Nychogomphus duaricus*		LC
Invertebrates	*Onychargia atrocyana*		LC
Invertebrates	*Orthetrum chrysis*		LC
Invertebrates	*Orthetrum japonicum*		LC
Invertebrates	*Orthetrum luzonicum*		LC
Invertebrates	*Paludomus conica*		LC
Invertebrates	*Pantala flavescens*	Wandering Glider	LC
Invertebrates	*Paracercion melanotum*	Eastern Lilysquatter	LC
Invertebrates	*Parreysia bonneaudi*		LC
Invertebrates	*Parreysia caerulea*		LC
Invertebrates	*Parreysia favidens*		LC
Invertebrates	*Parreysia lima*		LC
Invertebrates	*Parreysia occata*		LC
Invertebrates	*Parreysia shurtleffiana*		LC
Invertebrates	*Parreysia sikkimensis*		LC

Invertebrates	*Parreysia triembolus*		LC
Invertebrates	*Pila globosa*		LC
Invertebrates	*Pila theobaldi*		LC
Invertebrates	*Pisidium annandalei*		LC
Invertebrates	*Pisidium atkinsonianum*		LC
Invertebrates	*Pisidium casertanum*	Caserta Pea Mussel	LC
Invertebrates	*Pisidium chandanbariensis*		DD
Invertebrates	*Pisidium clarkeanum*		LC
Invertebrates	*Pisidium ellisi*		LC
Invertebrates	*Pisidium kuiperi*		DD
Invertebrates	*Pisidium nevillianum*		LC
Invertebrates	*Pisidium prasongi*		LC
Invertebrates	*Pomacea lineata*		LC
Invertebrates	*Procambarus clarkii*	Red Swamp Crayfish	LC
Invertebrates	*Pseudagrion rubriceps*		LC
Invertebrates	*Radix auricularia*		LC
Invertebrates	*Radix brevicauda*		LC
Invertebrates	*Radix hookeri*		DD
Invertebrates	*Radix viridis*		LC
Invertebrates	*Rhinocypha biforata*		LC
Invertebrates	*Rhyothemis variegata*		LC
Invertebrates	*Segmentina calatha*		LC
Invertebrates	*Segmentina trochoidea*		LC
Invertebrates	*Sermyla riqueti*		LC
Invertebrates	*Sphaerium indicum*		LC
Invertebrates	*Sympetrum hypomelas*		LC
Invertebrates	*Tarebia granifera*		LC
Invertebrates	*Tarebia lineata*		LC
Invertebrates	*Tholymis tillarga*	Old World Twister	LC
Invertebrates	*Tramea basilaris*	Keyhole Glider	LC
Invertebrates	*Tramea limbata*	Ferruginous Glider	LC
Invertebrates	*Trichopotamon sikkimensis*		LC
Invertebrates	*Tricula godawariensis*		DD
Invertebrates	*Tricula mahadevensis*		VU
Invertebrates	*Tricula montana*		LC
Invertebrates	*Trithemis aurora*		LC
Invertebrates	*Trithemis pallidinervis*	Dancing Dropwing	LC
Invertebrates	*Urothemis signata*		LC
Invertebrates	*Vestalaria smaragdina*		LC
Invertebrates	*Vestalis gracilis*		LC

Invertebrates	*Zygonyx iris*		LC
Invertebrates	*Zyxomma petiolatum*	Long-tailed Duskdarter	LC
Mammals	*Ailurus fulgens*	Red Panda	EN
Mammals	*Alticola stoliczkanus*	Stoliczka's Mountain Vole	LC
Mammals	*Aonyx cinereus*	Asian Small-clawed Otter	VU
Mammals	*Axis axis*	Chital	LC
Mammals	*Bandicota bengalensis*	Lesser Bandicoot Rat	LC
Mammals	*Bandicota indica*	Greater Bandicoot Rat	LC
Mammals	*Callosciurus pygerythrus*	Hoary-bellied Squirrel	LC
Mammals	*Canis aureus*	Golden Jackal	LC
Mammals	*Canis lupus*	Gray Wolf	LC
Mammals	*Capricornis thar*	Himalayan Serow	NT
Mammals	*Caprolagus hispidus*	Hispid Hare	EN
Mammals	*Crocidura attenuata*	Grey Shrew	LC
Mammals	*Cynopterus sphinx*	Greater Shortnosed Fruit Bat	LC
Mammals	*Dremomys lokriah*	Orange-bellied Himalayan Squirrel	LC
Mammals	*Episoriculus caudatus*	Hodgson's Brown-toothed Shrew	LC
Mammals	*Episoriculus leucops*	Long-tailed Brown-toothed Shrew	LC
Mammals	*Episoriculus macrurus*	Arboreal Brown-toothed Shrew	LC
Mammals	*Eptesicus serotinus*	Serotine	LC
Mammals	*Falsistrellus affinis*	Chocolate Pipistrelle	LC
Mammals	*Funambulus pennantii*	Five-striped Palm Squirrel	LC
Mammals	*Hemitragus jemlahicus*	Himalayan Tahr	NT
Mammals	*Herpestes auropunctatus*	Small Indian Mongoose	LC
Mammals	*Hipposideros armiger*	Great Himalayan Leaf-nosed Bat	LC
Mammals	*Hipposideros cineraceus*	Least Leaf-nosed Bat	LC
Mammals	*Hipposideros pomona*	Andersen's Leaf-nosed Bat	LC
Mammals	*Lepus oiostolus*	Woolly Hare	LC
Mammals	*Lutra lutra*	Eurasian Otter	NT
Mammals	*Macaca assamensis*	Assam Macaque	NT
Mammals	*Macaca mulatta*	Rhesus Monkey	LC
Mammals	*Manis pentadactyla*	Chinese Pangolin	CR
Mammals	*Marmota himalayana*	Karakoram Marmot	LC
Mammals	*Martes flavigula*	Yellow-throated Marten	LC
Mammals	*Martes foina*	Beech Marten	LC
Mammals	*Megaderma lyra*	Greater False Vampire	LC
Mammals	*Moschus leucogaster*	Himalayan Muskdeer	EN
Mammals	*Muntiacus vaginalis*	Northern Red Muntjac	LC
Mammals	*Murina huttoni*	White-bellied Tube-nosed Bat	LC
Mammals	*Mus booduga*	Little Indian Field Mouse	LC

Mammals	*Mus cervicolor*	Fawn-colored Mouse	LC
Mammals	*Mus cookii*	Ryley's Spiny Mouse	LC
Mammals	*Mus musculus*	House Mouse	LC
Mammals	*Mus terricolor*	Earth-colored Mouse	LC
Mammals	*Mustela altaica*	Altai Weasel	NT
Mammals	*Mustela kathiah*	Yellow-bellied Weasel	LC
Mammals	*Mustela sibirica*	Siberian Weasel	LC
Mammals	*Myotis formosus*	Hodgson's Bat	LC
Mammals	*Myotis muricola*	Nepalese Whiskered Myotis	LC
Mammals	*Myotis nipalensis*	Nepal Myotis	LC
Mammals	*Myotis sicarius*	Mandelli's Mouse-eared Myotis	VU
Mammals	*Myotis siligorensis*	Himalayan Whiskered Myotis	LC
Mammals	*Naemorhedus goral*	Himalayan Goral	NT
Mammals	*Neodon sikimensis*	Sikkim Vole	LC
Mammals	*Neofelis nebulosa*	Clouded Leopard	VU
Mammals	*Niviventer eha*	Little Himalayan Rat	LC
Mammals	*Niviventer fulvescens*	Chestnut White-bellied Rat	LC
Mammals	*Niviventer niviventer*	Himalayan White-bellied Rat	LC
Mammals	*Ochotona macrotis*	Large-eared Pika	LC
Mammals	*Ochotona roylei*	Royle's Pika	LC
Mammals	*Paguma larvata*	Masked Palm Civet	LC
Mammals	*Panthera pardus*	Leopard	VU
Mammals	*Paradoxurus hermaphroditus*	Common Palm Civet	LC
Mammals	*Pardofelis marmorata*	Marbled Cat	NT
Mammals	*Petaurista elegans*	Spotted Giant Flying Squirrel	LC
Mammals	*Petaurista magnificus*	Hodgson's Giant Flying Squirrel	LC
Mammals	*Phaiomys leucurus*	Blyth's Vole	LC
Mammals	*Philetor brachypterus*	Short-winged Pipistrelle	LC
Mammals	*Pipistrellus coromandra*	Coromandel Pipistrelle	LC
Mammals	*Pipistrellus javanicus*	Javan Pipistrelle	LC
Mammals	*Pipistrellus tenuis*	Least Pipistrelle	LC
Mammals	*Prionailurus bengalensis*	Leopard Cat	LC
Mammals	*Prionodon pardicolor*	Spotted Linsang	LC
Mammals	*Pteropus giganteus*	Indian Flying Fox	LC
Mammals	*Rattus andamanensis*	Indochinese Forest Rat	LC
Mammals	*Rattus nitidus*	Himalayan Field Rat	LC
Mammals	*Rattus pyctoris*	Himalayan Rat	LC
Mammals	*Rattus rattus*	House Rat	LC
Mammals	*Rattus tanezumi*	Oriental House Rat	LC
Mammals	*Rhinolophus affinis*	Intermediate Horseshoe Bat	LC

Mammals	*Rhinolophus ferrumequinum*	Greater Horseshoe Bat	LC
Mammals	*Rhinolophus lepidus*	Blyth's Horseshoe Bat	LC
Mammals	*Rhinolophus luctus*	Great Woolly Horsehoe Bat	LC
Mammals	*Rhinolophus macrotis*	Big-eared Horseshoe Bat	LC
Mammals	*Rhinolophus pearsonii*	Pearson's Horseshoe Bat	LC
Mammals	*Rhinolophus pusillus*	Least Horseshoe Bat	LC
Mammals	*Rhinolophus rouxii*	Rufous Horseshoe Bat	LC
Mammals	*Rhinolophus sinicus*	Chinese Horseshoe Bat	LC
Mammals	*Rhinolophus subbadius*	Little Nepalese Horseshoe Bat	LC
Mammals	*Rusa unicolor*	Sambar	VU
Mammals	*Scotophilus heathii*	Greater Asiatic Yellow House Bat	LC
Mammals	*Semnopithecus hector*	Tarai Gray Langur	NT
Mammals	*Semnopithecus schistaceus*	Nepal Gray Langur	LC
Mammals	*Suncus murinus*	House Shrew	LC
Mammals	*Suncus stoliczkanus*	Anderson's Shrew	LC
Mammals	*Sus scrofa*	Wild Boar	LC
Mammals	*Tatera indica*	Indian Gerbil	LC
Mammals	*Ursus thibetanus*	Asiatic Black Bear	VU
Mammals	*Vandeleuria oleracea*	Asiatic Long-tailed Climbing Mouse	LC
Mammals	*Viverra zibetha*	Large Indian Civet	LC
Mammals	*Viverricula indica*	Small Indian Civet	LC
Mammals	*Vulpes ferrilata*	Tibetan Fox	LC
Mammals	*Vulpes vulpes*	Red Fox	LC
Plants	*Anacyclus pyrethrum*	Atlas Daisy	VU
Plants	*Medicago sativa*	Alfalfa	LC
Plants	*Pistacia khinjuk*		LC
Reptiles	*Boiga trigonata*	Indian Gamma Snake	LC
Reptiles	*Crocodylus palustris*	Mugger	VU
Reptiles	*Elachistodon westermanni*	Indian Egg-eater	LC
Reptiles	*Eutropis carinata*	Keeled Indian Mabuya	LC
Reptiles	*Herpetoreas sieboldii*	Sikkim Keelback	DD
Reptiles	*Japalura tricarinata*	Three Keeled Mountain Lizard	LC
Reptiles	*Ovophis monticola*	Chinese Mountain Pit Viper	LC
Reptiles	*Psammophis condanarus*	Indo-chinese Sand Snake	LC
Reptiles	*Pseudoxenodon macrops*	Large-eyed False Cobra	LC
Reptiles	*Sibynophis collaris*	Collared Black-headed Snake	LC
Reptiles	*Sitana ponticeriana*	Fan Throated Lizard	LC
Reptiles	*Trachischium guentheri*	Gunther's Oriental Worm Snake	LC
Reptiles	*Varanus bengalensis*	Common Indian Monitor	LC

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Integrated Biodiversity Assessment Tool

About IBAT

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

Appendix 4
Minutes of Meeting &Consent Letters

आज मिति २०६९ वैशाख १४ गते चरिकोट खानेपानी तथा सरसफाइ आयोजना को उपभोक्ता समिति [illegible] निम्न अनुसार उपस्थिति दस्तखत भयो।

नाम | फोन | सहि

उपस्थिति

1)
2,
3, माधव प्रसाद [illegible] 9848209666
4, [illegible] प्रसाद [illegible]
5, [illegible] बहादुर [illegible]
6, रामदास [illegible] भी.न.पा.-3, 9844061264
6, नारायण [illegible] भी.न.पा.-3 - 9741148614
7- Ram Krishna K.C. 9851181753
8 [illegible] 9860843024
9. सुष्मा कार्की 9844469369
10. पदम [illegible] कार्की 9744022295
11. [illegible] कार्की 9844236398
12 नारायण [illegible] भी.न.पा.-6 [illegible]
13 नवराज [illegible] भी.न.पा. 6 [illegible]
14 ध्रुव सापकोटा भी.न.पा. 5 [illegible]
15. [illegible] भी.न.पा. [illegible] 9803947415
16 [illegible] भी.न.पा.-2 [illegible]
17 [illegible] " [illegible]
18 [illegible] भी.न.पा.-2
20 [illegible] "
[illegible] [illegible] भी.न.पा.-3 9844061196
21 [illegible] भी.न.पा.-3 9844001969
22 [illegible] भी.न.पा. 4 [illegible]
23 [illegible] भी.न.पा. 4 [illegible]
24 [illegible] भी.न.पा. 4 [illegible]
25 [illegible]
26 [illegible] भी.न.पा. 6 [illegible]

२७ दिपक प्रसाद ज्यौपाने ९८४४४६२४८९ [signature]

२८ गोकुल प्रसाद ज्यौपाने ९८४४०६५१०८० [signature]

२९. श्रीकृष्ण जोशी ने.वि.वि ९३ नं. २०५६४४०००११७ [signature]

30. Binod Chandra Devkota TAE [signature]

31. Shiva Adhikari [signature]

32 Rajendra Sapkota -

33 Subash Raj Panta

34 Manbahadur Gurung

35 Bal Ram Mayalu

३६.

छलफलका विषयहरू :

प्रस्तावहरू

(१) आयोजनाको अन्तीम प्रतिवेदन माथी छलफल ।

(२) विकेन्द्रीत फोहर पानी प्रशोधन तथा व्यवस्थापनका लागी आवश्यक जग्गा जमिनको स्थलगत अनुगमन (निमार्णस्थलमा) तथा जग्गाको नाउ वहनी र प्रशोधित पानीबाट सिचाइ हुने गाउँको पनि स्थलगत भ्रमण र उपयोगीतामाथी छलफल ।

(३) DEWATS लागी प्रयोग गरीने जग्गा र उक्त निमार्ण कार्यले वातावरण तथा सामाजिक सुरक्षण विषयमा पर्ने प्रभाव का विविध पक्षमाथी छलफल ।

निर्णयहरू :

(१) प्रस्ताव नं. १ माथी छलफल गर्दा यस भिमेश्वर नगरपालिका भित्र निमार्ण हुने खानेपानीको डिजाईन कन्सल्टेन्ट बाट विस्तृत मस्यौदा प्रस्तुती करण डिजाईन कन्सल्टेन्ट बाट प्रस्तुत गरियो । उक्त प्रस्तुतीकरण माथी छलफल गरियो र उक्त डिजाईन हाम्रो उपभोक्ताहरूलाई उपयोगी रहेकोले उक्त डिजाइनलाई

मध्ये नगर गरि अगाडि बढ्ने निर्णय गरियो। साथै फोहर पानी या ढल निकास बाट निस्कने फोहर पानी प्रशोधन केन्द्र निर्माण गर्ने विषयमा पनि छलफल गरियो उक्त छलफल र डिजाइन कन्सल्टेन्ट बाट तयार पारिएको Master plan अनुसार अगाडि बढ्ने निर्णय गरियो।

(२) प्रस्ताव नं. २ माथि छलफल गर्दा विकेन्द्रीत फोहर पानी प्रशोधन केन्द्र निर्माण गर्ने स्थान चिलुडाडा र रामकोटडाडा को स्थलगत अनुगमन गर्दा उक्त निर्माण कार्य बाट यहाँका स्थानीयले प्रशोधीत पानी बाट स्थानीयले सिंचाई सुविधा पाउने हुँदा स्थानीयलाई फाईदा हुने देखिएकाले फोहर पानीलाई प्रशोधन गर्नु नै पर्ने देखिएको ले उक्त कुरा डिजाइन कन्सल्टेन्ट ले तयार पारेको master plan अनुसार अगाडि बढ्ने निर्णय गरियो।

(३) प्रस्ताव नं. ३ माथि छलफल गर्दा DEWATS का लागी प्रयोग हुने जग्गा जमिन को प्रयोग बाट स्थानीयमा पर्ने सामाजिक सुरक्षा र वातावरण विषय माथि विस्तृत छलफल गरियो। डिजाइन कन्सल्टेन्ट बाट तयार पारेको डिजाइन अनुसार निर्माण गर्दा सामाजिक तथा वातावरण सुरक्षामा कुनै प्रभाव नपर्ने हुँदा उक्त डिजाइन लाई कार्यान्वयन गर्न आवश्यक परीमार्जन गरी निर्माण कार्य लाई अगाडि बढाउने निर्णय गरियो।

English TranslationofMinutesof Meeting

Today dated27 April2018,a public meetingwiththe beneficiariesoftheservicearea of the proposedprojectandtheconcernedWUSCincludingtheconsultantteamhasbeenorganizedin thepremisesofBhimeshworeMunicipality.The followingmentioneddecisionshavebeenmade for theproposalssuggestedinthepresenceofthefollowingmentionedparticipants:

Participants:

1	Madhav Prasad Subedi	
2	Moti Prasad Choulagain	
3	Krishna Bdr.Khadka	
4	RamDas Shrestha	BhimeshworeMunicipality-3
5	NarayanBhaktaShrestha	BhimeshworeMunicipality-3
6	RamKrishnaK.C.	
7	HemanKumar Shrestha	
8	SusmaKarki	
9	PadamBdr.Karki	
10	Bindu Karki	
11	NarayanBdr. Thapa	BhimeshworeMunicipality-6
12	NavarajSapkota	BhimeshworeMunicipality-6
13	Dhurva Sapkota	BhimeshworeMunicipality-4
14	SahadevKhadka	BhimeshworeMunicipality-5
15	Parbati Shrestha	BhimeshworeMunicipality-2
16	NirmalaShrestha	BhimeshworeMunicipality-2
17	Bal Kumari Shrestha	BhimeshworeMunicipality-2
18	LaxmiDevi Shrestha	BhimeshworeMunicipality-2
19	Anita Shrestha	BhimeshworeMunicipality-3
20	Radhika Dahal	BhimeshworeMunicipality-3
21	Rana Bdr. Basnet	BhimeshworeMunicipality-4
22	Sobha	BhimeshworeMunicipality-4
23	ArjunBdr. Budhathoki	BhimeshworeMunicipality-4
24	Lal Bdr. Khadka	BhimeshworeMunicipality-6
25	TejBdr. Khati	BhimeshworeMunicipality-6
26	DeepakPrasadNeaupane	
27	Gokul PrasadNeaupane	
28	Charitra Krishna Joshi	BhimeshworeMunicipality-2
29	Binod ChandraDevkota	TAEC-ICON JV
30	Shiva Adhikari	TAEC-ICONJV

ProposalsandDecisions:

Proposal 1: Final ReportPresentationontheproposed watersupplyproject

Decision:Regardingtheproposal1,finalreportpresentationwascarriedoutbytheconsultant teamfollowedbybriefdiscussion.Ithasbeendecidedtoproceedtheproposedwatersupply

projectunder theconsentofbeneficiaries andotherstakeholderspresent in themeeting.

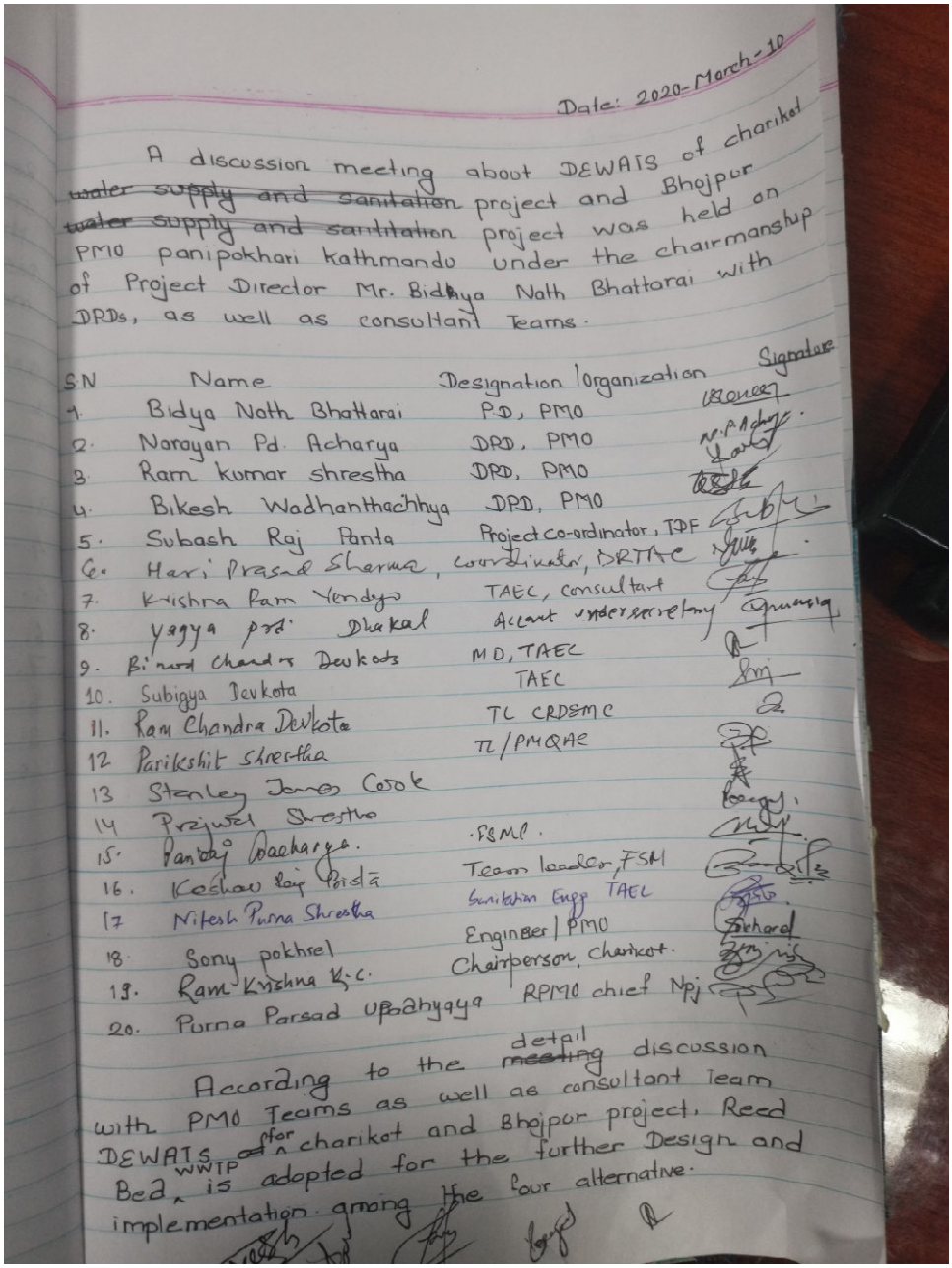
Proposal2:DiscussionregardingDEWATSincludinglandrequirementforthetreatmentsystems, site visitand its effectiveness.

Decision:Regardingbriefdiscussionontheproposal2,informationontheusefulnessofthe effluentfromthewastewatertreatmentsysteminirrigationpurposeshasbeensharedduetowhichtheparticipan tsgavepositivefeedbackforthis.Asthereisonlymasterplanpreparedfor DEWATS forthisprojectarea,ithasbeendecidedtoproceedconsideringtheconditionsofthe project.

DEWATS forthisprojectarea,ithasbeendecidedtoproceedconsideringtheconditionsofthe project.

Proposal3:Discussionsregardingthe likelyimpactson the environmental& socialaspectsfrom theland usedfor DEWATS andother project activities.

Decision:Regarding thediscussion madefor theproposal3, ithasbeendecided to proceedthis DEWATSprojectunderthesuitableconditionsasthe findingsoftheconsultantteamfromthe fieldvisitand the masterplanshowsthat therewillbenosuchsignificantimpactson the environmental as well as social aspectsof theproject area.

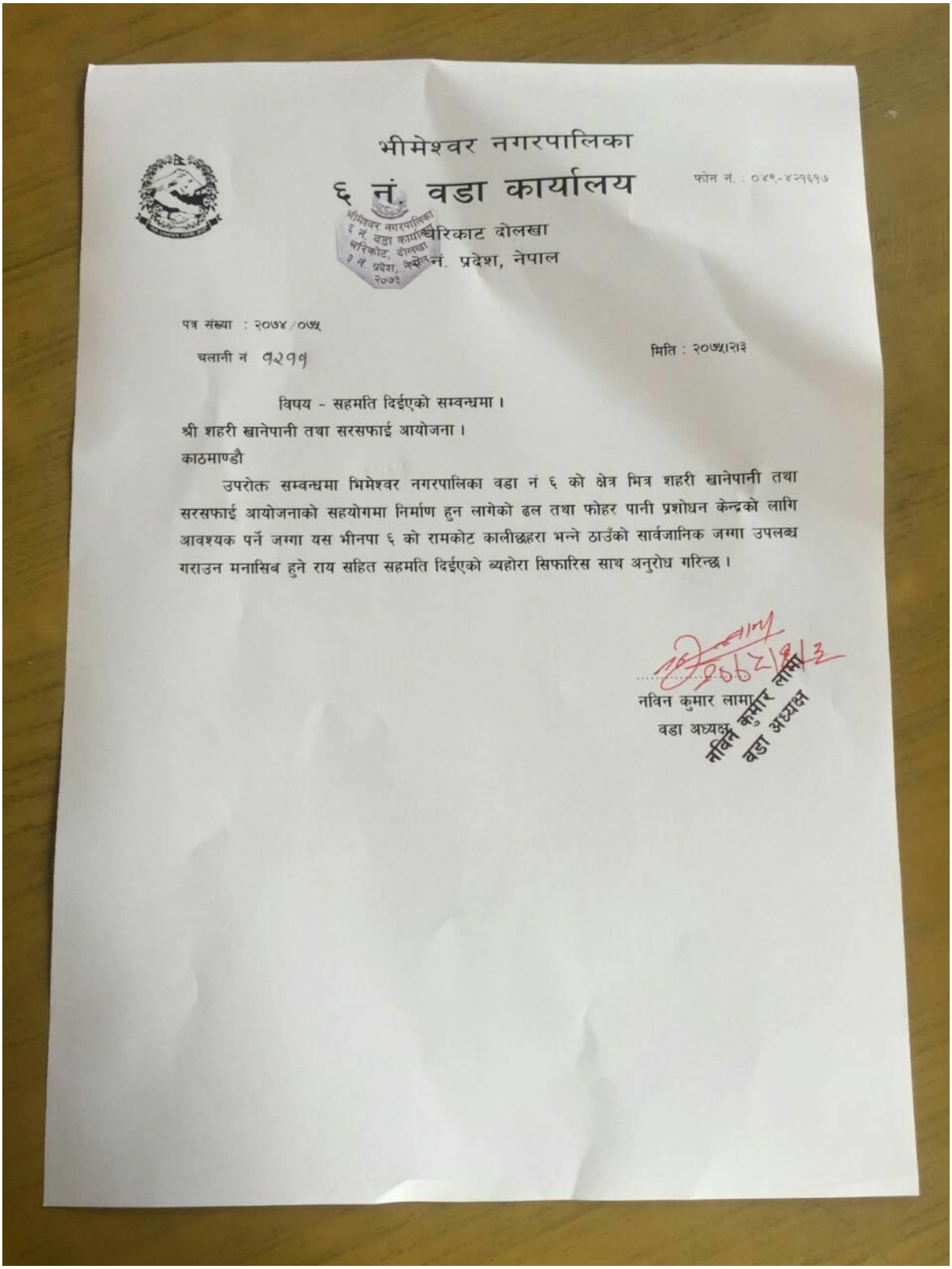


Date: 2020-March-10

A discussion meeting about DEWATS of charikot ~~water supply and sanitation~~ project and Bhojpur ~~water supply and sanitation~~ project was held on PMO panipokhari kathmandu under the chairmanship of Project Director Mr. Bidhya Nath Bhattarai with DRDs, as well as consultant Teams.

SN	Name	Designation/organization	Signature
1.	Bidya Nath Bhattarai	P.D, PMO	
2.	Narayan Pd. Acharya	DRD, PMO	
3.	Ram kumar shrestha	DRD, PMO	
4.	Bikesh Wadhanthachhya	DPD, PMO	
5.	Subash Raj Panta	Project co-ordinator, IDE	
6.	Hari Prasad Sharma,	coordinator, DRTTC	
7.	Krishna Ram Yendyo	TAEC, consultant	
8.	Yagya pra. Dhakal	Accont undersecretary	
9.	Binod Chandra Devkota	MD, TAEC	
10.	Subigya Devkota	TAEC	
11.	Ram Chandra Devkota	TL CRDSMC	
12	Parikshit shrestha	TL/PMQAE	
13	Stanley James Cook		
14	Prajwal Shrestha		
15.	Pankaj Acharya.	FSMP.	
16.	Keshav Raj Poudel	Team leader, FSM	
17	Nitesh Purna Shrestha	Sanitation Engg TAEC	
18	Sony pokhrel	Engineer/PMO	
19.	Ram Krishna K.C.	Chairperson, charikot.	
20.	Purna Parsad Upadhyaya	RPMO chief	

According to the ~~meeting~~ detail discussion with PMO Teams as well as consultant Team DEWATS ~~of~~ for charikot and Bhojpur project, Reed Bed, WWTP is adopted for the further Design and implementation among the four alternative.



भीमेश्वर नगरपालिका

६ नं. वडा कार्यालय

फोन नं. : ०४९-४२१६१७

चरिकोट दोलखा

नं. प्रदेश, नेपाल

पत्र संख्या : २०७४/०७५

चलानी नं ९२१९

मिति : २०७५।२।३

विषय - सहमति दिईएको सम्वन्धमा ।

श्री शहरी खानेपानी तथा सरसफाई आयोजना ।

काठमाण्डौ

उपरोक्त सम्वन्धमा भिमेश्वर नगरपालिका वडा नं ६ को क्षेत्र भित्र शहरी खानेपानी तथा सरसफाई आयोजनाको सहयोगमा निर्माण हुन लागेको ढल तथा फोहर पानी प्रशोधन केन्द्रको लागि आवश्यक पर्ने जग्गा यस भीनपा ६ को रामकोट कालीछहरा भन्ने ठाउँको सार्वजानिक जग्गा उपलब्ध गराउन मनासिब हुने राय सहित सहमति दिईएको व्यहोरा सिफारिस साथ अनुरोध गरिन्छ ।

२०७५।२।३

नविन कुमार लामा

वडा अध्यक्ष

नविन कुमार लामा

वडा अध्यक्ष

English Translation

BhimeshwarMunicipality
WardNo.6Office
Charikot,Dolakha
ProvinceNo.3, Nepal

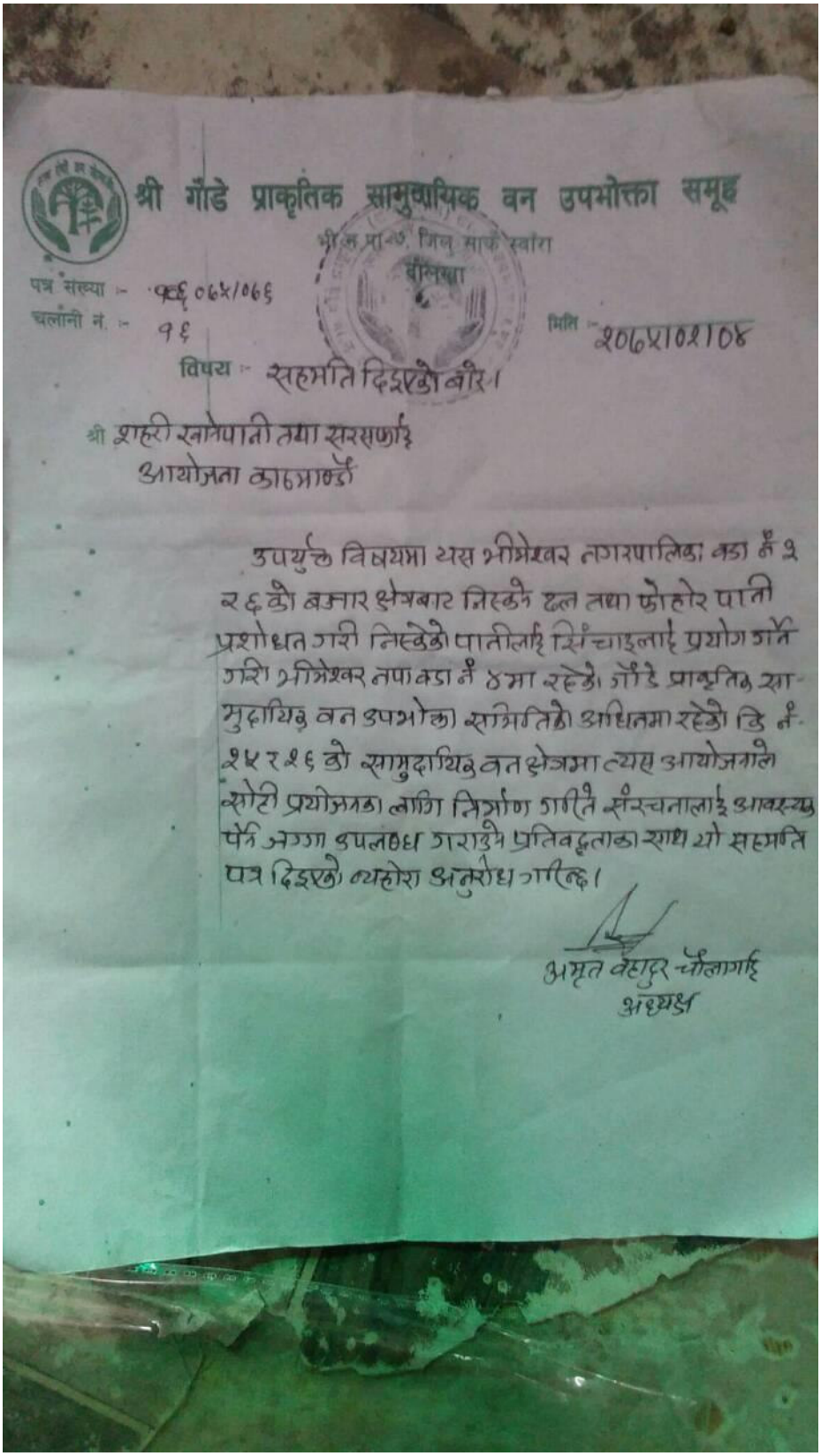
Date:17May, 2018

Subject:In regard to the Consent

To,
The UrbanWaterSupplyand Sanitation(Sector) Project
Kathmandu

With regard to the above mentioned subject,it isrequestedwithrecommendation thatthe approval has been granted along with opinion that the public land located at Ramkot,Kalichhahara of ward no. 6 of Bhimeshwore municipality, isreasonable to be provided forthe constructionof Waste Water TreatmentPlantthat is requiredforUrbanwater Supply andSanitation(Sector) Project, Dolakha.

NavinKumarLama
Ward Chairman



श्री गौडे प्राकृतिक सामुदायिक वन उपभोक्ता समूह

भी.न.पा-७, जिल्ला मार्के स्वारा

बालेखा

पत्र संख्या :- ०६५/०६६

चलानी नं. :- ९६

मिति :- २०६५।०१।०४

विषय :- सहमति दिइएको बारे।

श्री शहरी खानेपानी तथा सरसफाई

आयोजना कार्यालय

उपर्युक्त विषयमा यस भीमेश्वर नगरपालिका वडा नं २ र ६ को बजार क्षेत्रबाट निस्कने ढल तथा फोहोर पानी प्रशोधन गरी निस्केको पानीलाई सिंचाइलाई प्रयोग गर्ने गरी भीमेश्वर नपा वडा नं ४ मा रहेको गौडे प्राकृतिक सामुदायिक वन उपभोक्ता समितिको अधिनमा रहेको कि नं. १५२१६ को सामुदायिक वन क्षेत्रमा त्यस आयोजनाले सोही प्रयोजनका लागि निर्माण गरिने संरचनालाई आवश्यक पर्ने जग्गा उपलब्ध गराउने प्रतिवद्धताका साथ यो सहमति पत्र दिइएको व्यहोरा अनुरोध गरिन्छ।

अमृत बहादुर चौलागाई

अध्यक्ष

EnglishTranslation

Shree GaundePrakritikCommunityForestUsers Group
BhimeshworMunicipality
WardNo.7,Jilu,Saafe Swanra
Dolakha

Date:18May,2018

Subject:In regard to the Approval grant

To,
The UrbanWaterSupplyand Sanitation(Sector) Project
Kathmandu

With the regard to the above mentioned subject, this is to inform you that Shree Gaunde Prakritik Community ForestUsers' Group situated at the ward no. 4 of Bhimeshwore municipality provides consentwith the commitmentto grant therequired land for the proposed WWTP componentfrom the parcel no.25and26 that is under the ownership of this community forest user's group considering the circumstance to use the treated waste water released from the proposed WWTP for the irrigation purpose that has been discharged from the core areas of Bhimeshwore municipality located at the ward no. 3 & 6.

AmritBahadurChaulagain
Chairperson

भीमेश्वर नगरपालिका

चरिकोट, दोलखा

बागमती प्रदेश, नेपाल

पत्र संख्या :
चलानी नं. : ७७ /७८ ४२०

मितिः २०७७/०४/३०

श्री शहरी खानेपानी तथा सरसफाई क्षेत्रगत परियोजना
आयोजना ब्यबस्थापन कार्यालय
पानीपोखरी काठामाडौं ।

विषय : सहमति दिईएको सम्बन्धमा ।

प्रस्तुत विषयमा नेपाल सरकार खानेपानी मन्त्रालय , खानेपानी तथा ढल ब्यबस्थापन बिभाग अन्तर्गत खानेपानी तथा सरसफाई क्षेत्रगत परियोजना (UWSSSP) द्वारा भीमेश्वोर नगरपालिकाको वडा नं. ३ र ६ मुख्य बजार एरियामा निर्माण हुने ढल निकास तथा वडा नं. ४ र ६ मा निर्माण हुने ढल प्रशोधन केन्द्र निर्माणको लागि यस नगरपालिकाको तर्फबाट सहमित प्रादान गरिएको व्यहोरा अनुरोध छ ।

(भरत बहादुर के.सी.)
नगर प्रमुख
भरत बहादुर के.सी.
नगर प्रमुख

EnglishTranslation

BHIMESHWORE MUNICIPALITY

Charikot, Dolakha

Date: 14 August, 2020

To,
The Urban Water Supply & Sanitation (Sector) Project,
Project Management Office,
Panipokhari, Kathmandu

Subject: In regard to the Approval

With regard to the above mentioned subject, this is to inform you that the approval has been granted by this municipality for the construction of sewerage line at the main area located at ward no. 3 & 6 and for the construction of waste water treatment plant at the ward no. 4 & 6 of Bhimshwore Municipality that will be implemented by urban Water Supply & Sanitation (Sector) Project under Department of Water Supply & Sewerage Management of Ministry of Water Supply.

Bharat Bahadur K.C.
Mayor

भीमेश्वर नगरपालिका

चरिकोट, दोलखा

भीमेश्वर नगरपालिका
चरिकोट, दोलखा
बागमती प्रदेश, नेपाल
२०७३

पत्र संख्या : ०७७ /७८
चलानी नं. : 785

२०७७/०४/३० बागमती प्रदेश, नेपाल
मितिः

श्री शहरी खानेपानी तथा सरसफाई क्षेत्रगत परियोजना
आयोजना व्यबस्थापन कार्यालय
पानीपोखरी काठामाडौं ।

विषय : सहमति दिईएको सम्बन्धमा ।

प्रस्तुत विषयमा शहरी खानेपानी तथा सरसफाई क्षेत्रगत आयोजना (UWSSP) चरिकोट द्वारा भीमेश्वोर नगरपालिकाको वडा नं. ६ गैराबारी रामकोटमा नेपाल सरकार खानेपानी मन्त्रालय , खानेपानी तथा ढल व्यबस्थापन बिभाग र भीमेश्वर नगरपालिकाको लागत सहभागितामा निकट भविष्यमा निर्माण हुने (Decentralize Wastewater Treatment Plan) ढल प्रशोधन केन्द्र निर्माण हुने कुरा यस नगरपालिकाको जानकारीमा रहेको छ । उक्त केन्द्रबाट निस्काशन हुने प्रसोधित पानी यस नगरपालिका वडा नं ६ रामकोट स्तिथ कालिछाहराबाट निकास हुनेगरी व्यबस्थापन गर्न लागि यस नगरपालिकाको तर्फबाट सहमित प्रादान गरिएको व्यहोरा अनुरोध छ ।

(भरत बहादुर के.सी.)
नगर प्रमुख

भरत बहादुर के.सी.
नगर प्रमुख

EnglishTranslation

BHIMESHWORE MUNICIPALITY
Charikot, Dolakha

Date: 14 August, 2020

To,
The Urban Water Supply & Sanitation (Sector) Project,
Project Management Office,
Panipokhari, Kathmandu

Subject: In regard to the Approval

With regard to the above mentioned subject, it is well known to the municipality that the decentralized waste water treatment plant will be constructed in the coming future in Gairabari, Ramkot located in ward no. 6 of Bhimeshwore municipality, by Urban Water Supply & Sanitation (Sector) Project under the participatory cost contribution by Department of Water Supply & Sewerage Management under Ministry of Water Supply and by Bhimeshwore Municipality. This is to inform that the approval has been granted by this municipality for the sewerage management to release the treated waste water from Kalichhahara, Ramkot located in ward no. 6 of Bhimeshwore municipality.

Bharat Bahadur K.C.
Mayor

"ऐतिहासिक, धार्मिक र सांस्कृतिक धरोहर, प्रकृति र पर्यटनले सम्मुनत भीमेश्वर"

भीमेश्वर नगरपालिका

४ नं. वडा कार्यालय

जिलु, ढोलेखा

फोन नं.: ०४९-६९१३३४

वागमती प्रदेश, नेपाल

पत्र संख्या :०६६।७८

चलानी नं. : २१६

मिति :-

विषय : सहमति प्रदान गरिएको सम्वन्धमा ।

श्री शहरी खानेपानी तथा सरसफाई सेक्टर आयोजना

पानीपोखरी, काठमाण्डौं ।

प्रस्तुत विषयमा शहरी खानेपानी तथा सरसफाई क्षेत्रगत आयोजना UWSSP चरिकोट द्वारा भिमेश्वर नगरपालिकाको वडा नम्वर ४ जिलु डाँडामा नेपाल सरकार खानेपानी मन्त्रालय, खानेपानी तथा ढल व्यवस्थापन विभाग र भिमेश्वर नगरपालिकाको लागत सहभागितामा निकट भविष्यमा निर्माण हुने (Decentralized wastewater Treatment plant) ढल प्रशोधन केन्द्र निर्माण हुने कुरा यस नगरपालिकाको वडा कार्यालयमा जानकारीमा रहेको छ उक्त केन्द्रबाट निष्काशन हुने प्रशोधित पानी यस नगरपालिका वडा नम्वर ४ पर्ने सार्केश्वारा खोल्सी बाट निष्काशन हुने गरी व्यवस्थापन गरी उक्त पानीलाई सिंचाईमा प्रयोग गर्ने यस वडाकाको तर्फबाट सहमति प्रदान गरिएको व्यहोरा अनुरोध छ । उक्त खोल्सी बाट निष्काशन हुने पानी जिलू माटि धरमघर तलका बस्तीमा सिंचाईमा प्रयोग गरिने छ ।

बोधार्थ

परामर्शदाता, टेक कन्सल्ट प्रा.ली, शंखमुल

चरिकोट खानेपानी तथा सरसफाई उपभोक्ता संस्था, चरिकोट

हरिवंश चौलागाई

वडा अध्यक्ष

English Translation

BHIMESHWORE MUNICIPALITY

WARD NO – 4 OFFICE

JILU, DOLAKHA

Bagmati Province, Nepal
Date: October 07, 2020

Subject: In regard to the Conferral of Consent

To,
The Urban Water Supply & Sanitation (Sector) Project
Panipokhari, Kathmandu

In regard to the above mentioned subject, this ward office of Bhimeshwore municipality is well informed about the construction of Decentralized Wastewater Treatment Plant (WWTP-2) in ward no. 4 of Jilu Danda by UWSSP (Charikot) in the near future under the cost participation by DWSSM under GoN and Bhimeshwore Municipality. This is to inform you that the consent from the municipality has been conferred for the sewerage management through the discharge of treated effluent released from this WWTP into the Sarkeshwaanra Kholsi (Rivulet) located at ward no. 4 of this municipality. The water from this rivulet will be used for irrigation purpose for the lower settlements of Jilu, Mati & Dharamghar.

Cc:

1. Consultant, TAEC Consult P. Ltd., Shankhamul
2. Charikot Water Supply & Sanitation User's Committee

Haribansha Chaulagain
Ward Chairman

भीमेश्वर नगरपालिका
नगर कार्यपालिकाको कार्यालय
५ नं. वडा कार्यालय
दोलखा

पत्र संख्या: ०७६।०७८ — ३ नं. प्रदेश, नेपाल

चलानी नं: २६८ — मिति :- २०७६।६।१४

विषय:- सहमति प्रदान गरिएको सम्वन्धमा ।

श्री शहरी खानेपानी तथा सरसफाई सेक्टर आयोजना

पानीपोखरी, काठमाण्डौ ।

प्रस्तुत विषयमा शहरी खानेपानी तथा सरसफाई क्षेत्रगत आयोजना UWSSP चरिकोट द्वारा भिमेश्वर नगरपालिकाको वडा नम्बर ४ जिलु डाँडामा नेपाल सरकार खानेपानी मन्त्रालय, खानेपानी तथा ढल व्यवस्थापन विभाग र भिमेश्वर नगरपालिकाको लागत सहभागितामा निकट भविष्यमा निर्माण हुने (Decentralized wastewater Treatment plant) ढल प्रशोधन केन्द्र निर्माण हुने कुरा यस नगरपालिकाको वडा कार्यालयमा जानकारीमा रहेको छ उक्त केन्द्रबाट निष्काशन हुने प्रशोधित पानी यस नगरपालिका वडा नम्बर ५ मा पर्ने कमिनिचौर खोल्सीबाट निष्काशन हुने गरी व्यवस्थापन गरी उक्त पानीलाई सिंचाईमा प्रयोग गर्ने यस वडाको तर्फबाट सहमति प्रदान गरिएको व्यहोरा अनुरोध छ । उक्त खोल्सी बाट निष्काशन हुने पानी जिलू माटि धरमघर तलका बस्तीमा सिंचाईमा प्रयोग गरिने छ ।

बोधार्थ

परामर्शदाता, टेक कन्सल्ट प्रा.ली, शंखमुल

चरिकोट खानेपानी तथा सरसफाई उपभोक्ता संस्था, चरिकोट

०७६/६/१४

(रामचन्द्र बस्नेत)

वडा अध्यक्ष

English Translation

BHIMESHWORE MUNICIPALITY

WARD NO – 5 OFFICE

DOLAKHA

Bagmati Province, Nepal
Date: October 30, 2020

Subject: In regard to the Conferral of Consent

To,
The Urban Water Supply & Sanitation (Sector) Project
Panipokhari, Kathmandu

In regard to the above mentioned subject, this ward office of Bhimeshwore municipality is well informed about the construction of Decentralized Wastewater Treatment Plant (WWTP-2) in ward no. 4 of Jilu Danda by UWSSP (Charikot) in the near future under the cost participation by DWSSM under GoN and Bhimeshwore Municipality. This is to inform you that the consent from the municipality has been conferred for the sewerage management through the discharge of treated effluent released from this WWTP into the Kaminichaur Kholsi (Rivulet) located at ward no. 5 of this Municipality. The water from this rivulet will be used for irrigation purpose for the lower settlements of Jilu, Mati & Dharamghar.

Cc:

1. Consultant, TAEC Consult P. Ltd., Shankhamul
2. Charikot Water Supply & Sanitation User's Committee

Ram Chandra Basnet
Ward Chairman

Appendix 5

Checklists & Sample Survey Questionnaire

Checklist for Physico-chemical Environment

A. Checklist for Physical Environment

Parameters	Description
Topography	Extensive Terraces & Steep Gorges
Geology (Rock and Soil Types)	•Rocks of Ulleri Formation represented by Augen Gneiss & feldspathic Schist •Rocks of Seti Formation composed of grey to greenish-grey phyllites & quartzite •Soils ⇒ Colluvium to Alluvium Deposits
Erosion and Sedimentation	Not Observed
Climate	Sub tropical to temperate
Quarry Sites (If any)	No
Sites for Labor Camp	Within the proposed WWTP site
Site for Storage and Stockpiling	Within the proposed WWTP Site
Land Use	Majority land covered by forest and agricultural land.
Air Quality	Medium
Waste Water Quality	Refer to the Appendix 6, Requires proper treatment
Noise Level	Medium
Spoil disposal sites	Near the proposed WWTP site
Drainage Network	No proper drainage system; As the terrain is mostly steep, less concern in this.
Sewerage System	No Sewerage System, No WWTP, Some have septic tanks, Some directly connects to surface drains.

B. Checklist for Biological Environment

a) Vegetation & Wild Life

i) Vegetation in the project area

S.No.	Local Name	Botanical Name	Location	Vegetation Type	Local Status	Local Use	Protection Status			
							IUCN	CITES	GoN	IBAT
1.	Ainselu	Rubus ellipticus	Forests	Shrubs	Common	Medicinal, Fuel, Fruits	LC	LC	LC	
2.	Amala	Emblica officinalis	Forests	Medium Sized Deciduous Tree	"	Medicinal, Fruits	LC	LC	LC	
3.	Angeri	Pieris ovalifolia	Forests	Small Deciduous Tree	"	Medicinal	LC	LC	LC	
4.	Ashare phul	Lagerstroemia reginae	Near Human Habitation	Medium Sized Tree	"	Gardening	LC	LC	LC	
5.	Asuro	Adhatoda vasica	Forest	Shrub	"	Medicinal	LC	LC	LC	
6.	Bakaino	Melia azedaroch	Along road & forest edges	Medium Sized Shrub or Tree	"	Fruits, Agro forestry	LC	LC	LC	
7.	Bar	Ficus bengalensis	Human habitations	Tree	"	Medicinal, Fruits, Agro.	LC	LC	LC	
8.	Barro	Terminalia bellirica	Forests near Human habitation	Large Tree	"	Medicinal, fruits	LC	LC	LC	
9.	Bel	Aegle marmelos	Near Human Habitation	Shrub/Tree	"	Religous, fruits	LC	LC	LC	
10.	Bhalayo	Rhus wallichii	Forests	Tree	"	Medicinal	LC	LC	LC	
11.	Bhote Pipal	Populus ciliata	Forests, Human Habitation	Large Tree	"	Medicinal	LC	LC	LC	
12.	Bot Dhayaro	Lagerstroemia parviflora	Open grasslands	Tree	"	Edible gum, carpentry, Block	LC	LC	LC	
13.	Chilaune	Schima wallichii	Forests	Tree	"	Medicinal, Dyeing & Agro.	LC	LC	LC	
14.	Chyuri	Bassia butyracea	Near Human Habitation	Tree	"	Medicinal, Oils	LC	LC	LC	
15.	Chutro	Berberis aristata	Shrubberies, Open hillside	Shrub	"	Medicinal	LC	LC	LC	
16.	Daar	Debregeasia salicifolia	Forests, Shrubberies	Shrub/Small Tree	"	Fuel, Flavouring	LC	LC	LC	
17.	Dabdabe	Gomuda pinnata	Forest	Tree	"	Agroforestry,	LC	LC	LC	
18.	Dhobeni	Mussaenda macrophylla	Forest	Shrub	"	Medicinal	LC	LC	LC	
19.	Dhusure	Colebrookea oppositifolia	Open grasslands	Shrub	"	Medicinal, Fuel, Fodder	LC	LC	LC	
20.	Githa	Dioscorea bulbifera	Open grasslands	Climbing plant	"	Medicinal	LC	LC	LC	

S.No.	Local Name	Botanical Name	Location	Vegetation Type	Local Status	Local Use	Protection Status			
							IUCN	CITES	GoN	IBAT
21.	Gujyanto	Callicarpa macrophylla	Roadsides	Shrub/Small Tree		Medicinal, Edible, Fuel	LC	LC	LC	
22.	Hallunde	Lannea coromandelica	Lowland, Forests	Tree		Edible, Medicinal	LC	LC	LC	
23.	Harro	Terminalia chebula	Near Human Habitation	Medium to large tree		Medicinal, Religious	LC	LC	LC	
24.	Jamun	Syzygium cumini	Forests	Shrub/Tree		Medicinal, Edible	LC	LC	LC	
25.	Jhankri syaula	Phoebe lanceolata	Forests	Tree		Fuel, Agro forestry	LC	LC	LC	
26.	Kabro	Ficus lacor	Forests	Large Tree		Medicinal				
27.	Kadam	Anthocephalus chinelis	Forests	Large Tree		Medicinal	LC	LC	LC	
28.	Kafal	Myrica esculenta	Forests near Human habitation	Large Shrub/Tree		Medicinal, Fruits, Agro	LC	LC	LC	
29.	Kasam	Adina cordifolia	Forests	Tree		Medicinal	LC	LC	LC	
30.	Khayar	Acacia catechu	Forests	Tree		Edible	LC	LC	LC	
31.	Khanayo	Ficus semicordata	Forests	Small to medium sized tree		Fodder, Medicinal	LC	LC	LC	
32.	Khirro	Sapium insigne	Forests	Shrub/Tree		Poisonous	LC	LC	LC	
33.	Kimbu	Morus alba	Near Human Adaptation	Small to medium sized tree		Fruits, Agro, Medicinal	LC	LC	LC	
34.	Kutmiro	Litsea monopelata	Forests	Shrub/Small Tree		Medicinal, Furniture	LC	LC	LC	
35.	Laampate	Duabanga grandiflora	Forests	Tree		Edible, Dye, Medicinal	LC	LC	LC	
36.	Mauwa	Engelhardtia spicata	Forests	Tree		Agroforestry, Construction	LC	LC	LC	
37.	Phaledo	Erythrina stricta	Forests	Tree		Medicinal, Agro, Dye	LC	LC	LC	
38.	Pipal	Ficus religiosa	Human habitation	Tree		Medicinal, Fuel, Religous	LC	LC	LC	
39.	Sallo	Pinus roxburghii	Forests	Tree		Ornamental, Fuel Wood	LC	LC	LC	
40.	Saj	Terminalia tomentosa	Sal Forest	Medium to large Tree		Edible, Medicinal	LC	LC	LC	
41.	Simal	Bombax ceiba	Lowland Forests	Tree		Edible, Medicinal	LC	LC	LC	
42.	Simali	Vitex negundo	Forests	Shrub		Fuel, Wood, Medicinal, Edible Seeds, Agroforestry	LC	LC	LC	

S.No.	Local Name	Botanical Name	Location	Vegetation Type	Local Status	Local Use	Protection Status			
							IUCN	CITES	GoN	IBAT
43.	Sindure	Mallotus philippe-lis	Forests	Tree		Edible, Medicinal	LC	LC	LC	
44.	Sirris	Albizia chinesis	Forests	Tree		Agroforestry, Construction	LC	LC	LC	
45.	Sisoo	Dalbergia sisoo	Forests	Tree		Medicinal, Agroforestry	LC	LC	LC	
46.	Tanki	Bauhinia variegata	Forests	Tree		Edible, Medicinal	LC	LC	LC	
47.	Tuni	Cedrealla toona	Hillsides	Tree		Medicinal, Agro	LC	LC	LC	
48.	Uttis	Alnus nepalensis	Forests	Tree		Fuel Wood, Medicinal, Agroforestry, Dyeing, Tanning & Paper Manufacture	LC	LC	LC	

ii) **Wild Life(Fauna) in the project area**

I) **Mammals in the project area**

S.No.	Common Name	Scientific Name	Habitat	Local Status	Crop/Livestock Raider	Local Use	Protection Status			
							IUCN	CITES	GoN	IBAT
1.	Jungle Cat	Felis Chaus	Forests	Rarely seen	Livestock Raider	–	LC	LC	LC	–
2.	Assam Macaque	Macaca assamensis	Forests	Commonly found	Crop Raider	–	NT	NT	EN	NT
3.	Bat	Hipposideros cineraceus	Forests	Commonly found	Crop Raider	–	LC	LC	LC	LC
4.	Leopard	Panthera pardus	Forests	Rarely seen	Livestock Raider	–	VU	NT	NT	VU
5.	Porcupine	Hystrix hodgsoni	Forests	Rarely seen	Crop Raider	–	LC	LC	LC	LC
6.	Bengal Fox	Vulpes bengalensis	Forests	Commonly found in forests	Livestock Raider	–	LC	LC	LC	LC
7.	Squirrel	Funambulus pennanti	Forests	Commonly found	Crop Raider	–	LC	LC	LC	LC
8.	Langur	Semnopithecus schistaceus	Forests	Commonly found in forests	Crop Raider	–	LC	LC	LC	LC
9.	Marten	Martes flavigula	Forests	Rarely seen	None	–	LC	LC	LC	LC
10.	Mouse	Mos haamous	Human Habitations	Commonly found	Crop Raider	–	LC	LC	LC	LC
11.	Jackal	Gangetica canis aureus	Forests	Common	Livestock Raider	–	LC	LC	LC	LC

II) **Birds in the project area**

S.No.	Common Name	Scientific Name	Type	Habitat	Local Status	Protection Status			
						IUCN	CITES	GoN	IBAT
1.	Common Barn Owl	Tyto Alba	Owl	Human Habitations	Common	LC	LC	LC	LC
2.	Black Eagle	Ictinaetus malalensis	Eagle	Forests & Near Human habitation	Common	LC	LC	LC	LC
3.	Blue Throated Barbet	Psilopogon asiaticus	Asian Barbet	Forests	Common	LC	LC	LC	LC
4.	Common Koel	Eudynamys scolopaceus	Cuckoo	Forests	Common	LC	LC	LC	LC
5.	Common Hill Patridge	Arborophila torqueola	Pheasant	Forests	Common	LC	LC	LC	LC
6.	Common Myna	Acridotheres tristis	Tropical Bird	Farmlands, Roadside, Gardens	Common	LC	LC	LC	LC
7.	Common Quail	Coturnix coturnix	Nesting game bird	Hidden in crops	Rarely seen	LC	LC	LC	LC
8.	Dove	Streptopelia sp.	Common Pigeon	Trees near Human habitations	Common	LC	LC	LC	LC
9.	Eurasian Eagle Owl	Bubo bubo	Eagle Owl	Forests	Common	LC	LC	LC	LC
10.	Great Barbet	Psilopogon virens	Asian Barbet	Forests	Common	LC	LC	LC	LC
11.	Indian Cuckoo	Cuculus micropterus	Cuckoo	Forests	Common	LC	LC	LC	LC
12.	Large Billed Crow	Corvus macrorhynchos	Crow	Human Habitation	Common	LC	LC	LC	LC
13.	Long Tailed Nightjar	Caprimulgus macrurus	Nightjar	Forests	Common	LC	LC	LC	LC
14.	Plum Headed Parakeet	Psittacula cyanocephala	Parrot	Forests, Human Habitation	Common	LC	LC	LC	LC
15.	Sparrow	Passer domesticus	Passerine	" "	Common	LC	LC	LC	LC
16.	Spot Bellied Eagle Owl	Bubo nipalensis	Forest Eagle Owl	Forests	Common	LC	LC	LC	LC
17.	Kalij Pheasant	Lophura leucomelanos	Pheasant	Forests	Common	LC	LC	LC	LC
18.	Puff Throated Babbler	Pellorneum ruficeps	Passerine	Forests	Common	LC	LC	LC	LC

III) Herpito-Fauna in the project area

S.No.	Local Name	Scientific Name	Habitat	Local Status	Protection Status			
					IUCN	CITES	GoN	IBAT
1.	Chheparo	Calotes versicolar	Gardens, Agricultural land	Commonly found	LC	LC	LC	LC
2.	Hariyau	T. albolabris	Small Bush Vegetation, Trees	Common	LC	LC	LC	LC
3.	Mausuli	Hemidactylus brookii	Human Habitation	"	LC	LC	LC	LC
4.	Bhyaguto	Bufo melanostictus	Shrubland nearstreams, Fields	Commonly found	LC	LC	LC	LC
5.	Andho Sarpa	Oxyrhis monticola	Forests	—	LC	LC	LC	LC
6.	Rat Snake	Ptyas mucosus	Forests, Human Habitations	—	LC	LC	LC	LC
7.	Steam Frog	Rana cyanophylectis	Fields, Roadsides, Freshwates	Commonly found	LC	LC	LC	LC

IV) **Fishes in the project area**

S.No.	Local Name	Scientific Name	Status of Occurrence	Migratory Status/Season	Observed Location
1.	Asala (Trout)	Schizothoraichthys sp.		January to March	Rivers, Streams
2.	Chuche Buduna	Garra annandalei	Commonly Found	Resident Fish	"
3.	Faketa (Vagra Baril)	Barilius vagra	"	Resident Fish	"
4.	Katle (Copper mahseer)	Neolissocheilus hexagonolepis		January to March	"
5.	Mungri (Catfish)	Glyptothorax indicus	Commonly Found	Resident Fish	"
6.	Singhi (Stinging catfish)	Heteropneustes fossilis	"	Resident Fish	"
7.	Gadela (Stone loach)	Nemacheilidae	"	" "	"
8.	Tite (Stone Carp)	Psilorhynchus pseudecheneis	"	Resident Fish	"
9.	Hile (Dwarf Snakehead)	Channa gachua	"	Resident Fish	"
10.	Sahar (Tor barb)	Tor tor			

IV) **Fishes in the project area**

S.No.	Local Name	Scientific Name	Status of Occurrence	Migratory Status/Season	Observed Location
1.	Asala (Trout)	Schizothoraichthys sp.		January to March	Rivers, Streams
2.	Chuche Buduna	Garra annandalei	Commonly Found	Resident Fish	"
3.	Foketa (Vagra Bavil)	Bazilius vagra	"	Resident Fish	"
4.	Katle (Cyprinus mahseer)	Neolissocheilus hexagonolepis		January to March	"
5.	Mungri (Catfish)	Glyptothorax indicus	Commonly Found	Resident Fish	"
6.	Singhi (Stinging catfish)	Heteropneustes fossilis	"	Resident Fish	"
7.	Gadela (Stone loach)	Nemacheilidae	"	" "	"
8.	Tite (Stone Carp)	Psilorhynchus pseudecheneis	"	Resident Fish	"
9.	Hile (Dwarf Snakehead)	Channa gachua	"	Resident Fish	"
10.	Sahar (Tor barb)	Tor tor			

Sample Survey Questionnaire

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

नगर आयोजना: हरिकोट खानेपानी घर नं. १३१

जिल्ला पाल्पा नगरपालिका/गा.वि.स. रामेश्वर वडा नं. २

अन्तरवार्ता लिनेको नाम : सुजना खतिवडा अन्तरवार्ता मिति : २०७२/०५/१०

सुपरिवेक्षकको नाम : राजु सर्की नोड नं.: २७१४

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

१.१ अन्तरवार्ता दिनेको नाम : कृष्ण बहादुर श्रेष्ठ

१.२ घरमुलिको नाम कृष्ण ब. श्रेष्ठ लिङ्ग : पुरुष ☑ महिला ☐ तेस्रो लिङ्गि ☐ पेशा ☐

परिवार सदस्यः पुरुष: ४ महिला: २ तेस्रो लिङ्गि..... जम्मा: ६ एकल महिला घरमुलि भए ☒

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

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

परिवारको स्वरुप : एकल ☐ संयुक्त ☑

१.५ घर परिवारका सदस्यहरुको विवरण दिनुहोस्

क्र.सं.	घरपरिवारका सदस्यको नाम	उमेर	लिङ्ग	शिक्षा स्तर	पेशा
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८					
९					
१०					

नोटः पेशा : १. कृषि २. व्यापार ३ नौकरी ४. उद्योगधन्दा ५. रेमिटेन्स (वैदेशिक रोजगार)
६. ज्याला ७. अन्य ८) कुनै पेशा नभएका आश्रित जस्तैः विधार्थी, गृहिणी, अशक्त बूढाबूढी, ५ वर्ष मुनिका बालबालिका आदि नोट गर्ने)

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

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

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

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

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

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

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

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

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

*(**पक्की** : छत ढलान, **अर्ध पक्की** : ढुङ्गा/इट्टाको गाह्रो, टीनको छाना/ढुङ्गा/स्लेट,झिगटी/टायल आदि, **कच्ची** : माटो गाह्रो : खर/टायल/खपडाले छाएको)*

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

जग्गा कति छ ?: ५ रोपनी

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

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

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

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

यदि नपुग भएमा कसरी धान्नु हुन्छ ? १. व्यापार २. ☐करी ३. उ☐धन्दा ४. रेमिटेन्स (वैदेशिक रोजगार) ५. ज्याला ६. अन्य

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

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

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

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

१.१	कृषि उत्पादनको विक्रीबाट आय (मकै, गहुँ, धान, तरकारी, फलफूल)				
१.२	पशुजन्य उत्पादन (दुध, दही, घ्यू, बाखा, कुखुरा आदि)				
	(क) को जम्मा				
२	(ख) गैह्र कृषि तर्फ				
२.१	नोकरी / जागिर				
२.२	ज्याला मजदुरी				
२.३	पेन्सन/उपदान आदी				
२.४	वैदेशीक रोजगार (रेमिटेन्स)				
२.५	पसल/व्यापार				
२.६	उद्योग				
२.७	पसल/घर भाडा				
२.८	गाडी/ढुवानी व्यवसाय				
२.९	अन्य भए उल्लेख गर्ने				
	(ख) को जम्मा				
	क+ख कुल जम्मा			१५०००/-	

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

२. खानेपानी तथा सरसफाइ व्यवस्थापन

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

क्र.सं.	वर्षायाममा	✓	लिटर/दैनिक	सुख्खा याममा	✓	लिटर/दैनिक
१.	ईनार/कुवा	☐		ईनार/कुवा	☐	
३.	ट्यूबेल/हयाण्डपम्प/डिप ट्यूबेल	☐		ट्यूबेल/हयाण्डपम्प/डिप ट्यूबेल	☐	
६.	सार्वजनिक धारा	☑	५००	सार्वजनिक धारा	☑	५००
७.	निजी धारा	☐		निजी धारा	☐	
८.	मूल, खोला, नदी, पोखरी	☐		मूल खोला, नदी, पोखरी	☐	
९.	बिक्रेतासँग पानी किनेर	☐		बिक्रेतासँग पानी किनेर	☐	
१०.	वर्षातको पानी संकलन गरेर	☐		वर्षातको पानी संकलन गरेर	☐	
११.	अन्य	☐		अन्य	☐	

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

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

नोट : *अन्तरवार्ता लिने व्यक्तिले पानीको भाँडो हेरी सोको क्षमता यकिन गरि परिमाणउल्लेख गर्ने ।*

३. निजी धारा जडान

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

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

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

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

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

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

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

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

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

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

सह-लगानि अवधारणा सम्बन्धी प्राथमिकता

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

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

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

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

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

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

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

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

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

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

५.लैङ्गिक दृष्टिकोणबाट महिला सहभागिता

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

क) महिलाहरुको उपस्थिति र सहभागीता

५.१ आयोजनाकोबारेमा छलफल गर्न कुनै बैठक बोलाईएको थियो ?

थियो ☑ थिएन ☐

५.२ के आयोजनाको छनौट गर्न बैठकमा महिला उपभोक्ताहरुको उपस्थिती थियो ?

थियो ☑ थिएन ☐

यदि थियो भने महिला उपभोक्ताहरुको भुमिका कस्तो थियो ?

सुन्ने मात्र ☑ अन्तर्क्रियात्मक ☐ निर्णायक ☐

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

ख) लैङ्गिकताका आधारमा कार्य विभाजन

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

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

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

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

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

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

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

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

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

६. सम विकासमा पहुँचका आधारमा सामाजिक समावेशी सहभागिता

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

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

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

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

ख) निर्णय प्रक्रियामा समावेशी प्रकृया अपनाईएको थियो ?

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

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

७. स्वास्थ्य र सरसफाइ

क. खानेपानी

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

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

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

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

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

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

२.४)साबुन पानीले ☐ २.५) अन्य (उल्लेख गर्नुस्) .....

३. तपाई घरमा पानी कसरी राख्नु हुन्छ ?

(एक भन्दा बढी उत्तर आउन सक्ने)

३.१) पानी भर्नु पहिले भाँडा सफा गर्ने ☑ ३.२) बासी पानी फ्याँक्ने ☐

३.३) पानी राख्ने भाँडो राम्रोसँग ढाकेर/छोपेर राख्ने ☑ ३.४) अन्य (उल्लेख गर्ने).....

४. तपाई गाग्रो वा घैंटोबाट पानी कसरी निकाल्नुहुन्छ ?

४.१) पानी सार्नु अघि अम्खोरा, लौटा, करुवा, मग धोएर ☐

४.२) गिलास, मग, कप गाग्रीमा डुबाएर ☐

४.३) गाग्रोबाट लोटा, अंम्खोरा, करुवा, गिलासमा पानी सारेर ☑

४.४) अन्य (उल्लेख गर्ने) ..... ☐

ख. चर्पी

१. के तपाईंको घरमा चर्पी छ ? छ ☑ छैन ☐ **(छैनभने १.३ जाने)**

१.१ यदि छ भने, कस्तो प्रकारको चर्पी छ ? ☐

१) खाल्डे चर्पी ☐ ४) सिस्टर्न फ्लस ☐

२) भेन्टिलेटेड खाल्डे चर्पी ☐ ५) अन्य ..... ☐

३) वाटर सिल/पोर फ्लस ☑

१.२ यदि छ भने, तपाईंको घरमा चर्पी कसकसले प्रयोग गर्नुहुन्छ ? १

(१. सबैले, २. बच्चा बाहेक सबैले ३. वयस्क र प्रौढले मात्रै ४. विरामी मात्रैले)

१.३ यदि छैन भने, दिसा गर्न कहाँ जानुहुन्छ ? ☐ ☐

(क. खोला/जङ्गल/किनार ख. खुल्ला मैदान/ठाउँ ग. घर/सडक छेउ घ. जहाँ सजिलो हुन्छ)

१.४ के तपाईंको समुदाय खुल्लदिसामुक्त क्षेत्र घोषणा भएको छ ? छ ☐ छैन ☐

ग. खानेकुराको सरसफाइ

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

१.१) पकाएको खाना छोपेर/ढाकेर राख्ने ☑ १.२) सफा हातले खाना पस्कने गर्नाले ☑

१.३) काँचै खाइने खानेकुरा राम्रोसँग पखालेर धोएर ☑ १.४) हात गोडा सफा गरेर मात्र भान्सामा पसेर ☑

१.५) धेरै बासी वा सडे गलेका खाना, फलफुल बिसर्जन गर्ने ☑

१.६) डाडु पन्यु, थाल/भाँडाकुँडा सफा गरेर मात्र खाना पस्कने/खाने ☑

१.७) चुलो चौकी पकाउने भाडा, ढकनहरूसफा राख्ने ☑

२. के तपाई खानेकुरा छोपेर/ढाकेर राख्नुहुन्छ ? राख्छु ☑ राख्दिन ☐

घ. व्यक्तिगत सरसफाइ (घरपरवारको संख्या अनुसार कृयाकलापमा टीक चिन्ह लगाएर संख्या राख्ने । जस्तो चारजनाको परिवार भए हरेक कृयाकलापमा टीक सहित चारको संख्या आउनुपर्ने)

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

क्र.सं.	बिवरण	५ वर्ष मुनिका बलबालिका		महिला		पुरुष	
		धुने (✓)	नधुने (✖)	धुने (✓)	नधुने (✖)	धुने (✓)	नधुने (✖)
१	खाना खानु अघि		✓	✓		✓	
२	खाना खाएपछि	✓		✓		✓	
३	दिसा गएपछि			✓		✓	
४	फोहर मैला छोएपछि	✓		✓		✓	

५	कामबाट फर्केपछि			✓		✓	
६	केटाकेटीलाई दिसा पिसाब गराइ सकेपछि			✓		✓	
७	अन्य (उल्लेख गर्ने)						

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

क्र.सं.	विवरण	५ वर्ष मुनिका बालबालिका		महिला		पुरुष	
		धुने (✓)	नधुने (✗)	धुने (✓)	नधुने (✗)	धुने (✓)	नधुने (✗)
१.	पानी मात्रै						
२.	खरानी पानी						
३.	भुस/पिठो पानी						
४.	साबुन पानी			✓		✓	
५.	अन्य (उल्लेख गर्ने)						
	जम्मा						

३. तपाई र परिवारका अन्य सदस्यले कहिले कहिले नुहाउनुहुन्छ ?
नुहाउने भए यस्तो (✓) चिन्ह लगाउनुहोस् र ननुहाउने भए यस्तो (✗) चिन्ह लगाउनुहोस ।

क्र.सं.	विवरण	बालबालिका	महिला	पुरुष
		(✓) (✗)	(✓) (✗)	(✓) (✗)
१.	प्रत्येक दिन			
२.	एक दिन बिराएर			
३.	हप्तामा २ पटक		✓	✓
४.	हप्तामा १ पटक	✓		
५.	२ हप्तामा १ पटक			
६.	महिनामा एक पटक			
	जम्मा			

ङ. फोहर मैला व्यवस्थापन

१. तपाईको घरबाट निस्कने ठोस फोहर मैला कहाँ विसर्जन गर्नुहुन्छ ?

१.१ घर नजिक खाल्डोमा ☐ १.२ निजी फोहर संकलनकर्तालाई दिने ☐
१.३ गा.वि.स./नगरपालिकाले व्यवस्था गरेको खाल्डो वा क्यानमा ☐ १.४ अन्य (उल्लेख गर्ने).....

२. ठोस तथा तरल फोहर वस्तुलाई अव्यवस्थित तरिकाले विसर्जन गर्नाले हुने नराम्रा असरहरूके के हुन् ? (एक भन्दा वढी उत्तर आउन सक्ने)

२.१ फोहोर वातावरणमा वृद्धि ☐ २.२ लामखुट्टे, झिंगा, किराहरुको वृद्धि ☐
२.३ रोग सर्नेमा वृद्धि ☐ २.४ अन्य (उल्लेख गर्ने) ...

३. तपाईको घरबाट निस्कने फोहोर पानी कहाँ विसर्जन गर्नुहुन्छ ?

३.१ खाल्डोमा (Soak pit) ☐ ३.२ तरकारी बारीमा/करेसा बारीमा ☐
३.३ सार्वजनिक ढलमा ☐ ३.४ अन्य (उल्लेख गर्ने)

च. वस्तुभाउको फोहर व्यवस्थापन

१. के तपाईले वस्तुभाउ पाल्नु भएको छ ? छ ☒ छैन ☐ छैन भने पानी जन्य सरुवा रोगमा जाने)
यदि छ भने कुन कुन प्रकारका छन् र तिनीहरुलाई कहाँ राख्नु हुन्छ ?

क्र. सं.	वस्तुभाउको प्रकार	घरभित्रै राख्ने	बाहिर छुट्टै गोठमा राख्ने
१	गाई/भैंसी	✓	✓
२	बंगुर/संगुर		
३	बाखा		

४	कुखुरा/हाँस		
५	ऋनय		

२. बस्तुभाउवाट निस्कने फोहोर कहाँ र कसरी विसर्जन गर्नुहुन्छ ?

२.१ मलखादमा ☐ २.२ आगो बाल्ने/गुईंठा बनाउने ☑

२.३ गोवर ग्यास प्लान्टमा प्रयोग गर्ने ☐ २.४ अन्य (उल्लेख गर्ने)

३. वस्तुभाउको फोहोर मैलाको जथाभावि अव्यवस्थित तवरले विसर्जन गर्दा हुने खराव असरहरूके के हुन् ? (एक भन्दा वढी उत्तर आउन सक्ने)

३.१ वातावरणीय फोहोरमा वृद्धि हुने ☑ ३.२ लामखुट्टे, झिंगा, किराहरुको वृद्धि हुने ☑

३.३ रोगव्याधि वढ्ने तथा सर्ने ☑ ३.४ गाँउ, छरछिमेक तथा नगर अशोभनिय देखिने ☑

३.५ अन्य (उल्लेख गर्ने) .....

छ. सेफ्टेज (फोहरलेदो) व्यवस्थापन (चर्पिबाट सेफ्टीट्यांकमा जम्मा भएको फोहरलेदो **थप प्रश्नहरु सहित**)

१) चर्पिबाट बिसर्जित मलमुत्र व्यवस्थापन (जम्मा) कहाँ गर्ने गरेको छ ?

खाल्डो ☑ रिङ्ग खाल्डो ☐ सेफ्टी ट्यांक ☐ अन्य ☐

२) सो सेफ्टी ट्यांक/खाल्डोको क्षमता कति (ठुलो सानो साइज) छ ?

३) हालसम्म कहिल्यै सफा गर्नु भएको छ ? छ ☐ छैन् ☐ छभने कति बर्षमा भरियो ? ☐

सफागर्न कति रकम तिर्नु भयो ? रु:

४) सेफ्टी ट्यांकबाट निस्केको फोहर प्रशोधन पछि मलका रुपमा प्रयोग गर्न तयार हुनुहुन्छ ? छ ☐ छैन् ☐

५) सेफ्टी ट्यांकबाट निस्केको फोहर सफागर्न कतिसम्म रकम तिर्न तयार हुनुहुन्छ ? छ ☐ छैन् ☐

५.१ तिर्न तयार भए कतिसम्म तिर्नुहुन्छ ? रु २००० सम्म ☐ रु २००० माथि ☐

६.तपाईको घरबाट सेफ्टीट्यांकमा जम्मा भएको फोहर लेदो (सेफ्टेज) कसरी थान्को गर्नुहुन्छ ?

.१ आफै सफा गर्ने ☐ २ सफागर्ने मान्छे प्रयोग गर्ने ☐ ३ व्यवस्थित कम्पनीको सेवालिने ☐ ४ अन्य

७. सेफ्टेज(फोहर लेदो) कहाँ व्यवस्थान गर्ने गरेको छ ?

१ खेतबारीमा ☐ २ खोलानाला, खोल्साखोल्सीमा ☐ ३ बनजंगल सार्वजनिक स्थानमा ☐ ४ सडक वाटो छेउछाउ ☐ ५ अनुकुल अनुसार ☐ ६ अन्य ☐

८. सेफ्टेज(फोहर लेदो) व्यवस्थान सुधार गर्न चाहनुहुन्छ ? चाहान्छु ☐ चाहान्न ☐

९. सेफ्टेज(फोहरलेदो व्यवस्थान सुधार गर्दा के गर्न चाहानु हुन्छ ?

१ सेफ्टीट्यांक बनाउने ☐ २ भएको सेफ्टीट्यांक/चर्पीको खाल्डो सुधार गर्ने ☐

३ तपाँइको चर्पिबाट ढल जोडी सामुहिक रुपमा सेप्टेज प्रशोधन प्रणाली व्यवस्थापन गरे सेवालिन तयार हुनुहुन्छ ?

४ अन्य (उल्लेख गर्ने) ☐

१०. सुधार गर्न कति रकम सम्म लगानी गर्न ईच्छा छ ? सोधेर नोट गर्ने रु: ☐

ज. पानीजन्य सरुवा रोगहरु

१. पानीजन्य सरुवा रोगको कारणहरूके के हुन् ? (एक भन्दा वढी उत्तर आउन सक्ने)

१.१ दूषित पानी प्रयोग गर्दा ☑ १.२ दूषित खाना खाँदा ☑

१.३ घर तथा सार्वजनिक स्थलमा फोहर बढ्नाले ☑ १.४ मानिसको मलमूत्र जथाभावी बिसर्जन गर्नाले ☑

१.५ फोहोर मैला जथाभावी फ्याँक्ने गर्दा ☑ १.६स्वास्थ्य शिक्षा तथा स्वस्थ बानीको अभाव ☑

१.७ सरसफाई र स्वास्थ्य सम्वन्धी ज्ञान र चेतनाको अभावले ☐ १.८ अन्य .....

२. तपाईंको परिवारमा कोही बिरामी परेमा के गर्नुहुन्छ ?(प्राथमिकता अनुसार नम्बर लेख्ने)

२.१ घरायसी उपचार गर्ने [१] २.२ धामी, झाँक्री, पुजारी कहाँ लाने [ ]

२.३ औषधि पसलमा जाने [२] २.४ स्वस्थ्य चौकि वा अस्पतालमा जाने [३]

२.५ अन्य (उल्लेख गर्ने)

३. यदि परिवारमा कसैलाई झाडापखाला लागेमा के गर्नुहुन्छ ? (प्राथमिकता अनुसार नम्बर लेख्ने)

३.१ जीवनजल खुवाउने [१] ३.२ घरायसी उपचार गर्ने [ ]

३.३ धामी, झांक्री वा पुजारी कहाँ जाने [ ] ३.४ औषधि पसलमा जाने [ ]

३.५ स्वास्थ्य चौकि वा अस्पतालमा जाने [२] ३.६ अन्य (उल्लेख गर्ने).....

४. गत एक सालभित्रमा तँपाइका परिवारका सदस्यहरु झाडा पखाला तथा पानीजन्य अन्य सरुवा रोगहरुबाट प्रभावित थिए ? प्रभावित भएका भए कति जना थिए तलको तालिकामा सख्या नोट गर्ने ।

क्र. सं.	रोग	५ वर्ष मुनिका बालबालिका	महिला	पुरुष	वार्षिक खर्च रु.
१	झाडापखाला		X		
२	आउँ				
३	जुका				
४	टाईफाईड				
५	हैजा				
६	छाला सम्बन्धी रोग				
७	औलोरोग (मलेरिया)				
८	कमलपित्त (जण्डीस)				
९	अन्य				
	जम्मा	X	X	X	

६. गत एक वर्षभित्र तपाईका परिवारमा झाडा पखाला तथा पानीजन्य अन्य सरुवा रोगहरुबाट कसैको मृत्यु भएको छ ? (मृत्यु अवस्था)

रोग	५ वर्ष मुनिका बालबालिका	महिला	पुरुष
झाडा पखाला			
आउँ			
पानीजन्य अन्य सरुवा रोगहरु			
जम्मा	X	X	X

७. गत एक वर्षभित्र तपाईंको परिवारका सदस्यलाई झाडापखाला र पानीजन्य अन्य सरुवा रोगहरुको उपचारमा कति रकम खर्च गर्नु भयो ?

रोग	खर्च रकम (रु.मा)
झाडापखाला	
पानीजन्य अन्य सरुवा रोगहरु	
जम्मा	X

धन्यवाद!

Appendix 6
Waste Water Quality Sample Test Report

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ENVIRONMENT AND PUBLIC HEALTH ORGANIZATION
ENPHO LABORATORY

(Govt. Reg. 168/047/048, SWC Reg. 283/047/048)

Managed and Marketed by : Eco Concern Pvt. Ltd.

Sample Analysis Report

Lab Sample ID: 4176[076-077]

ENPHO/QR/5.10.2.1/04/2076-077

Client: Taec Consult Pvt. Ltd.
Client Address: Shankhamul, Kathmandu
Received On: Sunday, February 23, 2020
Sampled By: Lab Staff
Client's Sample Code: Sample no. 02 (12Hr Sampling; Gairawari outlet)
Sample Volume and Condition: 7Ltr and Ice Box, Sample Bottle from Lab

Sample Category: Wastewater
Sample Location: Charikot, Bhimeshwor Municipality, Dolakha
Point of Sample Collection: Sewerage Pipe
Source of Sample: Municipal waste
Treated/Untreated: Untreated

PHYSICO-CHEMICAL AND MICROBIOLOGICAL ANALYSIS

Parameters	Unit	Result	Test Methods
Arsenic	mg/L	ND(<0.005)	APHA, AWWA, WEF (2017), 3114 C
Biochemical Oxygen Demand (BOD)	mg/L	293	APHA, AWWA, WEF (2017), 5210 B
Cadmium	mg/L	ND(<0.003)	APHA, AWWA, WEF (2017), 3111 B
Chemical Oxygen Demand (COD)	mg/L	446	APHA, AWWA, WEF (2017), 5220 B
Chloride	mg/L	87.4	APHA, AWWA, WEF (2017), 4500-Cl- B
Copper	mg/L	ND(<0.02)	APHA, AWWA, WEF (2017), 3111 B
E. coli	CFU/mL	$3*10^4$	APHA, AWWA, WEF (2017), 9222
Helminths	Present/Absent	Present (*Ascaris* spp)	Priya, M. et al, (2008)
Hexavalent Chromium*	mg/L	ND (<0.05)	APHA, AWWA, WEF (2017), 3500-Cr B
Lead	mg/L	ND(<0.01)	APHA, AWWA, WEF (2017), 3111 B
Mercury	mg/L	ND(<0.005)	APHA, AWWA, WEF (2017), 3112 B
Nickel	mg/L	ND(<0.01)	APHA, AWWA, WEF (2017), 3111 B
Nitrate	mg/L	3.92	APHA, AWWA, WEF (2017), 4500-NO_3^- B
Nitrogen-Ammonia	mg/L	20.78	APHA, AWWA, WPCF (1985), 417 B
Oil & Grease	mg/L	16.6	APHA, AWWA, WEF (2017), 5520 B
pH	-	6.59	APHA, AWWA, WEF (2017), 4500 H B
Phosphate	mg/L	7.3	APHA, AWWA, WEF (2017), 4500 P F
Potassium	mg/L	16.0	APHA, AWWA, WEF (2017), 3111 B
Selenium	mg/L	ND(<0.005)	APHA, AWWA, WEF (2017), 3114 C
Silver	mg/L	ND(<0.05)	APHA, AWWA, WEF (2017), 3111 B
Sulphides	mg/L	4.12	APHA, AWWA, WEF (2017), 4500-Sulphide F
Temperature	°C	18.59	APHA, AWWA, WEF (2017), 2550 B
Total Alkalinity	mg/L	218.0	APHA, AWWA, WEF (2017), 2320 B
Total Dissolved Solids (TDS)	mg/L	497.0	APHA, AWWA, WEF (2017), 2540 C
Total Kjeldahl Nitrogen(TKN)	mg/L	32.54	APHA, AWWA, WEF (2017), 4500-Norg B
Total Nitrogen	mg/L	33.85	APHA, AWWA, WEF (2017), 4500-Norg B
Total Solids	mg/L	649.0	APHA, AWWA, WEF (2017), 2540 B
Total Suspended Solids (TSS)	mg/L	152.0	APHA, AWWA, WEF (2017), 2540 D
Volatile Suspended Solids	mg/L	122.0	APHA, AWWA, WEF (2017), 2540 E
Zinc	mg/L	ND(<0.05)	APHA, AWWA, WEF (2017), 3111 B

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References: Standard Methods for the Examination of Water and Wastewater, 23rd Edition, APHA, AWWA, WEF (2017).
() : Maximum Concentration Limit ND : Not Detected
CFU- Colony Forming Unit * = Subcontracted to other accredited laboratory
Result with '<' indicate that the concentration was below the detection limit. The limit is indicated by the number following '<' sign.

ANALYZED BY

CHECKED BY

AUTHORIZED BY

Note:
(1) The results refer only to the parameters tested of the sample provided/collected for analysis. Endorsement of products is neither inferred nor implied.
(2) In order to ensure the confidentiality, the report will be released to the person who produces the registration receipt.
(3) All the samples are disposed off 7 days after the report date unless the laboratory has received special request.
(4) Total liability of our organization is limited to the invoiced amount only.
(5) The report should not be used in any advertising media without prior written permission from ENPHO Lab.

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ENVIRONMENT AND PUBLIC HEALTH ORGANIZATION
ENPHO LABORATORY

(Govt. Reg. 108/047/048, SWC Reg. 283/047/048)

Managed and Marketed by : Eco Concern Pvt. Ltd.

Sample Analysis Report

Lab Sample ID: 4175[076-077]

ENPHO/QR/5.10.2.1/04/2076-077

Client: Taec Consult Pvt. Ltd.
Client Address: Shankhamul, Kathmandu
Received On: Sunday, February 23, 2020
Sampled By: Lab Staff
Client's Sample Code: Sample no. 01 [12Hr Sampling: Jiludanda Outlet)
Sample Volume and Condition: 7Ltr and Ice Box, Sample Bottle from Lab

Sample Category: Wastewater
Sample Location: Charikot, Bhimeshwor Municipality, Dolakha
Point of Sample Collection: Sewerage Pipe
Source of Sample: Municipal waste
Treated/Untreated: Untreated

PHYSICO-CHEMICAL AND MICROBIOLOGICAL ANALYSIS

Parameters	Unit	Result	Test Methods
Arsenic	mg/l	0.008	APHA, AWWA, WEF (2017), 3114 C
Biochemical Oxygen Demand (BOD)	mg/L	427	APHA, AWWA, WEF (2017), 5210 B
Cadmium	mg/L	ND(<0.003)	APHA, AWWA, WEF (2017), 3111 B
Chemical Oxygen Demand (COD)	mg/L	560	APHA, AWWA, WEF (2017), 5220 B
Chloride	mg/L	89.3	APHA, AWWA, WEF (2017), 4500-Cl- B
Copper	mg/L	ND(<0.02)	APHA, AWWA, WEF (2017), 3111 B
E. coli	CFU/mL	$5*10^4$	APHA, AWWA, WEF (2017), 9222
Helminths	Present/Absent	Absent	Priya, M. et al, (2008)
Hexavalent Chromium*	mg/L	ND(<0.05)	APHA, AWWA, WEF (2017), 3500-Cr B
Lead	mg/L	ND(<0.01)	APHA, AWWA, WEF (2017), 3111 B
Mercury	mg/L	ND(<0.005)	APHA, AWWA, WEF (2017), 3112 B
Nickel	mg/L	ND(<0.01)	APHA, AWWA, WEF (2017), 3111 B
Nitrate	mg/L	5.49	APHA, AWWA, WEF (2017), 4500-NO_3^- B
Nitrogen-Ammonia	mg/L	15.50	APHA, AWWA, WPCF (1985), 417 B
Oil & Grease	mg/L	39.8	APHA, AWWA, WEF (2017), 5520 B
pH	-	6.46	APHA, AWWA, WEF (2017), 4500-H B
Phosphate	mg/L	4.5	APHA, AWWA, WEF (2017), 4500 P E
Potassium	mg/L	13.1	APHA, AWWA, WEF (2017), 3111 B
Selenium	mg/L	ND(<0.005)	APHA, AWWA, WEF (2017), 3114 C
Silver	mg/L	ND(<0.05)	APHA, AWWA, WEF (2017), 3111 B
Sulphides	mg/L	3.72	APHA, AWWA, WEF (2017), 4500 Sulphide I
Temperature	°C	18.51	APHA, AWWA, WEF (2017), 2550 B
Total Alkalinity	mg/L	210.00	APHA, AWWA, WEF (2017), 2320 B
Total Dissolved Solids (TDS)	mg/L	403.0	APHA, AWWA, WEF (2017), 2540 C
Total Kjeldahl Nitrogen(TKN)	mg/L	28.66	APHA, AWWA, WEF (2017), 4500-Norg B
Total Nitrogen	mg/L	30.09	APHA, AWWA, WEF (2017), 4500-Norg B
Total Solids	mg/L	733.0	APHA, AWWA, WEF (2017), 2540 B
Total Suspended Solids (TSS)	mg/L	330.0	APHA, AWWA, WEF (2017), 2540 D
Volatile Suspended Solids	mg/L	236.7	APHA, AWWA, WEF (2017), 2540 E
Zinc	mg/l	ND(<0.05)	APHA, AWWA, WEF (2017), 3111 B

ENPHO Laboratory Accredited by Nepal Bureau of Standards and Metrology (NBSM), Govt. of Nepal, Accredition No. Pra. 05/057-058

References: Standard Methods for the Examination of Water and Wastewater, 23rd Edition, APHA, AWWA, WEF (2017).
() : Maximum Concentration Limit ND : Not Detected
CFU- Colony Forming Unit * = Subcontracted to other accredited laboratory
Result with '<' indicate that the concentration was below the detection limit. The limit is indicated by the number following '<' sign.

ANALYZED BY **CHECKED BY** **AUTHORIZED BY**

Note:
(1) The results refer only to the parameters tested of the sample provided/collected for analysis. Endorsement of products is neither inferred nor implied.
(2) In order to ensure the confidentiality, the report will be released to the person who produces the registration receipt.
(3) All the samples are disposed off 7 days after the report date unless the laboratory has received special request.
(4) Total liability of our organization is limited to the invoiced amount only.
(5) The report should not be used in any advertising media without prior written permission from ENPHO Lab.

Appendix 7
Photographs

1. WWTP Site, Jillu

2. WWTP (Jillu) Site Visit

3. WWTP Site, Gairabari

4. Charikot Bazaar Area

5. Overall View of Service Area

6. Meeting with the Mayor of Bhimeshwore Municipality

Comment and Response Matrix-ADB Comments

Charikot Sewerage (DEWATS) Project, Dolakha

S.N.	Chapter/ Section/ Page	Comment/Suggestions	Response from Consultant		
			In chapter/ section/ paragraph no. / page no.	Description of change	Remarks
A.	**Section V (Description of the Project)**				
1	Chapter IV, Section B, Page 31	Provide clear description if the project involves upgrading of existing WWTPs/STPs only (Gairabari and Jiludanda), or construction of new WWTPs/STPs. If upgrading, discuss if all existing components will be dismantled and replaced by new components.	Chapter IV, Section B, Line 98, Page 32	This has been incorporated.	
2	Chapter IV, Section B, Page 44	Provide street level maps (drawn to scale) showing the routes of the sewage pipes.	Chapter IV, Section B, Figure IV-X, Page 51	This has been incorporated.	
3	Chapter IV, Section B, Page 44	Provide street level maps (drawn to scale) showing the exact locations of the WWTPs/STPs, including the immediate vicinities such as communities and receiving bodies of water.	Chapter IV, Section B, Figure IV-X, Page 51	This has been incorporated.	
4	Chapter IV, Section B, Pages 40 & 42	Provide discussion on the access to these WWTP/STP sites. Are these existing roads with ROW?	Chapter IV, Section B, Line 138, Page 43 and Line 142, Page 46	This has been incorporated.	
5	Chapter IV, Section D, Page 45	Provide additional discussion confirming that the sites have sufficient space for all the WWTP/STP components, including buffer zones and possible future expansion.	Chapter IV, Section F, Line 150, Page 53	This has been incorporated.	
6	Chapter IV	Provide more specific discussion on sludge management. It is unclear on how dried sludge is treated and disposed. There has to be a specific location where to dispose the sludge (Simply mentioning that it will be reused or used as fertilizer is not acceptable). A concrete sludge management plan needs to be discussed.	Chapter IV, Section D, Lines 146& 147, Page 52	This has been incorporated.	
7	Chapter IV	Sludge disposal site. Provide the specific location, area, and expected functional period of this disposal site.	Chapter IV, Section D, Lines 146& 147, Page 52	This has been incorporated.	
8	Chapter IV	If sludge is to be used as fertilizer, discuss the requirements needed to follow in order to allow its use as fertilizer. Please cite all relevant government guidelines or laws, and/or international guidelines, and discuss how the project will comply with these.	• Chapter IV, Section D, Line 147, Page 52 • Chapter II, Section A, Table II-I, Pages 12, 13, 16 , 19 & 20	This has been incorporated.	

S.N.	Chapter/ Section/ Page	Comment/Suggestions	Response from Consultant		
			In chapter/ section/ paragraph no. / page no.	Description of change	Remarks
B.	**Section V (Description of the Existing Environment)**				
1		In addition to the effluent analysis, undertake water sampling of surface water relative to the locations of discharge (upstream and downstream) for the WWTP/STP sites.			The sampling of surface water is not possible at this stage because the water will be available at the drainage point during rainy season / flash flood only. It means the drainage/ outlet point is dry kholsi. The WUSC and Municipality are aware on it. During implementation stage, it can be carried out and compared.
2	Chapter V, Section A-f), Page 49	Provide air quality data at the sites. Secondary data may be used.	Chapter V, Section A-f), Lines159 to 161, Table V-II, Page 58	This has been incorporated.	
C.	**Section VI (Anticipated Impacts of the Proposed Project on Environment)**				
1	Chapter VI, Section B-d)-ii): I & II, Pages 75 & 76	Provide a discussion on health and safety plan for responding to COVID-19 or other emerging infectious diseases.	Chapter VI, Section B-d)-ii): I & II, Pages 85 to 87	This has been incorporated.	
2	Chapter VIII, Section B, Table VIII-I, Pages 102 & 103 and Section E, Table VIII-IV, Pages 111 to 113	Accordingly, update the EMP table and Budget table in Section VIII.	Chapter VIII, Section B, Table VIII-I, Pages 114 to 117 and Section E, Table VIII-IV, Page 127	This has been incorporated.	
D.	**Section IX (Information Disclosure, Consultation and Participation)**				
1		The consultation conducted is not sufficient. Please undertake more consultation activities with stakeholders and communities surrounding the sewer alignments and		It is well known that it's been seven months that the	

S.N.	Chapter/ Section/ Page	Comment/Suggestions	Response from Consultant		
			In chapter/ section/ paragraph no. / page no.	Description of change	Remarks
		WWTP/STP sites.		COVID-19 pandemic has been hitting around the world. Due to this, our team is not able to go for the remaining field visits for the proposed Charikot DEWATS projects to carry out various public consultation programs to deliver information in regard to the proposed projects. Currently, the situation in Nepal regarding this epidemic is worsening day by day and it is still difficult to carry out the field visit, gather the people and discuss accordingly. We are also informed that some of the stakeholders in Charikot town has been suffering from this COVID and is said to be in isolation. Hence, we ensure you that once the condition seems normal the remaining field visits shall be carried out promptly. Since the time of design of water supply component to	
2		Consultation activities with communities surrounding the WWTP/STP sites should be informed well of the design of the project, the potential impacts, and the mitigation measures that the project will implement, particularly on odor, treated wastewater disposal, treated sludge disposal, etc. Ensure to obtain acceptability of the project from these stakeholders.			

S.N.	Chapter/ Section/ Page	Comment/Suggestions	Response from Consultant		
			In chapter/ section/ paragraph no. / page no.	Description of change	Remarks
				DEWATS components, it has been well informed to the community, WUSC and Municipality regarding the sewerage and DEWATS system and its function. The WWTP sites are located at isolated area of the settlement. People will not face odor nuisance problem and other impacts from the implementation of Charikot DEWATS project. The town will be hygienic and environmentally safe significantly after the implementation of the project than without project. However, the formal consultation will be carried out once the situation becomes favorable or before contract award.	
E.	**Update the Executive Summary accordingly**				
	Executive Summary		Executive Summary, Pages i to viii	This has been incorporated.	