Initial Environmental Examination

Project Number: 47229-001
March 2016

IND: Uttarakhand Emergency Assistance Project

Subproject : Devprayag Water Supply System

Submitted by

Project Implementation Unit, Uttarakhand Jal Santhan, Jal Bhawan, Dehradun, Uttarakhand

Asian Development Bank

GM/AS

PROJECT IMPLEMENTATION UNIT (PIU)
(Urban Water Supply Sector)
Uttarakhand Emergency Assistance Project (UEAP)
Uttarakhand Jal Sansthan
Jal Bhawan, B-Block, Nehru Colony, Dehradun, Uttarakhand
Tel.: 0135-2669992, Fax: 0135-2676177 e-mail: adb ujs@rediffmail.com

Ref: 956 /PIU-UEAP/12/2015-16 Dated: 01 March, 2016

To,

The Country Director
South Asia Department, India Resident Mission,
4 San Martin Marg, Chanakyapuri
New Delhi – 110021

Sub: Loan 3055 IND - Uttarakhand Emergency Assistance Project (UEAP) Urban Water Supply Regarding Submission of updated IEE report for Devprayag.

Dear Madam,

With reference to above subject kindly find attached updated Initial Environmental Examination (IEE) of Devprayag subproject under Uttarakhand Emergency Assistance Project (UEAP) Urban Water Supply for your approval.

Enclosure: As above.

Yours Sincerely

(Neelima Garg)
Secretary Appraisal
Uttarakhasn Jal Sansthan

ASIAN DEVELOPMENT BANK
INRM
03 MAR 2016
RECEIVED
9727

ASIAN DEVELOPMENT BANK
INRM
1815
GM
03 MAR 2016
RECEIVED
Recd. Soft copy on 3.03.16

Initial Environmental Examination

UPDATED

FEBRUARY 2016

India: Rehabilitation of Water Supply System of Devprayag under Uttarakhand Emergency Assistance Project

Prepared by State Disaster Management Authority, Government of India, for the Asian Development Bank

This initial environmental examination is a document of the State Disaster Management Authority, Government of Uttarakhand. 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.

ABBREVIATIONS

ADB	Asian Development Bank
BOD	Bio Chemical Oxygen Demand
CO	Carbon Mono Oxide
CFE	Consent for Establishment
CH_4	Methane
CFO	Consent for Operation
CWR	Clear Water Reservoir
DO	Dissolve Oxygen
dB	Decibel
IEE	Initial Environmental Examination
EA	Executing Agency
EIA	Environmental Impact Assessment
EC	Environmental Clearance
GoI	Government of India
GoU	Government of Uttrakhand
Ha	Hectare
H_2S	Hydrogen Sulphide
HDPE	High Density Poly Ehylene
HFL	High Flood level
Km	Kilometer
KL	Kiloliter
Leq	Equivalent continuous noise level
Mg	Milligram
MFF	Multitranche Financing Facility
MoEF	Ministry of Environment & Forests
MLD	Million Litter Per day
Mn	Million
M	Meter
mm	Millimeter
mg/l	Milligram per Liter
m3	Cubic meter
NAAQM	National Ambient Air Quality Monitoring
NOx	Oxides of Nitrogen
NA	Not Applicable
OUR	Oxygen uptake rate
PIU	Project Implementation Units
$PM_{2.5}$	Particulate matter size less than 2.5µm
PPE	Personal Protective Equipments
PWD	Public works Division
RCC	Reinforced Cement Concrete
RoW	Right of Way
RP	Resettlement Plan
SEIAA	State Environment Impact Assessment Authority
SPCB	State Pollution Control Board
UEPPCB	Uttaranchal Environmental Protection and Pollution Control Board
SS	Suspended Solids
SBR	Sequential Batch Reactor

SPM	Suspended Particulate Matter
SO_2	sulphur dioxides
ST	Scheduled Tribes
SC	Scheduled Castes
SOP	Standard Operational Procedures
UDD	Urban Development Department
UEAP	Uttarakhand Emergency Assistance Project
UEPPCB	Uttarakhand Environmental Protection and Pollution Control Board
UJS	Uttarakhand Jal Sansthan
UPCL	Uttaranchal Power Corporation Limited
($\mu g/m^3$	Micro Gram Per Cubic Meter

WEIGHTS AND MEASURES

Cm	-	centimeter
Crore	–	100 lakhs = 10,000,000
Lakh	–	100 thousand = 100,000
Km	–	Kilometer
Kph	-	Kilometer per hour
Lpd	–	liters per day
M	–	Meter
mg/l	–	milligrams per liter
mm	–	Millimeter
MSL	-	Mean sea level
µ	-	10^{-6} meter
$\mu g/m^3$	–	micrograms per cubic meter
µS/cm	-	micro Siemens per centimeter
NTU	-	Nephalo turbidity unit
ppm	–	parts per million

NOTE{S}

In this report, "$" refers to US dollars.
“INR” and “₹” refer to Indian rupees

Contents

APPENDICES

List of tables

List of figures

EXECUTIVE SUMMARY

1. Uttarakhand lies in the northern part of India amidst the magnificent Himalayas and dense forests. The State is bordering Himachal Pradesh in the north-west and Uttar Pradesh in the South and shares international borders with Nepal and China. The State is comprised of 13 districts divided into two regions and also called administrative divisions; the Kumaon and Garhwal.

2. Recent disaster of unprecedented floods in June, 2013 in the state of Uttarakhand, devastated many towns and villages on the banks of rivers Bhagirathi, Pindar, Mandakini, Alaknanda and Sarju. Infrastructure facilities like roads, power supply, communication, buildings, and water supply had been affected severely. Though the state government had taken up many steps to temporarily restore the facilities, it is envisaged to take up permanent measures to restore and rehabilitate the facilities.

3. The disaster impacted supply of water in terms of quantity and quality. There is a gap quantity of 0.46 MLD at delivery to the users after the disaster and it has also caused increase in turbidity. This is due to the damage of the supply infrastructure including pumps, reservoirs and distribution network.

4. To address the impact, proposals have been made to relay 16.09 km of clear water transmission main and 11 km of distribution mains at the damaged location. Construction of R.C.C. Cross Wall at Dewanigarh and Randhigarh Gadhera, iInstallation of 1 no. Uttaranchal Koop at Dewanigarh, 2 nos. Uttaranchal Koop at Randhigarh Gadhera, construction of R.C.C. CWR of 50kL capacity near Tehsil and construction of office building (G+1) of 200 sq.m. near Tehsil have also proposed under this subproject .

5. Consistent with the Environmental Assessment and Review Framework, the proposed subporject were screened using ADB rapid environmental assessment (REA) checklist-of water supply. The environmental screening revealed that no protected or sensitive areas were traversed. All impacts are site specific; few are irreversible and can be readily mitigated supporting an environmental “Category B” classification.

6. IEE for the subproject was published in ADB website in November 2014. Due to Forest land aqusition for non forestry pourpose (construction of office building) this IEE has been updated as per Environmental Assessment and Review Framework (EARF) which is in consistent with the ADB’s Safeguard Policy Statement (SPS) 2009. Requirement of forest land aquasition, executive agency file the case on 17th of December 2014, after second satge certification the required documents submitted to regionl office of MoEFCC and executive agency obtained NOC through letter no 10/x4/1(300)/2015 on dated 18th Febraury 2016.

7. IEE was conducted based on preliminary Detailed Design Report (DPR). The IEE covers all activities proposed under the project. The core zone of impact is taken as direct impact of the new construction or reconstruction or rehabilitation of the project component. IEE also covers the direct impact of the sub-project component. Assessment is carried out for all components of environment covering terrestrial and aquatic ecology, soil, water, noise and socio economic aspects.

8. **Baseline environmental data**. The pristine environment and sparse population suggest that most part of the State have a very good air quality while noise level is calm except in central part of the Devprayag town.The baseline of air quality and noise level will be generated before commencement of the construction in April 2015 has been considered in this report.

9. **Seismicity**. The State constitutes one of the most active domains of the Himalayan region. Several damaging earthquakes are recorded from this region. As such, the region is classified under high seismic zone IV.

10. **Forest.** Uttarakhand is ranked 9th in all-India in terms of forest covered area with 24,495 km^{2}of forestland The district of Pauri Garhwal, Uttarkashi, Nainital, and Chamoli have the largest forest cover accounting for 50% of all the state's total. The State Govt. of Uttarakhand has declared the oak tree (*Quercus* sp.) as a *Kalpvriksha* or wish fulfilling divine tree often treated as the signature plant of the Kumaon Himalayas as numerous logos and insignias with a stylized version of the deodar inscribed on them.

11. **Sensitive Ecosystem.** The subproject location does not fall within any sensitive ecosystem. Neither the project component have direct intervention not indirect intervention with sensitive ecosystem.

12. **Significant Environmental Impacts and Proposed Mitigation Measures.** No environmental impacts related to siting were identified in the environmental examination. Only for construction of new office building and clear water reservoir (near Tehsil) 0.36 ha of reserved forest land under Narendranagar Forest Division and forest block Devprayag compartment no -2B, needs to be acquired. NOC has been obtained for acquisition of forest land. 19 numbers of trees need to be cut for this purpose.Inprinciple approval for the diversion of forest land for non forest purpose has been obtained from the Nodal Officer, Dehradun on September 15, 2015. As per instruction of the Divisional Forest Officer (DFO), Narendranagar an amount of Rupees 4,94,200.00 has been deposited by the PIU, UEAP,UJS for the diversion of 0.36 ha of forest land for non forest purpose and for plantation and maintenenace of 190 trees.

13. Except new office building and Clear Water Reservoir (CWR), no components of subproject is located inside or near a cultural heritage site, protected area, wetland, mangrove, estuarine, buffer zone of protected area or special area for protecting biodiversity.There are no rare, threatened, and endangered species (flora and fauna) within the subproject corridor of impact.The potential significant environmental impacts identified and assessed are related to construction time impacts.

14. **Information Disclosure, Consultation, Participation, and Grievance and Redress Mechanism.** Wide stakeholder consultation and participation was observed during the environmental examination of UEAP. Project affected communities, government institutions, and non-governmental of organizations. Highlight of all consultations were documented and applicable recommended measures particularly in minimizing shifting of structures, potential conflict with migrant workers, and competing demand for local resources were incorporated in the design and the environmental management plan. This IEE report will be disclosed in the ADB website pursuant to the Bank's *Public Communication Policy* and in the SDMA website.

15. **Environmental Management Plan**.The Environmental Management and Monitoring Plan (EMMP), to form part of the bidding documents, adopted the procurement package scheme and facilitate subsequent compliance monitoring by the contractor.

16. **Conclusion.** The environmental status of the proposed Rehabilitation of Water Supply System of Devprayag has been assessed. The overall conclusion is that if the mitigation, compensation and enhancement measures are implemented in full, there should be no significant negative environmental impacts as a result of location, design, construction or operation of the subproject. There should in fact be some benefits from recommended mitigation and enhancement measures, and major improvements in quality of life and individual and public health once the scheme is in operation. All required issues have been assessed to be best of our knowledge and no further studies are required to comply with ADB procedures or the laws of Government of India.

I. INTRODUCTION

A. Project Background/Rationale

1. Recent disaster of unprecedented floods in June, 2013 in the state of Uttarakhand, devastated many towns and villages on the banks of rivers Bhagirathi, Pindar, Mandakini, Alaknanda and Sarju. Infrastructure facilities like roads, power supply, communication, buildings, and water supply had been affected severely. Though the state government had taken up many steps to temporarily restore the facilities, it is envisaged to take up permanent measures to restore and rehabilitate the facilities.

2. Uttarakhand being a tourist and pilgrimage State, attracts a large number of tourist and pilgrims. A major disaster during 15-17 June 2013 resulted in severe damages in several parts of Uttarakhand, which has a mountainous terrain and a fragile geology. Several towns have been washed away by the unprecedented flash floods and landslides, and a large number of houses, public buildings, roads, bridges, urban, rural, and tourism infrastructure, power generation and distribution facilities have been damaged. The impact on the affected population due to the loss of connectivity has been manifold

3. Based on the request of India, a Rapid Joint Damage and Needs Assessment (RJDNA) was undertaken by Asian Development Bank (ADB) and the World Bank. ADB agreed to assist the Government of India (GOI) with reconstruction and rehabilitation efforts for which the Uttarakhand Emergency Assistance (Sector) Project (UEASP) has been formulated as a multi-sector emergency loan in sector loan modality. The executing agency (EA) for the UEASP will be Government of Uttarakhand (GOU) and State Disaster Management Authority (SDMA). The primary implementing agencies (IA) will be Public Works Department (PWD) for roads & bridges, urban roads, and trekking routes including eco-trails Department of Tourism (DOT) for tourism infrastructure, Uttarakhand Civil Aviation Development Authority (UCADA) for helipads; and Uttarakhand Jal Sanstahan (UJS) for urban water supply, or any successor hereto. Some other state agencies such as Forest Department, Kumaon Mandai Vikas Nigam Limited, and Garhwal Mandai Vikas Nigam Limited are likely to be entrusted with some works under UEASP under these primary IAs.

B. The Uttarakhand Emergecy Assistance Project (UEAP)

4. In the month of June 2013 a severe flood and rain event occurred in Uttarakhand causing extensive damage to the state. The major affected areas are of Roads and bridges, Water Supply other infrastructure and livelihood. To assist in the rehabilitation works ADB decided to assist the Government of Uttarakhand in rehabilitating the various sectors. As part of this, ADB has provided a loan (No. 3055-IND) to the government of India. For smooth functioning of the various works **Uttarakhand Emergency Assistance Project (UEAP)** is devised.

C. The Uttarakhand Emergecy Assistance Project (UEAP) – Urban Water Supply

5. The UEAP will support the Government of India (GoI) and the Government of Uttarakhand (GoU) in their efforts to rehabilitate and reconstruct the damaged water supply system in 9 selected towns of Uttarakhand. The investment program will support: (i) Water supply; and (ii) Planning and design, institutional and policy development, capacity building and creating awareness.

6. The Project Management Unit (PMU) of Uttarakhand Emergency Assistance Project (UEAP) created for implementation of the said project under the Government of Uttarakhand (GoU) and the Project Implementation Units (PIU), Uttarakhand Jal Sansthan (UJS) will be provided with necessary consulting services under the proposed loan to strengthen their project design, management and implementation capabilities including mainly engineering design and construction supervision. The work in this Project is of emergency nature and has to be finished within stipulated time, so as to provide drinking water to affected population. The Executing Agency (EA), State Disaster Management Authority (SDMA) will work closely with the Implementing Agency (IA) Uttarakhand Jal Sansthan

7. Total 09 towns, 06 towns of Garhwal Region and 03 towns of Kumaun Region have been selected for implementation of Assistance Project. These towns are as follows: (1) Srinagar (2) Devprayag (3) Rudraprayag (4) Gauchar (5) Karnprayag (6) Uttarkashi (7) Dharchula (8) Kapkot (9) Bageshwar . Location of the project towns are shown in **Figure 1**

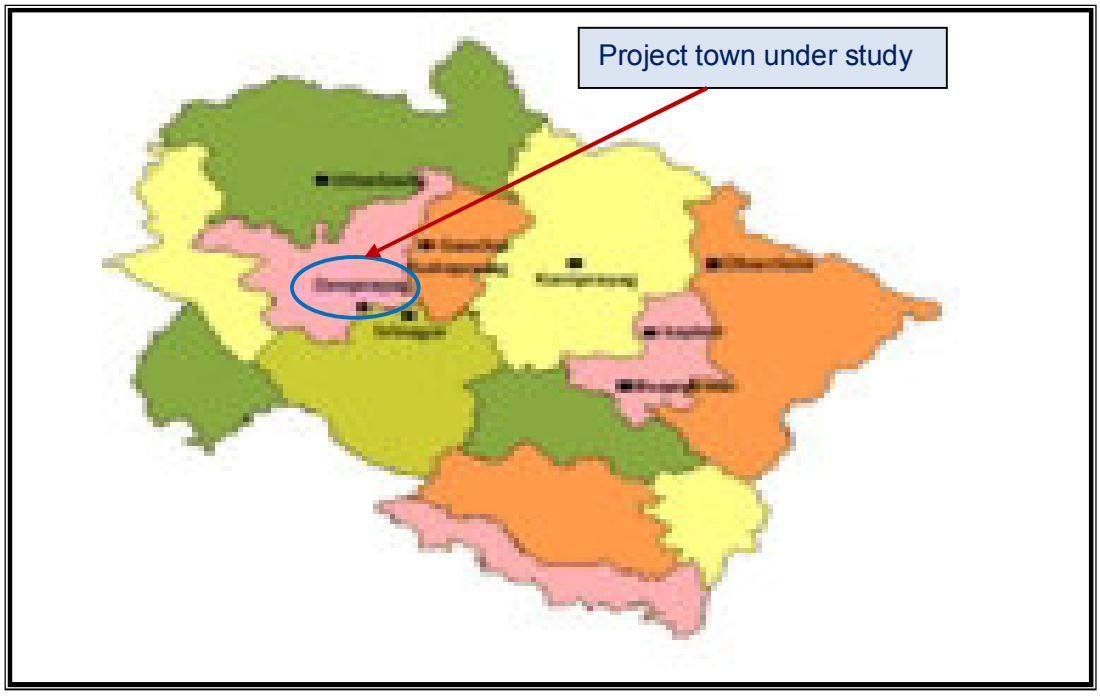


Figure 1: Location of project towns

D. Purpose of the Environmental Assessment

8. The purpose of the study is to identify the environmental issues to be considered at project planning and design stage, assesses environmental consequences due to project intervention and suggests mitigation measures to minimise the adverse environmental impacts, if any, associated with construction and operation.

9. Consistent with the Environmental Assessment and Review Framework, the proposed subporject were screened using ADB rapid environmental assessment (REA) checklistof water supply. The environmental screening revealed that no protected or sensitive areas were traversed. All impacts are site specific; few are irreversible and can be readily mitigated supporting an environmental "Category B"[1] classification as per ADB Safeguard Policy Statement (2009) .

10. Initial environmental examination (IEE) has four basic objectives; (i) asses relevant potential impacts and risks associated with the proposed rehabilitation of Water Supply system, (ii) assess the compliance with ADB environmental safeguard requirements and applicable environmental laws, (iii) incorporate mitigation measures in the project design, (Iv) preparation of environmental management and monitoring plan.

E. Updated IEE and Extent of IEE

11. IEE was conducted based on preliminary Detailed Design Report (DPR). The IEE covers all activities proposed under the project. The core zone of impact is taken as direct impact of the new construction or reconstruction or rehabilitation of the project component. IEE also covers the direct impact of the sub-project component. Assessment is carried out for all components of environment covering terrestrial and aquatic ecology, soil, water, noise and socio economic aspects. IEE for the subproject was published in ADB website in November 2014. Due to change in scope of work of the subproject this IEE has been updated to comply with the Environmental Assessment and Review Framework (EARF) which is in consistent with the ADB's Safeguard Policy Statement (SPS) 2009. Requirement of forest land aquasition, executive agency file the case on 17th of December 2014, after second satge certification the required documents submitted to regionl office of MoEFCC and executive agency obtained NOC through letter no 10/x4/1(300)/2015 on dated 18th Febraury 2016.

F. IEE Content

12. The IEE has been largely structured as per SPS, 2009 ADB's Environmental Assessment Guidelines (2003) and environmental safeguards- A Good Practice Source Book (December 2012). This includes following eight chapters including this introduction Chapter.

Chapter 1- Introduction
Chapter 2- Policy, Legal and Administrative Framework
Chapter 3- Description of Project
Chapter 4- Description of Environment
Chapter 5- Anticipated Impacts and Mitigation Measures
Chapter 6- Information Disclosure, Consultation, and Participation

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

Chapter 7- Grievance Redress Mechanism
Chapter 8 - Environment Management Plan and
Chapter 9 Conclusion and Recommendation

G. Methodology

13. The following key steps were followed in this study:

- review of legal requirements,
- reconnaissance survey for identification of key issues data requirement and preliminary consultation,
- primary and secondary data collection,
- impact assessment,
- consultation with stakeholders,
- identification of impacts and mitigation measures,
- institutional review
- Prepare Environment Management Plan
- Integration of safeguard measures with bid document

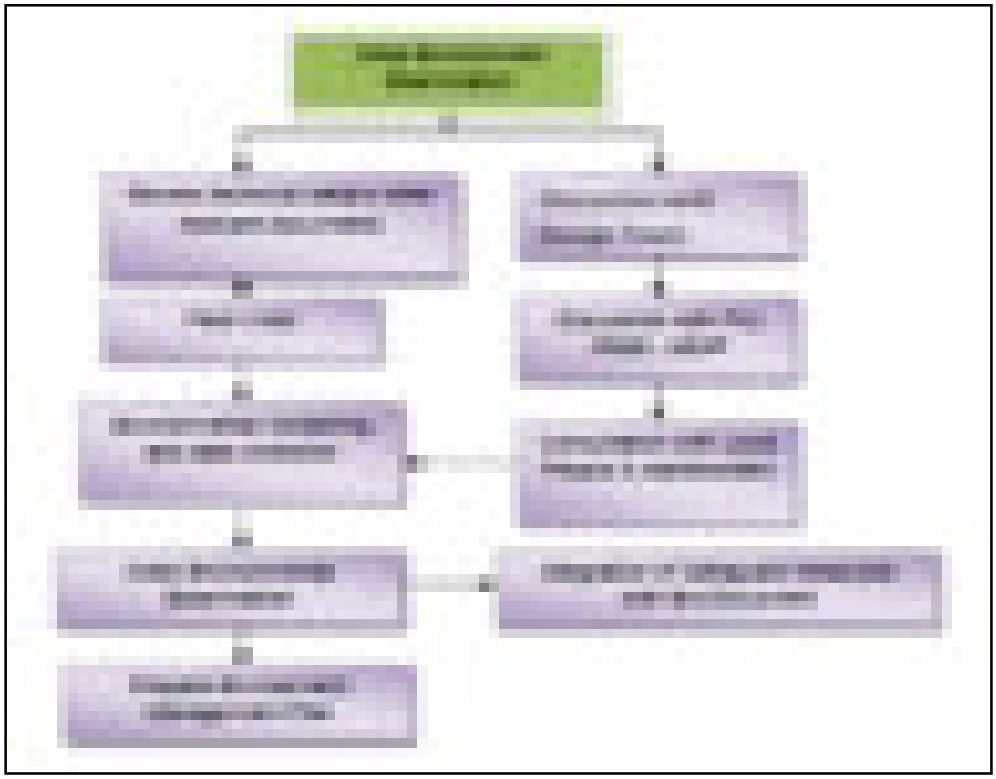


Figure 2: Methodology for IEE preparation

H. Public Consultation

14. Extensive consultations were held with all stakeholders' that includes: local residents, Gov't. Departments / agencies, other water users, and NGOs with intent to collect

baseline information, for better understanding of the potential impacts and appreciate the perspectives/concerns of the stakeholders. Key information gathered were integrated in project design and used in formulating mitigation measures.

I. Scope of the Study for this Subproject

15. This report contains the Initial Environmental Examination (IEE) for the rehabilitation of water supply system of Devprayag town in Tehri Garhwal district of Uttarakhand state in India (Figure 2). It discusses the potential environmental impacts and mitigation measures relating to the location, design, construction and operation of physical works proposed under the subproject in package UK/UEAP-WSS-GW/01-Lot-5.

Package UK/UEAP-WSS-GW/01-Lot-5 consists of following components -

Surface Source

- Construction of R.C.C. Cross Wall at Dewanigarh and Randhigarh Gadhera. 3 numbers of Uttaranchal Koop, 1 no. at Diwanigarh & 2 nos. at Randhi Ghad

Clear Water Transmission Mains

- Randhigarh Source to GLSR - 200mm dia 4.8mm thick MSERW pipe - 4.41 km 125mm dia 4.8mm thick MSERW pipe - 4.68 km
- Dewanigarh to GLSR- 125mm dia GI (H) - 7.0 km,
- Sluice valves, Scour valves and Air valves to be installed.
- RCC/MS valve chambers and thrust blocks/anchor blocks need to be constructed.

Distribution Mains:

- Around 11 km of distribution mains to be re-laid. 100mm dia GI (m) - 1.0 km 25mm dia GI (m) - 10.0 km
- Sluice valves, Scour valves and Air valves to be installed.
- RCC/CI/MS valve chambers and thrust blocks/anchor blocks need to be constructed.

Construction of CWR of 50 kl capacity near Tehsil

Construction of office building (G+ 1) 200 sq.m near tehsil

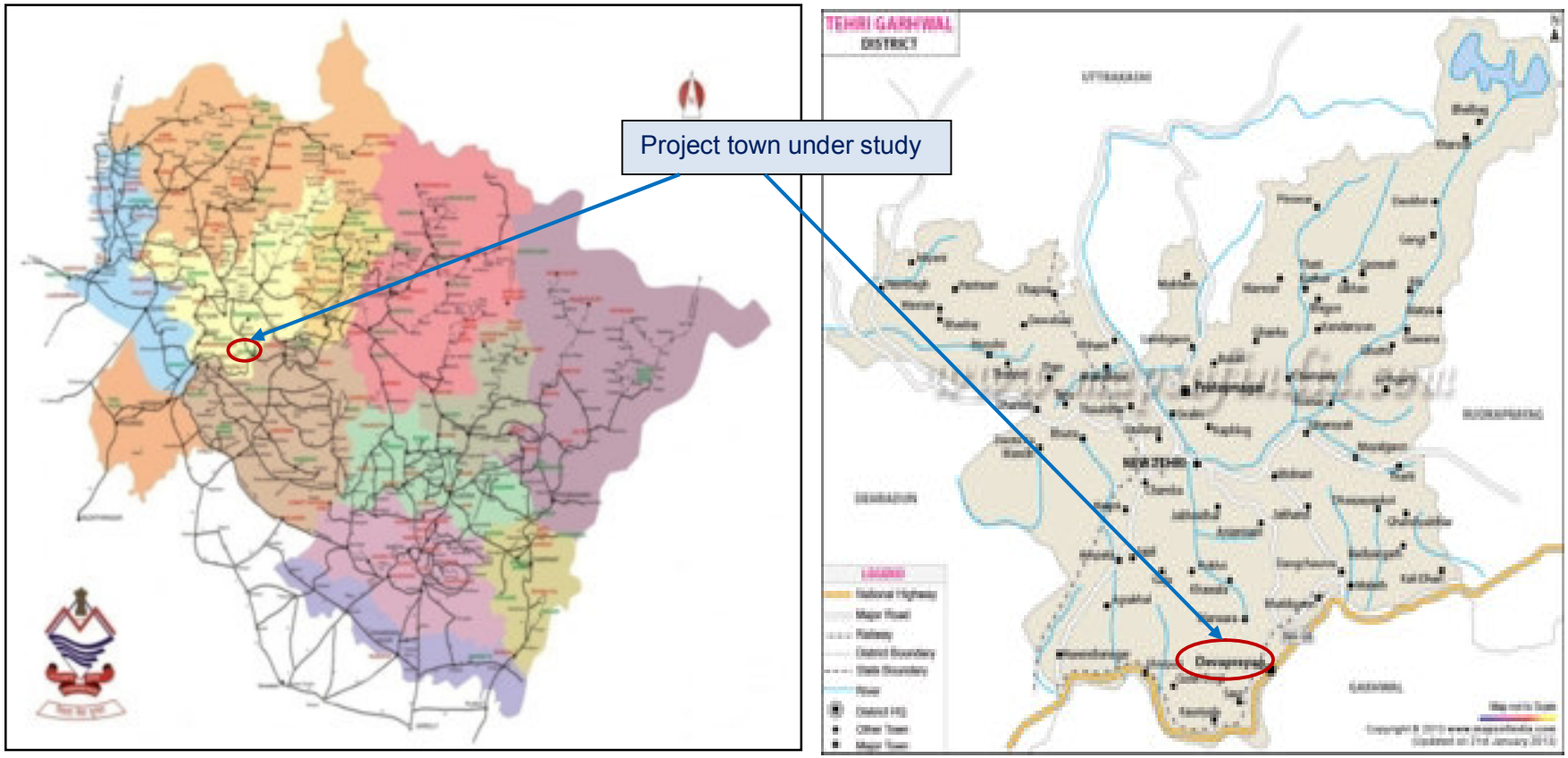


Figure 3: Location of the project town in Uttarakhand state

Location of the project town in Tehri Garhwal district

II. POLICY, LEGAL and ADMINISTRATIVE FRAMEWORK

16. The legal framework of the country consists of several acts, notifications, rules and regulations to protect environment and wildlife. In 1976, the 42nd Constitutional Amendment created Article 48A and 51A, placing an obligation on every citizen of the country to attempt to conserve the environment. Specifically for the UEAP, the following environmental laws and regulations are applicable:

Table 1- Applicable Environmental National and State Requirements for UEAP

S.No.	Clearances	Acts/Rules/Notifications/Guidelines and Application to Water Supply Projects	Concerned Agency	Applicable to Contract package	Responsibility	Status of Complia\nce
		A. Pre-construction Stage				
1	Environmental Clearance	EIA Notification, 2006 amended till date, promulgated under Environment (Protection) Act 1986 It delineates the steps required for obtaining Environmental clearance. As per the notification, a list of projects in the Schedule of the notification, requiring Environmental Clearance from regulatory agencies at the State or Central government level has been provided.It also provides for categorization of projects into category A and B, based on the threshold limits of the project as provided in the schedule of the notification.	State Environmental Impact Assessment Authority (SEIAA). If not constituted then MoEF.	No	IA / PMU	Not required
2	Forest Clearance for felling of trees and acquisition of forest land for widening.	**Forest Conservation Act (1980) and Rules 2003 & 2004:** This act provides guidelines for conservation of forests and diversion of forest land for non-forest use. The law also states guidelines on de-reservation of various categories of forests for diversion of forest land. This law describes the penalty for contravention of the provisions of the Act. Restriction on the dereservation of forests or use of forest land for non-forest purpose. i) If the forest land exceeds 20 hectare then prior permission of Central Government is required; ii) if the forest land is between 5	District Level Committee constituted by the State Govt.	There is requirement of acquisition of forest land. The details are: **Type of forest :** Reserve Forest **Area to be diverted** - 0.36 ha **Name of Forest Division -** Narendranagar Forest Division **Name of Forest Circle** - Bhagirathi Circle **Forest block** Devprayag compartment no	IA / PMU	NOC obtained for the diversion of forest land for non forest purpose has been obtained from Govt.of Uttrakhand on dated 18th of Feb 2016. .(Refer) appendix -2)

		to 20 hectare, then permission form the Regional Office of Chief Conservator is required; iii) If the forest land is below or equal to 5 hectare the State Government can give permission. If the construction area is more than 40% forest, permission to undertake any work is needed from the Central Government, irrespective of the size of the area. MoEF issued soecific guidelines in July 2013 for state of Uttarakhand for expediting forest cleatrances to carry out the emergency work in forest areas (excluding works in national parks and sanctuaries) vide no 11-298/2013-FC Dated 24.07.2013		-2B, **Total No. of trees to be Felled-** 19 nos.		
3	Wildlife department clearences	**The Indian Wildlife (Protection) Act, 1972, as amended till 2006** This Act provides guidelines for protection of [Wild animals, birds and plants] and for matters connected therewith or ancillary or incidental thereto. It also states the norms for hunting of wild animals, prohibition of picking, uprooting, etc., of specif ied plants. The Act deals with the declaration of area as Sanctuary, National Park, and closed area and also states the restriction of entries in the sanctuary. The 2002 Amendment Act which came into force in January, 2003 have made punishment and penalty for offences under the Act more stringent.	National Board for Wildlife	No (The wildlife protection act is not applicable to the proposed subproject.	IA/PMU	Not required
4	Clearences required for using biological resources	**Biodiversity Act 2002 and Biodiversity Rules 2004:** The Act essentially controls access to indigenous biodiversity resources. No agency/person shall, without previous approval of the National Bio-diversity Authority, obtain any biological resource occurring in India or knowledge associated thereto for research or for commercial utilization or for bio-survey and bio-utilization.	Uttarakhand Biodiversity Board.	Not Applicable for the subproject	IA/PMU	Not required

5	Permission to carry out construction activities in the sites of Archaeological Importance	The Ancient Monuments and Archaeological Sites and Remains Act, 1958, and the rules, 1959: The Act provides guidance for carrying out activities, including conservation, construction and reuse in and around the protected monuments Project site is not an ASI protected monument and there are no any monuments of this nature within the jurisdiction.	State Level Committee constituted by the Central Govt.	Not Applicable for the subproject	IA/PMU	Not required
B. Implementation Stage						
6	Consents to establish & operate Water Treatment Plant	**Water (Prevention and Control of Pollution) Act, 1974 and as amended in 1978, 1988 and 2003;** **Water (Prevention and Control of Pollution) Cess Act was enacted in 1977;** **The Air (Prevention and Control of Pollution) Act, 1981 as Amended in 1987 and Air (Prevention and Control of Pollution) Rules, 1983** The Water (Prevention and Control of Pollution) Act was enacted in 1974 to provide for the prevention and control of water pollution, and for the maintaining or restoring of wholesomeness of water in the country. The Water (Prevention and Control of Pollution) Cess Act was enacted in 1977, to provide for the levy and collection of a cess on water consumed by persons operating and carrying on certain types of industrial activities. This cess is collected with a view to augment the resources of the Central Board and the State Boards for the prevention and control of water pollution constituted under the Water (Prevention and Control of Pollution) Act, 1974	Uttarakhand Environmental Protection and Pollution Control Board - Dehradun	Not Applicable for the subproject	IA/PMU	
7	Authorization for Disposal of Hazardous Waste	Hazardous Wastes (Management, Handling and Transboundary movement) Rules, 2008 and Hazardous Waste (Management, Handling and Transboundary Movement) Fourth Ammendments Rules, 2010	Uttarakhand Environmental Protection and Pollution Control Board – Dehradun	Not Applicable for the subproject	Contractor	

8	Consent for Disposal of Sewage from Labour camps	Water (Prevention and Control of Pollution) Act 1974	Uttarakhand Environmental Protection and Pollution Control Board - Dehradun	Not Applicable for the subproject	Contractor	
9	Use of Fly ash within 100 kms around Thermal Power plants	Fly Ash Notification, 1999 as amended 03.11.2009	MoEF	Not Applicable for the subproject	Contractor	
10	Pollution Under Control Certificate	Central Motor and Vehicle Act 1988 and Central Motor and Vehicle Rules,1989 amended till 2013	Department of Transport, Govt. of Uttarakhand	Yes	Contractor	
11	Installation of Generators	The Air (Prevention and Control of Pollution) Act, 1981 as Amended in 1987 and Air (Prevention and Control of Pollution) Rules, 1983	Uttarakhand Environment Protection and Pollution Control Board - Dehradun	Not Applicable for the subproject	Contractor	
12	Employing Labour/ workers	The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 & The Building and Other Construction Workers Related Laws (Amendment) Bill, 2013	District Labour Commissioner	Yes	Contractor	
13	Permission for extraction of boulder and sand from river beds	Mines & Minerals (Regulation and Development) Act, 1957 and its amendements in1958, 1972, 1986, 1994,1999 & 2010	Department of Mines and Geology. Government of Uttarakhand	Yes	Civil Work Contractor	
14	License for Storing Diesel and other explosives	Petroleum Rules, 2011. Hazardous Wastes (Management, Handling and Transboundary movement) Rules, 2008 and Hazardous Waste (Management, Handling and Transboundary Movement) Fourth Ammendments Rules, 2010	Commissioner of Explosives and Uttarakhand Environmental Protection and Pollution Control Board – Dehradun	Not Applicable for the subproject	Contractor	

III. DESCRIPTION OF PROJECT

A. Project Location

17. The sub project is the rehabilitation of water supply system of Devprayag town in Tehri Garhwal district of Uttarakhand state in India (Figure 2). Devprayag is a town and a municipality at Tehri Garhwal district. It is one of the five confluences of the Alakananda River, where it merges with the Bhagirathi River. This place is significant because this is where the river takes the name Ganga or the Ganges. Devprayag means "Godly Confluence". This place is surrounded by mountains and deep forests. Situated at the confluence of the Alaknanda and the Bhagirathi, the town of Devaprayag lies at an altitude of 472 m. on the metalled road running from Rishikesh to Badrinath and about 87 km. from Narendra Nagar.

B. Proposed Category of the Project

18. Pursuant to the requirements of the ADB Safeguard Policy Statement (2009) proposed rehabilitation of water supply system in Devprayag was screened to identify significance of potential impacts, determine the environmentally sensitive component, establish the needed level of assessment, and prescribe the information disclosure and consultations requirement to be complied by the Uttarakhand-Jal Sansthan. Consistent with the Environmental Assessment and Review Framework, the subproject was screened using the ADB rapid environmental assessment (REA) checklist- Water supply. (Refer appendix-1)

19. The environmental screening revealed that no protected or sensitive areas were traversed but the office building is falling under reserve forest (NOC obtained, Annexure-II). There are no rare, threatened, and endangered species (flora and fauna) within the subproject corridor of impact. All being hill town, the most significant environmental impacts are potential increase in erosion, siltation, and landslide.

20. Existing water supply system in Devprayag is proposed to be rehabilitated post disasted and no additional infrastructure is proposed. All impacts are site specific, and all impacts can be readily mitigated supporting a Category B classification.

C. Background of the Proposed Sub-project

21. The water supply system of Devprayag is severely damaged during the floods in June, 2013 affecting the supply to the Public. The gravity sources were substantially damaged. In addition, the scheme is quite old and facing production problems due to high turbidity in monsoons. As per the damage assessment report of UJS, the average per capita supply is about 40 lpcd after damages due to floods, on temporary restoration of the scheme. The current service is much lower than the desired level (135 lpcd).

Table 2: Demand and Supply Gap Parameters

S. No.	Parameter	Demand	Supply Before Damage	Supply after damage	Gap/ Need for the Project
1	Surface water quality after treatment	As per CPHEEO permissible limit is 10 NTU. No turbid appearance.	Satisfactory	Satisfactory.	-
2	Water production	0.86 mld (year 2013)	0.44 MLD	0.26 mld (Surface water).	0.6MLD gap
3	System Leakage	15 %	35-40%	35-40% (assumed)	More hydraulically efficient distribution system
4	Delivery	0.66 mld (year 2013)	0.25 mld	0.2mld	0.46 mld gap
5	Per Capita Demand	135 lpcd	90 lpcd	40 lpcd	New distribution system
6	UFW	20%	40%	45%	More hydraulically efficient distribution system
7	Reservoir capacity	-	-	-	Reservoir capacity is sufficient at present
8	Transmission Lines	12.0 km	12.0 km	10.0km	Transmission mains from gravity sources are damaged at various places and needs replacement
9	Distribution lines	12.0 km	12.0 km	12.0 km	Distribution pipelines (wherever damaged) need to be rehabilitated
10	Supply hours	24 hours per day	4-6 hours per day	4-6 hours per day	Requirement of new system to increase supply standard
11	Coverage	100 % coverage	100%	50%	Requirement of new system to increase supply standard

The main reasons for gaps:

Impact due to floods

- Damaged surface sources and transmission pipeline.
- The present system is restored and being managed on ad-hoc basis and may not withstand any similar calamity in future and requires immediate intervention for rehabilitation and augmentation on permanent basis.

Other Reasons

In addition to the above, the following are the other reasons, which need attention, while taking up the proposed project.

1. Deterioration of Existing facilities

   - Damaged sources due to heavy rainfall.
   - Damages and leakages in the transmission main.
   - The existing distribution system is very old primarily laid during 1979 to 1990s, leading to leakages and transmission losses.
   - The Clear Water Reservoirs (CWR) are old.

2. Inappropriate planning

   - No initiative for augmentation of surface water abstraction.
   - The distribution network is deficient in effective hydraulics.

3. Poor O&M

   - High transmission loss

4. Funds constraint

   - Low budget allocation for water supply rehabilitation and augmentation

D. Subproject Description

Objective of project in Devprayag Town

22. The main objective of the project is to provide emergency assistance to rehabilitate and augment existing infrastructure facilities and utilities pertaining to water supply scheme and restore water supply to the consumers as per the standard supply rate of 135 lpcd. The main objectives of the project are to:
    - Improve water supply level to the consumers as per the standard rate of supply.
    - Improve quality of water for consumer supply.
    - Rehabilitate / Augment water supply components to meet the prospective demand for another 10 years.

Beneficiaries:

Total Design Population (beneficiaries) for Devprayag can be summed up as:
- 2015 – 2955 + 2000 Floating Population
- 2025 – 3177 + 2000 Floating Population

Improved Service Level:
- Per capita supply at consumer end – 135 lpcd;
- Quality of the potable water as per GOI standard
- Physical losses: Not more than 20 %

Improved Service Level:
- Per capita supply at consumer end – 135 lpcd;
- Quality of the potable water as per GOI standard
- Physical losses: Not more than 20 %

Project Components

23. To restore the water supply to the consumers as per standard level, the existing system needs rehabilitation and augmentation, which are outlined below:

Surface Source:

- Construction of R.C.C. Cross Wall at Dewanigarh and Randhigarh Gadhera. 3 numbers of Uttaranchal Koop, 1 no. at Diwanigarh & 2 nos. at Randhi Ghad

Clear Water Transmission Mains

24. Randhigarh Source to GLSR - 200mm dia 4.8mm thick MSERW pipe - 4.41 km 125mm dia 4.8mm thick MSERW pipe - 4.68 km , (b) Dewanigarh to GLSR- 125mm dia GI (H) - 7.0 km, Sluice valves, Scour valves and Air valves to be installed.RCC/MS valve chambers and thrust blocks/anchor blocks need to be constructed.

Distribution Mains:
Around 11 km of distribution mains to be re-laid. 100mm dia GI (m) - 1.0 km 25mm dia GI (m) - 10.0 km, Sluice valves, Scour valves and Air valves to be installed. RCC/CI/MS valve chambers and thrust blocks/anchor blocks need to be constructed.

Construction of CWR of 50 kl capacity near Tehsil

Construction of office building (G+1) 200 sq.m near tehsil

E. Implementation Schedule

All the components of the subproject will be completed within 18 months.

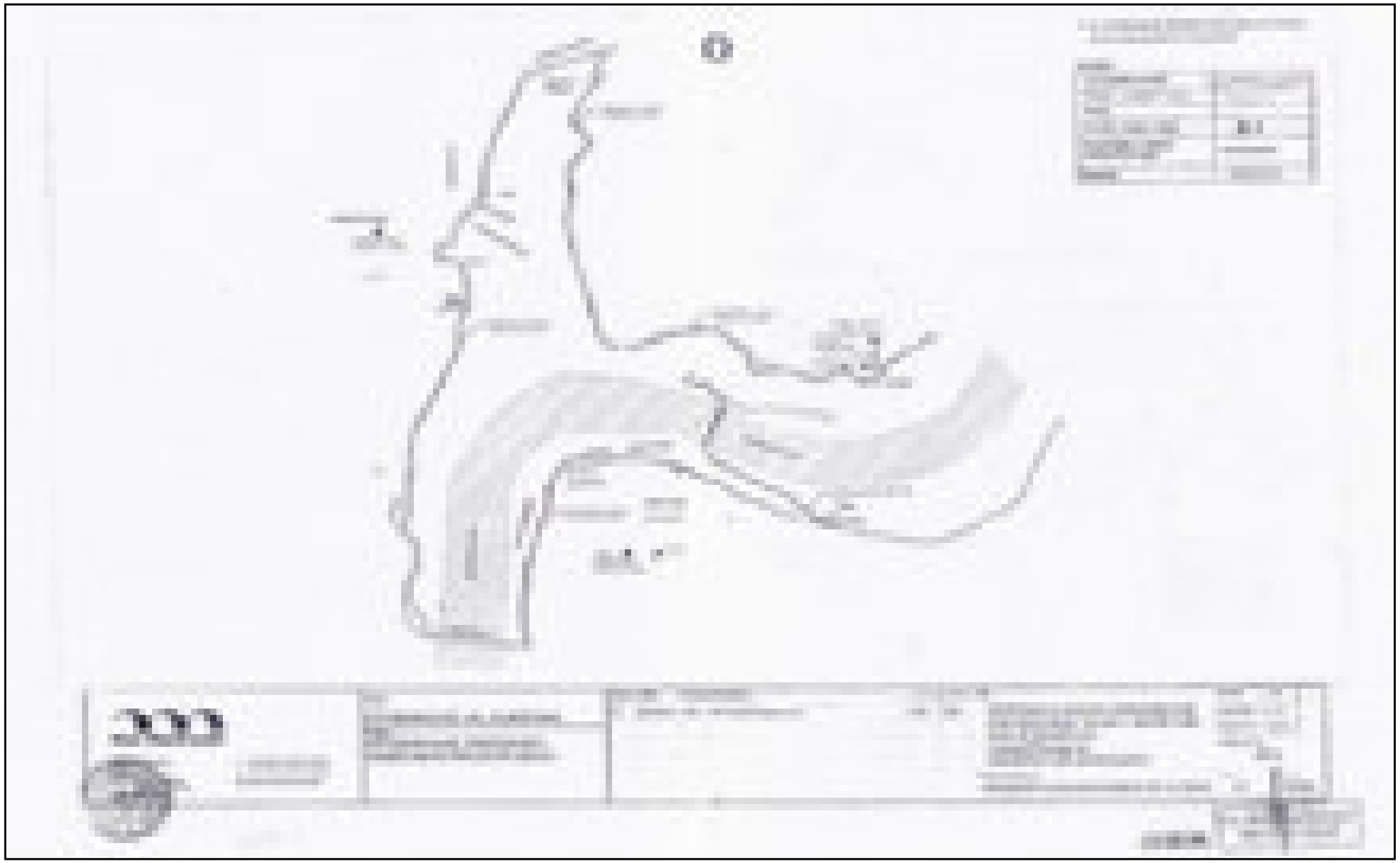


Figure 4: Proposed 25mm dia GI distribution pipeline from Tehseel water tank 60KL in Devprayag

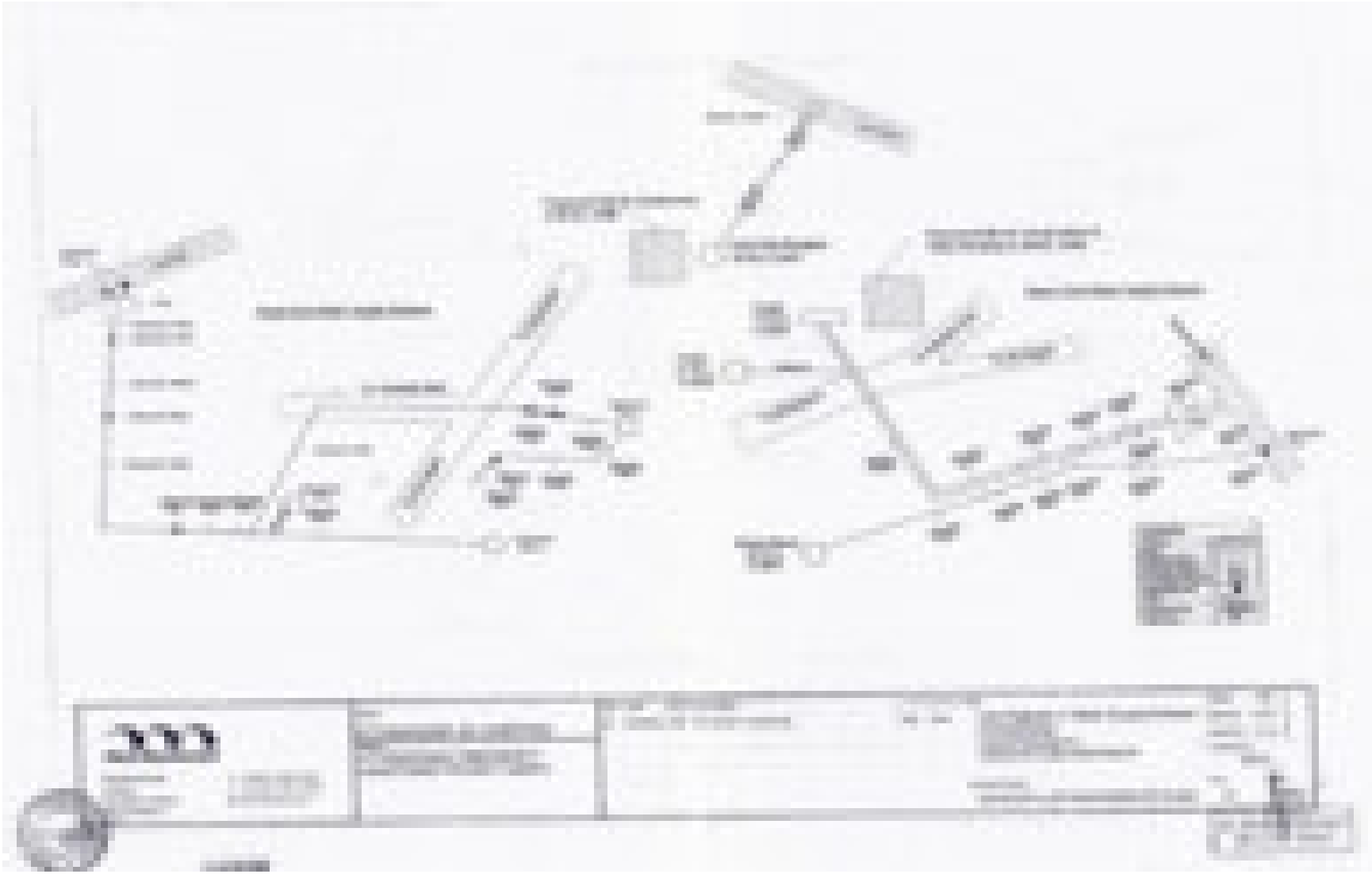


Figure 5: Line diagram of water supply scheme in Devprayag

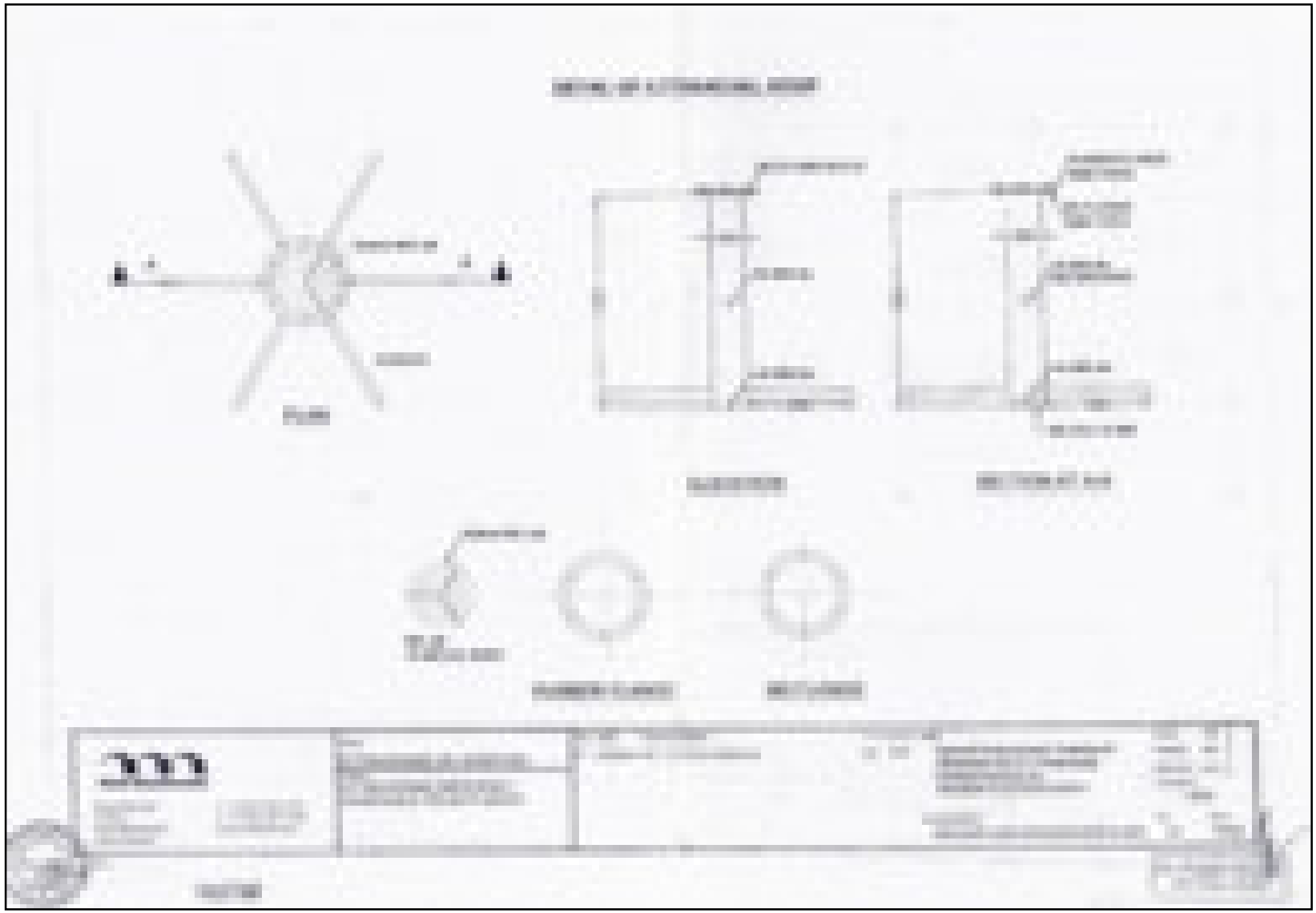


Figure 6: General arrangement drawing for Uttranchal koop in Devprayag

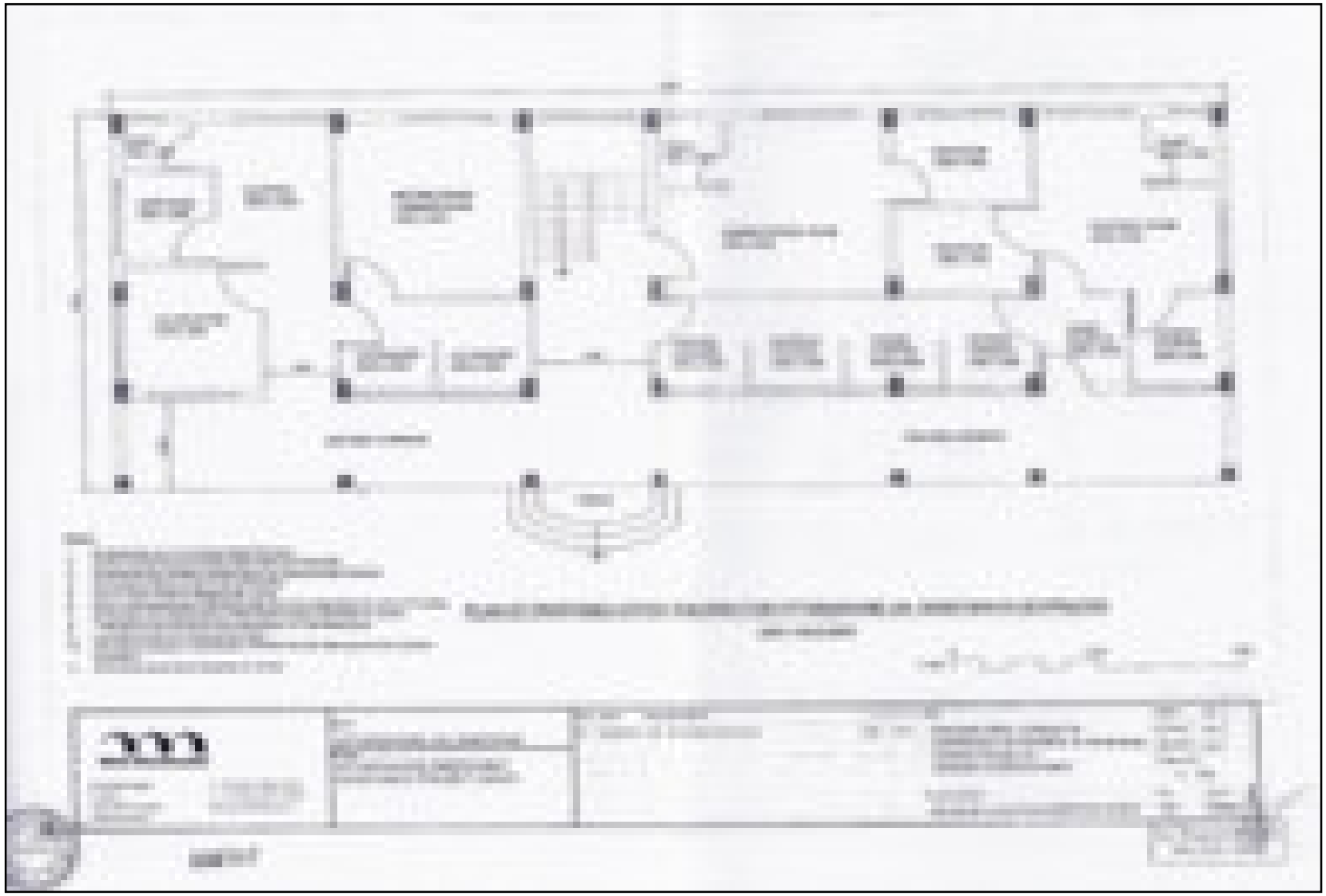


Figure 7: Proposed office building for Uttarakhand Jal Sansthan in Devprayag

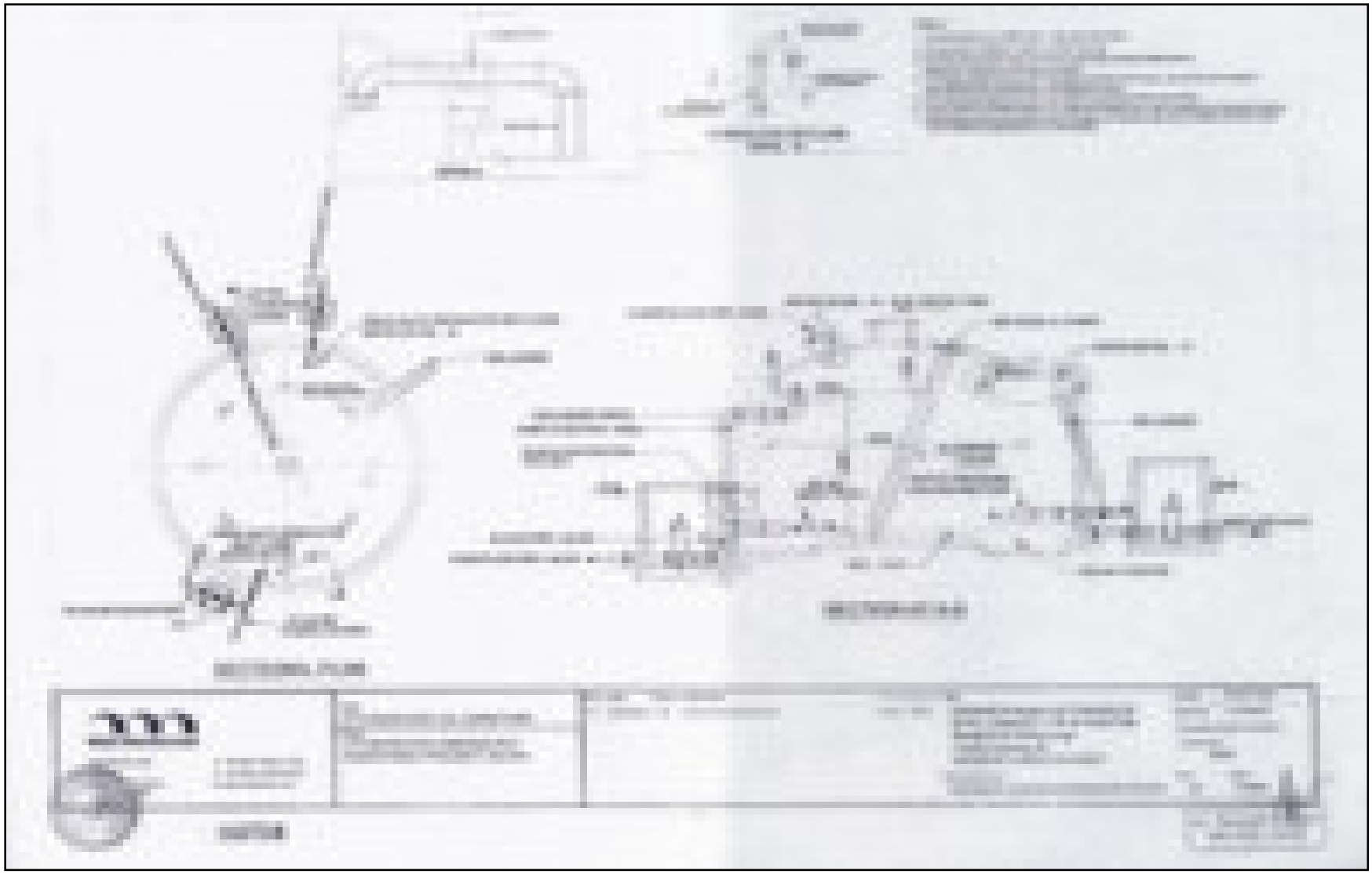


Figure 8: General arrangement drawing for 50 KL capacity CWR at Gadi Dak bunglow in Devprayag
:

IV. DESCRIPTION OF THE ENVIRONMENT

A. Physical Environment

25. This section presents a brief description of the existing environment, including its physical, ecological resources, and socio-economic development of Sub project of Devprayag. Broad aspects on various environmental parameters such as geography, climate and meteorology, physiography, geology, seismology, ecology, socio-cultural and economic development parameters that are likely to be affected by the proposed rehabilitatio of water supply system in Devprayag are presented. Secondary information was compiled from relevant government agencies like the Forest Department, Wildlife Department, State Environment Protection, and Pollution Control Board and Metrological Department.

Geography

26. The project area is part of Tehri Garhwal district which is one of the mountainous districts of Uttarakhand State. The district lies between latitudes 30º03' and 30º53' N and longitudes 77º56' and 79º04' E. The district falls in Survey of India toposheet nos. 53J and 53N. The district is bounded by Uttarkashi district in the north, Rudraprayag district in the east, Pauri Garhwal district in the south and Dehradun district in the west. The geographical area of the district is 3796 km^2 . The project area is in Devprayag tehsil and Devprayag developmental block.

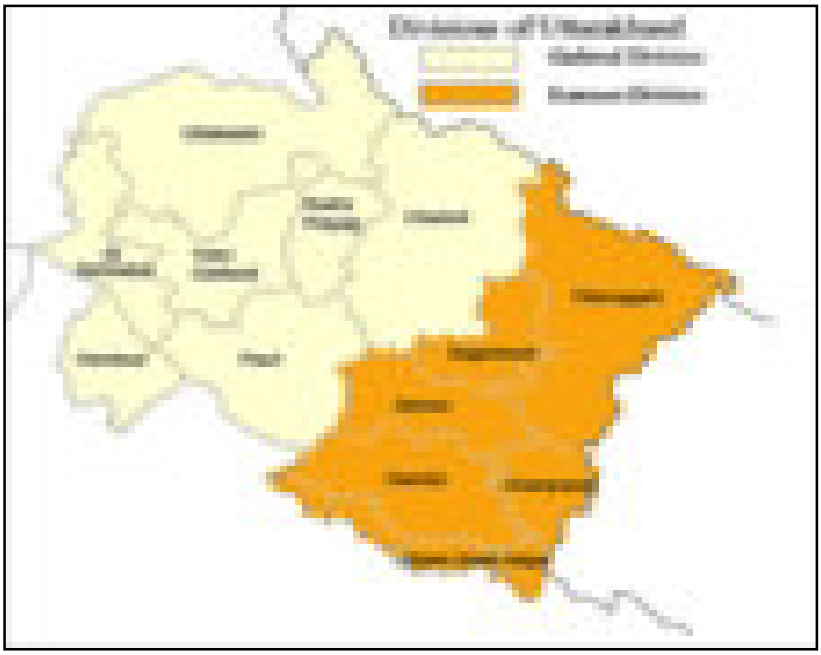


Figure 10: Districts of Uttarakhand

27. For the administrative convenience Tehri Garhwal district, a part of Garhwal Division, has been divided into five tehsils viz. Pratapnagar, Tehri, Narendranagar, Ghanshali and Devprayag and nine Developmental Blocks viz. Pratapnagar, Bhilangana, Jakhnidhar, Jaunpur, Thouldhar, Chamba, Narendranagar, Devprayag and Kirtinagar. The district. is entirely on rugged mountain ranges dissected by valley, and deep gorges. The

Alaknanda River, the main source of the Ganges, traces its headwaters in this region. Bhagirathi River flows from north to south and meets Alaknanda River at Devprayag town. Devprayag is located on the hills and surrounded area is covered with forest. The project influence area is built on slope of hill (Refer figure 11).

Plate 1: Confluence of Alkananda and Bhagirathi River in Devprayag

Geology

28. District Tehri Garhwal is represented by the rocks of Lesser Himalaya and Central Himalaya. The geological set up is very complex due to the repeated tectonic disturbances caused by different orogenic cycles. Valdiya (1980) carried out extensive geological and structural mapping in the area. The salient features of geology are depicted in the geological map of Tehri Garhwal district (Figure 12). The map is based on Geological Survey of India, 2002.

29. The rock units exposed in various parts of Tehri Garhwal district are exposed in two broad geotectonic zones viz. Central or Higher Himalaya and Lesser Himalaya. The Central Himalaya lies to the north of Main Central Thrust (MCT) whereas the Lesser Himalaya occurs to the south of it. A group of regionally metamorphosed rocks known as Central Crystallines are exposed in the Central Himalaya. The Central Crystallines occur as thrust sheets over the metasedimentary and sedimentary rocks of Lesser Himalaya in varied tectonic settings. Major rock types of Central Crystallines are migmatites, psammitic and mica gneiss, calc gneiss, quartzite, marble, mica schist and amphibolite. Granites of different ages ranging from Paleoproterozoic to Mesozoic-Tertiary intrude the Central Crystallines. The Lesser Himalaya occupies major part of the district and comprises of different groups like

Jaunsar Group, Blaini-Krol Group and Tal Group. The groups are subdivided into various formations like Bhilangana Formation, Rautgara Formation, Bijni Formation. A suite of granitic intrusives known as Granitoids of Kedarnath and basic volcanics of Garhwal Group are also exposed in parts of the district. Generally, the rocks of the Lesser Himalayan Zone show signs of multiple phases of deformation and metamorphism.

30. The area is covered by soil/ slope wash and river borne deposit resting over Garhwal group of rocks. The river borne material consists of boulders of quartzite, gneisses, metabasics and schists mixed with silt, sand, cobbles and pebbles. The Garhwal group of rocks consists mainly of quartzite. The general trend of bend is NE-SW to E-W with moderate to steep deeps on both sides.

Soil types and soil quality

31. The soils of Tehri Garhwal district can be broadly classified into two types, viz. soils of Central/Higher Himalaya and soils of Lesser Himalaya. The soils of Central Himalaya have been broadly classified under a) Soils of Summits, Ridge Tops and Mountain Glaciers, b) Soils of Side Slopes, c) Soils of Upper Glacio-Fluvial Valleys and d) Soils of Cliffs. Major part of the district is covered by soils of Lesser Himalaya, which may be broadly subdivided into three soil types. Soils of the first type are moderately shallow, excessively drained, thermic, fine loamy, moderately eroded and slightly stony and are known as Dystric Eutrudepts. The second type, Lithic Udorthents, is characterised by very shallow, excessively drained, severely eroded and strongly stony, thermic loamy soils exposed on steep slopes with loamy and sandy surface. Typic Udorthents, the third major soil type, is moderately shallow, excessively drained, moderately eroded and slightly stony, loamy soils on moderate slopes with loamy surface. (Figure 13)

32. The soils of the study area are basically the product of fluvial process of the river Bhagirathi and its tributaries (Bhilangana, Balganga etc.). The alluvial soil of the area is dry, porous, sandy, faint yellow and consists of clay and organic matter. Soil quality analyses of primary data generated indicate that Soils of the area are slightly alkaline. The pH value of the soils varies depending upon the type of forests. The soil of is sandy loam. The pH values on all sites and depths ranged 7.4 to 8.1. Organic matter content varies from 1.93 to 2.93 % by mass.(Refer table 1)

Geomorphology

33. Tehri Garhwal district comprises two broad physiographic divisions viz. Central Himalayan Zone (north of the Main Central Thrust) exposed in the north eastern part and Lesser Himalayan Zone (south of the Main Central Thrust) in rest of the area. The physiography of the district is characterised by high mountain peaks, deep gorges and valleys. Major part of the area is inaccessible due to extremely rugged topography and dense forest cover. The altitude varies from 369 to 6672 m. The regional trend of major ridges is NNW-SSE, which is usually parallel to the strike of the country rocks. However, E-W, NW-SE and N-S trending ridges are also observed which are mainly structurally controlled.

Table 3 : Soil Quatity analysis Devprayag

SL. No.	Parameters	Unit	SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7	SW-8	SW-9	SW-10
1	pH	.-	7.42	7.34	7.39	7.6	8.1	8.11	8.11	7.9	8.1	8.1
2	Conductivity	Hs/CM	487.32	479.87	647.93	609.8	673.2	732.97	789.23	589.23	548.29	639.23
3	Moisture	% by mass	9.87	10.32	10.23	9.87	10.34	10.23	7.93	9.8	11.23	9.87
4	Sodium as Na	mg/Kg	217.21	201.98	287.93	298.32	3.0198	298.27	201.93	298.73	311.23	298.23
5	Potassium as K	mg/Kg	80.39	77.87	113.93	113.32	112.98	98.93	98.29	98.93	98.25	98.28
6	Total Kjeldahl Nitrogen	% by mass	0.97	0.98	1.03	0.87	0.73	1.09	0.93	1.17	1.09	1.73
7	Phosphorus	mg/Kg	80.40	97.32	75.96	87.31	90.23	98.23	113.27	98.23	119.29	113.27
8	Organic matter	% by mass	1.01	1.09	0.98	1.27	1.17	0.98	1.17	1.98	1.73	1.75
9	Lead (as Pb)	mg/Kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
10	Organic Carbon	% by mass	1.93	2.72	1.98	2.32	2.87	2.09	2.73	2.73	2.73	2.93
11	Soil Gran Size Analysis/ Texure											
	Sand	% by mass	71.25	70.25	70.25	6950	71.25	71.25	72.25	69.25	71.25	69.25
	Silt	% by mass	20.25	21.25	19.25	20.25	20.25	21.25	15.25	20.25	20.25	23.25
	Clay	% by mass	8.50	8.50	10.50	10.25	8.50	7.50	12.25	10.50	8.50	7.50

Drainage

34. Drainage of the area is mainly controlled by the major perennial rivers like Bhagirathi, Bhilangana, Alaknanda and their tributaries like Bal Ganga and Dharma Ganga. Bhagirathi River flows from north to south and meets Alaknanda River at Devprayag. Bhilangana River flows from north east to south west and meets Bhagirathi River near Old Tehri. Bhagirathi and Bhilangana Rivers drain the central part of the district while Alaknanda River flows in the southernmost part close to the district boundary. Apart from the major rivers, many seasonal streams and rivulets (locally called gad and gadhera) drain the area. Important among them are Nailchami Gad, Lastar Gad, Nagun Gad, Bhadri Gad, Chandrabhaga Gad, Bandal Nadi etc. Sub-trellis and sub-dendritic are the most common drainage patterns in the area. The perennial rivers are primarily fed by snowmelt with relatively smaller contribution from ground water. However, during the lean period, the rivers are fed by ground water occurring as base flow (Figure 14)

Climate and Meteorology

Temperature, Relative Humidity and Wind

35. Based on long-term climatological data of the project area , it is surmised that January is the coldest month with mean maximum temperature of 19.6°C and the mean minimum temperature of 4.6°C. Temperature becomes highest usually during June, having mean minimum and mean maximum temperatures of 32.6°C and 36.5°C respectively. Relative Humidity in the area increases rapidly with the onset of monsoon and reaches maximum (85% in the morning and 84% in the evening) during August, when peak monsoon period sets in. Relative Humidity is minimum during the summer months (from April to June) with May being the driest month (47% in morning and 25% in evening). Skies are heavily clouded during the monsoon months and for short spells when the district is affected by Western Disturbances. Two broad wind patterns are observed in the district viz. north easterly to easterly (May to September) and south easterly to westerly (October to March). The average wind speed is minimum (0.8 km/hr) in December and maximum in July (4.1 km/hr) whereas the average annual wind speed is 2.3 km/hr.

Rainfall

36. Rainfall, in the project area, occurs almost throughout the year. Maximum rainfall is recorded during the monsoon period i.e. from July to September. During the non-monsoon season, rainfall is quite low in November and increases from December onward till March. Winter precipitation is associated with the passage of the Western Disturbances and is in the form of snowfall on higher elevations. The monthly and annual rainfall in Tehri Garhwal district is quite variable and ranges between 956 mm and 2449 mm at Narendranagar. The annual rainfall at Tehri Observatory is 1028.6 mm whereas the average number of rainy days (having daily rainfall ≥2.5 mm) is 61.5 days. The annual rainfall at Mukhim Observatory is 1708.8 mm and the average number of rainy days is 87.4 days. The average annual rainfall (AAR) of the district is 1395 mm..

37. However, the overall climatic condition in the State is governed by the southwest monsoon. It has a sub-tropical to temperate climate, with three pronounced seasons; summer, winter, and monsoon. December to March.

Hydrogeology

38. Ground water, in Tehri Garhwal district, generally occurs locally within disconnected bodies under favourable geohydrological conditions such as in channel and alluvial terraces of river valleys, joints, fractures and fissures of crystalline and metasedimentary rocks, well vegetated and relatively plain areas of valley portions and in subterranean caverns of limestone and dolomitic limestone country rocks. The occurrence and movement of ground water depend not only on the nature of the litho units and the nature of the interspaces/ interstices, but also on the degree of interconnection between them, the vertical and aerial extension of joints, faults and/or shear zones and the local and regional geomorphology. Ground water emerges as springs and seepage (locally called Srots and Naolas) under favourable physiographic conditions such as in gently sloping areas, broad valleys of rivers and along the lithological contacts. Gadheras are the group of springs coming from higher reaches of the mountainous tracts.

39. Rainfall is the principal source of ground water replenishment. A part of the precipitation received (either as rainfall or snowfall) is lost into the atmosphere as evaporation and evapotranspiration from soils and plants, another considerable part flows as surface run off due to extremely rugged and undulating topography with steep slope and the remaining part directly infiltrates through the soil profile to form the ground water storage in joints, fractures, fissures etc. In Tehri Garhwal district, ground water flows out as springs and seepages where the water table intersects the ground surface. Based on the observations of various workers of Central Ground Water Board over the last couple of decades, a hydrogeological map of Tehri Garhwal district is prepared (Figure15). A study of this map indicates the general hydrogeological scenario of the district and reveals the presence of two main types of aquifers viz. a) Local or Discontinuous Aquifers and b) Localised Aquifers. Ground water in the district occurs in fissured formations characterised by secondary porosity.

40. From the concentrations of different inorganic constituents in ground water in Tehri Garhwal district, it is concluded that the quality of ground water is excellent and it is suitable for drinking, domestic and irrigational purposes.

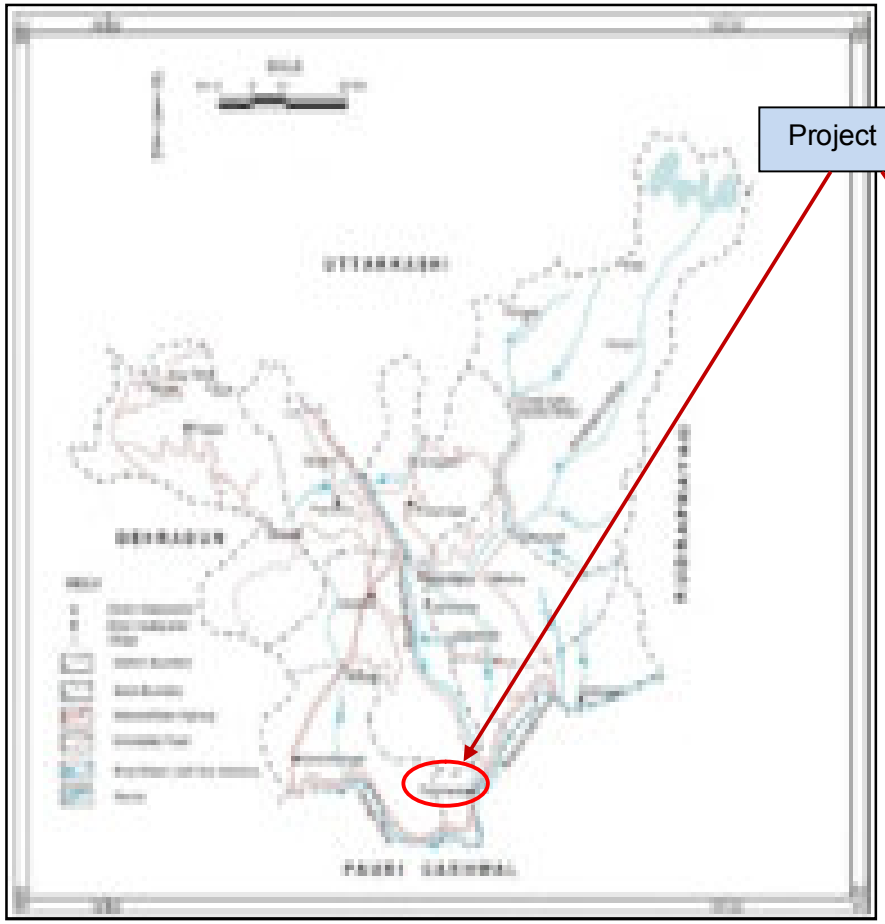


Figure 11: Base of Tehri Garhwal showing project area

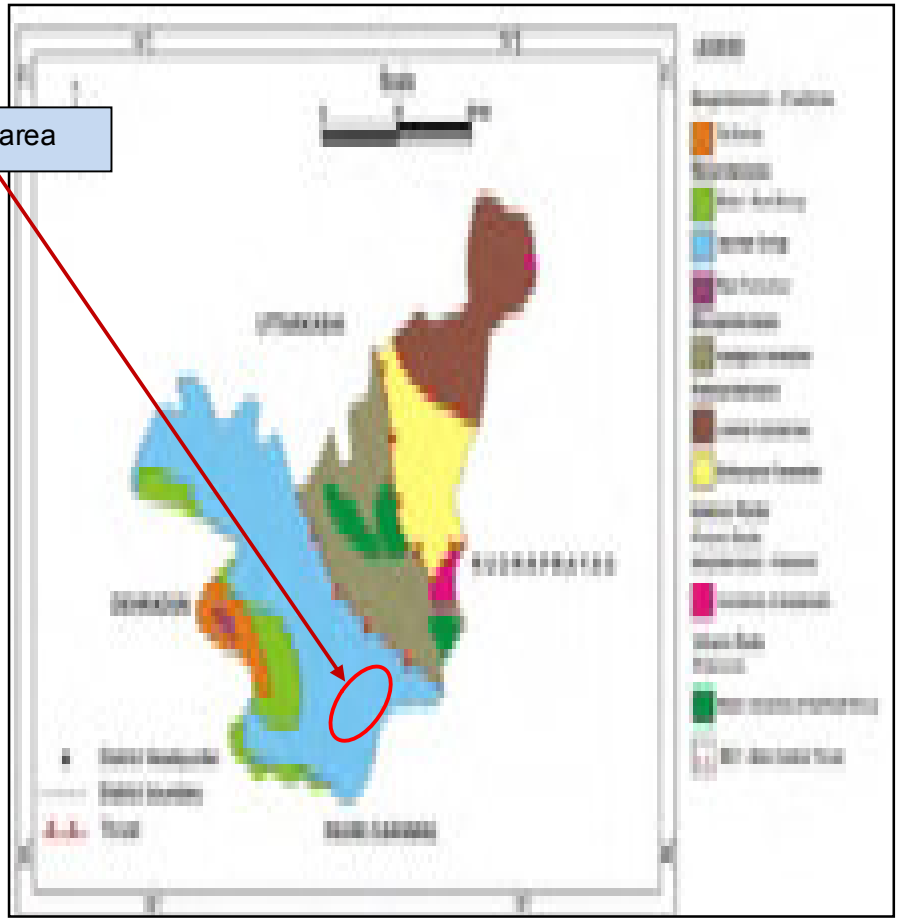


Figure 12: Geological map of Tehri Garhwal showing project area

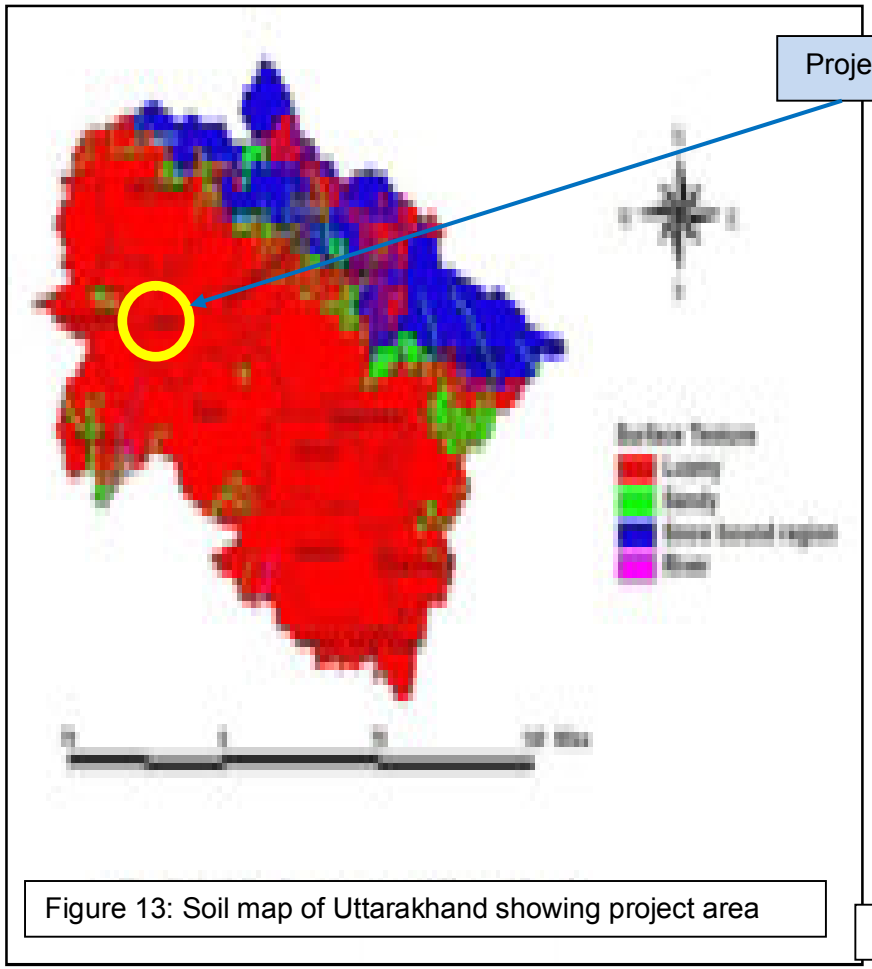


Figure 13: Soil map of Uttarakhand showing project area

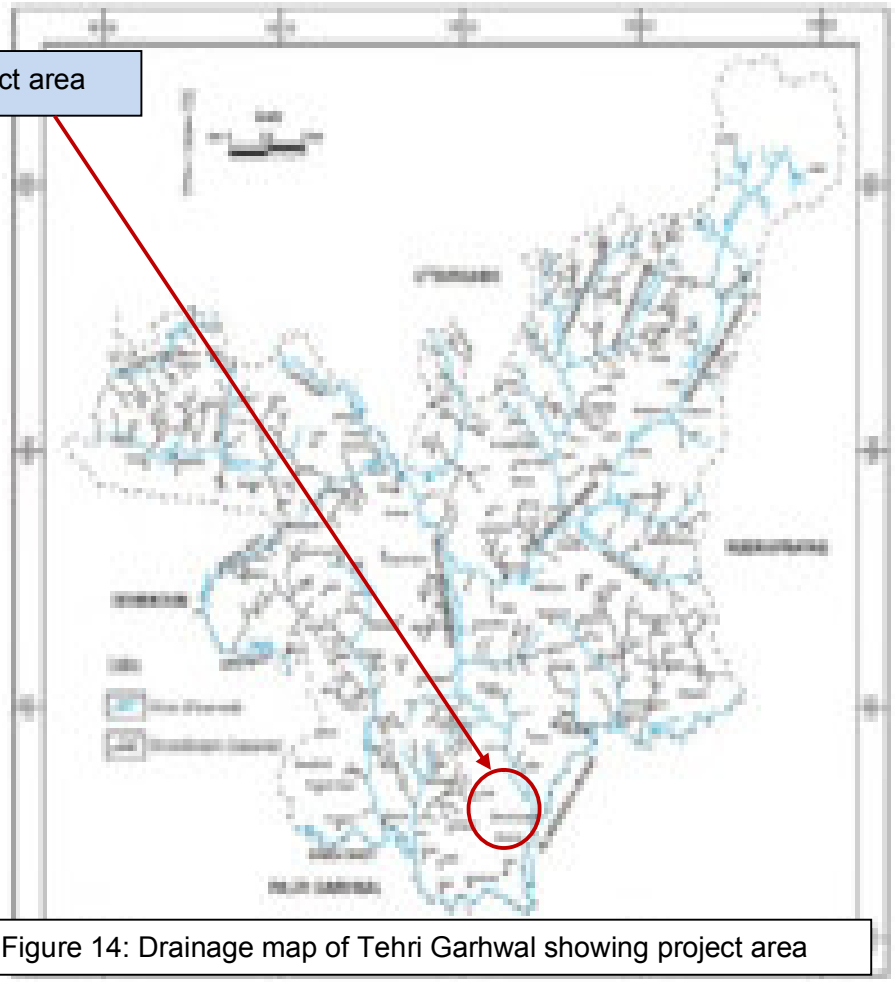


Figure 14: Drainage map of Tehri Garhwal showing project area

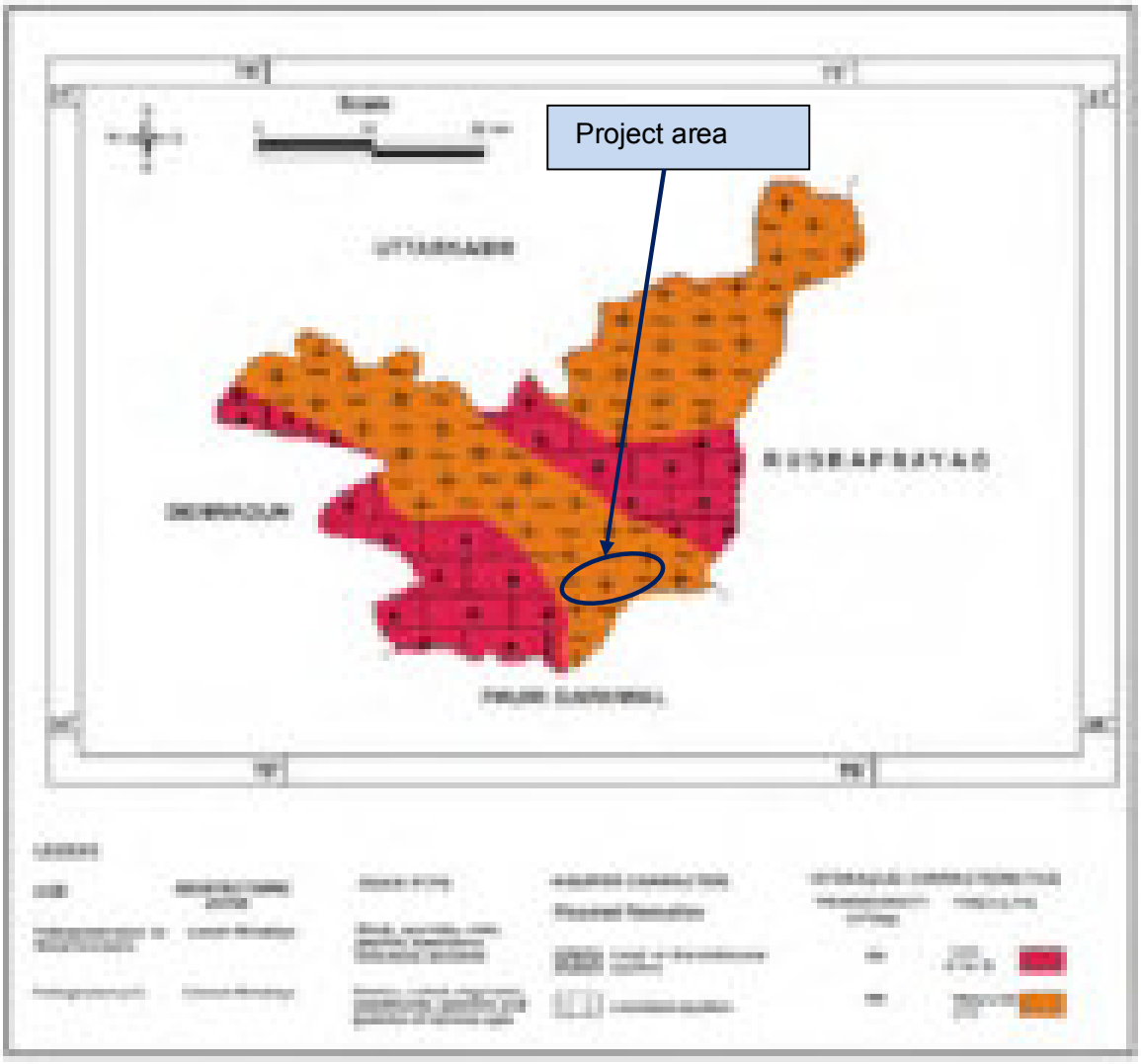


Figure 15: Hydrogeological map of Tehri Garhwal showing project area

Ambient Air Quality

41. The pristine environment and sparse population suggest that most part of the State have a very good air quality. Any point or non-point pollution sources of air pollution were not observed throughout the survey period. It was observed that the traffic on the roads is too low to cause unbearable air pollution due to vehicular exhaust. Finally, there are no industries recorded in or along the subproject area and hence any other source of atmospheric air pollution is not expected.

42. The baseline data on ambient air quality generated by collection of representative samples from five locations. The sampling locations were selected considering representative of residential, commercial, institutional, industrial and sensitive locations.

43. The air quality results reveal the fact that all the parameters with respect to the air quality are within the permissible limitsof the national standards[2] of residential areas because there are no major sources of pollution in the region.

Table 4: Ambient air quality of Devprayag

Project Town	Monitoring Location	Date of monitoring	Parameters				
			$PM_{2.5}$ µg/m^3	PM_{10} µg/m^3	SO_2 µg/m^3	NO_2 µg/m^3	CO mg/m^3
Devparyag	Within the city limits where pipe laying will be done	08/04/2014 to 09/04/2015	52.39	81.79	10.33	13.00	<0.2
	Near Construction of Reservoir	08/04/2014 to 09/04/2015	46.30	80.89	12.01	14.63	<0.2
	Location of Intake well/WTP	07/04/2014 to 08/04/2015	47.31	77.52	9.77	12.84	<0.2
	Near construction Camp	07/04/2014 to 08/04/2015	47.40	80.11	12.89	15.82	<0.2
	Residential Area near the location of River Bed Filtration	09/04/2014 to 10/04/2015	52.98	83.94	11.73	16.47	<0.2

Ambient Noise Level

44. Generally, noise pollution is not a problem in the state except in the urban areas like Dehradun. Traffic, industrial, and festival/cultural noises, along with noise generated from construction activities, DG sets etc., are the most prominent sources of noise in the urban areas. Overall noise level in the town is calm except on the busy roads of Devprayag.

45. The baseline data on ambient noise quality generated by collection of representative samples from five locations. The sampling locations were selected considering representative of residential, commercial, institutional, industrial and sensitive locations.

[2] CPCPB National Ambent air quality Standards(NAAQS) 2009

It was observed that ambient noise scenario in residential, commercial, and sensitive areas in the study area are quite low in general.

46. The air quality results reveal the fact that all the day time noise levels are slightly higher and the night time noise is also slightly higher than n the permissible limitsof the national standards[3] of residential areas because there are no major sources of pollution in the region.

Tabel 5: Ambient noise quality of Devprayag

Project Town	Monitoring Location	Date of monitoring	Noise Level in dBA	
			Leq Day	Leq Night
Devparyag	Location of Intake well /WTP	07/04/2015 to 08/04/2015	64.72	46.54
	Location of Construction of Reservoir	08/04/2015 to 09/04/2015	63.84	44.95
	Within the City limits where pipe laying will be done	08/04/2015 to 09/04/2015	62.28	43.58
	Residential Area Near the location of River Bed Filtraton	09/04/2015 to 10/04/2015	63.73	47.77
	Near Construction Camp	07/04/2015 to 08/04/2015	62.57	47.45

Surface Water Quality

47. The Devprayag town situated on the bank of Alaknanda River. The raw and treated water quality during construction will be monitored. Construction debris will be disposed away from the source and WTP premises on daily basis to avoid any contamination..

48. There is very little documentation on the pollution status of rivers except that of the holy river Ganga and some other water bodies where there were at least limited monitoring studies recently. In terms of quality, the surface water of the State is unprotected from untreated wastewater, and runoffs from chemical fertilizers and pesticides. No proper sewage treatment facilities exist in the project area. The increasing pollution of water bodies constitutes the biggest threat to public health. At present, there is limited information available on the quality of fresh water resources in the State.

49. Based on limited records, the water quality of Uttarakhand's rivers, rivulets, and other natural water sources is generally good and no major source of water pollution was found. The hand pumps, natural water seeping out from mountains locally called as "Naula", and natural water springs locally called as "Gadhera" represent the ground water sources in the hills. There are no major sources of water pollution in terms of point or non – point sources aside from natural landslides leading to deposition of debris in

[3] The Noise Pollution (regulation and control) rules, 2000 and its amendment in 2010 and 2012

streams. The baseline data on water quality were generated by collection of representative samples from 4 locations. Data reveal the fact that surface water quality is fit for Drinking water Source without Conventional treatment but after disinfections (Class A), Outdoor bathing(Organised) (class B) , Drinking water with conventional treatment Followed by disinfections (class C) as per the CPCB classification of inland surface water bodies[4] .

Table 6: Surface water quality of Devprayag

Parameters (unit)		**Sample Location**			
	(unit)	**SW1**	**SW2**	**SW3**	**SW4**
Colour	Hazen	<5.0	<5.0	<5.0	<5.0
Odour	-	Unobjecti--onable	Unobjecti--onable	Unobjecti--onable	Unobjecti--onable
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Turbidity	NTU	<1.0	<1.0	<1.0	<1.0
pH Value	..	6.87	6.98	7.13	7.21
Total Hardness (as $CaCO_3$)	mg/l	35.0	47.0	59.0	67.0
Iron (as Fe)	mg/l	<0.1	<0.1	<0.1	<0.1
Chlorides (as Cl)	mg/l	18.0	29.0	37.0	43.0
Residual free chlorine	mg/l	Nil	Nil	Nil	Nil
Total Dissolved Solids	mg/l	105.0	130.0	155.0	165.0
Fluoride (as F)	mg/l	<0.01	<0.01	<0.01	<0.01
Total Coliform	per 100ml	Absent	Absent	Absent	Absent

SW1: Up stream of Intake well and left bank of the river, SW2: Downstream left bank of Intake well, SW3: Upstream of RBF and left bank of the river, SW4: Downstream left bank of RBF.

[4] Inland surface water categories (CPCB,1978)

Ground water quality

50. A perusal of hydrochemical data shows that ground water in Tehri Garhwal district is mildly alkaline having pH varying from 8.0 to 8.2. The pH values are within permissible limit as per the guidelines of the Bureau of Indian Standards (BIS, 1991).

    The electrical conductivity varies generally between 91 µS/cm (at 25ºC) and <800 µS/cm except at Neergad (1150 µS/cm) and Kaddukhal Gadhera (2720 µS/cm), which is possibly due to higher degree of mineralisation imparted by the rocks of Krol Formation. Concentration of bicarbonate varies from 85 to 409 mg/L. Concentration of chloride varies between 7.1 and 21 mg/L. Nitrate concentration in ground water of the district varies from 0.14 to 22 mg/L, which indicates that ground water is free from anthropogenic sources of pollution. Concentration of sulphate varies from 4.8 to 557 mg/L, except at Kaddukhal Gadhera where a very high concentration of 1465 mg/L is observed. This is possibly due to higher mineralisation of ground water in the area. Concentration of calcium in Tehri Garhwal district varies between 8 and 325 mg/L while concentration of magnesium varies from 4.9 to 212 mg/L. Sodium concentration in ground water varies from 1.6 to 44 mg/L whereas potassium concentration varies between 0.3 and 3.7 mg/L. The Total Hardness as $CaCO_3$ varies from 50 to 1681 mg/L.

    In general, the values of Total Hardness are low to moderately high thereby indicating that ground water is suitable for drinking and domestic uses. Concentration of fluoride in ground water of Tehri Garhwal district is generally well below the acceptable limit of 1.0 mg/L (BIS, IS: 10500, Second Revision, 2003). It varies from 0.02 mg/L in a spring at Kemri Khala to a maximum of 0.75 mg/L in a spring at Narendra Nagar. Hence, ground water is safe as far as fluoride concentration is concerned. Concentration of silica in ground water varies between 11 and 25 mg/L indicating the absence of highly acidic source rocks (aquifer material) in the area.

    From the concentrations of different inorganic constituents in ground water in Tehri Garhwal district, it is concluded that the quality of ground water is excellent and it is suitable for drinking as per national standard[5]

Disaster risk

Vulnerability of the State

51. The State is prone to severe earthquakes, landslides. In addition, the state is also affected by disaster like floods, epidemics, fire, hailstorm, lightening, road accidents, etc. The state of is highly vulnerable to multihazards viz. earthquake, landslides, flash-floods, avalanches, Dam Burst , drought, but particularly Earthquake, as the state falls in the highest seismic risk zones of the country i.e. Zone V and IV. In the disaster prone map of the country, Uttarakhand has attained its position among first five states in respect of natural hazards, i.e., earthquakes, flash floods triggered by cloud burst, landslides, avalanches and forest fires & frequent droughts in summers. These disasters have caused immense loss of property, natural wealth, and human lives *(NIDM Uttarakhand National Disaster Risk Reduction Portal, 2014)*

Vulnerability to Earthquakes

52. As per earthquake zoning map of India, the entire State can be divided into two zones, i.e. Zone V and Zone IV. The State has experienced many earthquakes of small and large scale with their epicenters located within the Himalayan region. These earthquakes

[5] Drinking water standards – (IS 10500: 2012)

have demonstrated that the seismic vulnerability of the building stocks in the region is primarily responsible for a large number of human casualties. The State has witnessed two major earthquakes in the recent past i.e. the Uttarkashi earthquake in 1991 and the Chamoli earthquake in 1999. About 768 people died in Uttarkashi and 106 died in Chamoli earthquake. The districts of Bageshwar, Chamoli, Pithoragarh, Rudraprayag and Uttarkashi, which were most severally affected in the 2013 flash flood, also fall within the Seismic Zone V.

53. As shown in the map four of the thirteen districts of the state (Pithoragarh, Chamoli, Bageshwar and Rudraprayag) fall completely in Zone V (representing damage risk of ≥ IX on MSK scale), while five other districts (Uttarkashi, Tehri-Garhwal, Pauri, Almora and hampawat) fall partially in Zone V and partially in Zone IV (damage risk of VIII on MSK scale) and the rest (Dehradun, Haridwar, Nainital and Udham Singh Nagar) fall totally in Zone IV (of the seismic risk map of India).

54. The vulnerability of the region to earthquakes is characterized by the fact that during the last century, the region had experienced 11 earthquakes of magnitude greater than 6.0 on the Richter scale. As per IMD, there have been 65 earthquakes of varying intensity since 1803.

55. The main tectonic elements of the region include the (i) central thrust and (ii) boundary fault. Several NE-SW lineaments are also known from the area and these traverses across different tectonic zones.

56. Seismically, the State constitutes one of the most active domains of the Himalayan region. Several damaging earthquakes are recorded from this region. As such, the project area is classified under high seismic zone IV. The modified mercalli intensity broadly associated with the zone IV is VIII.

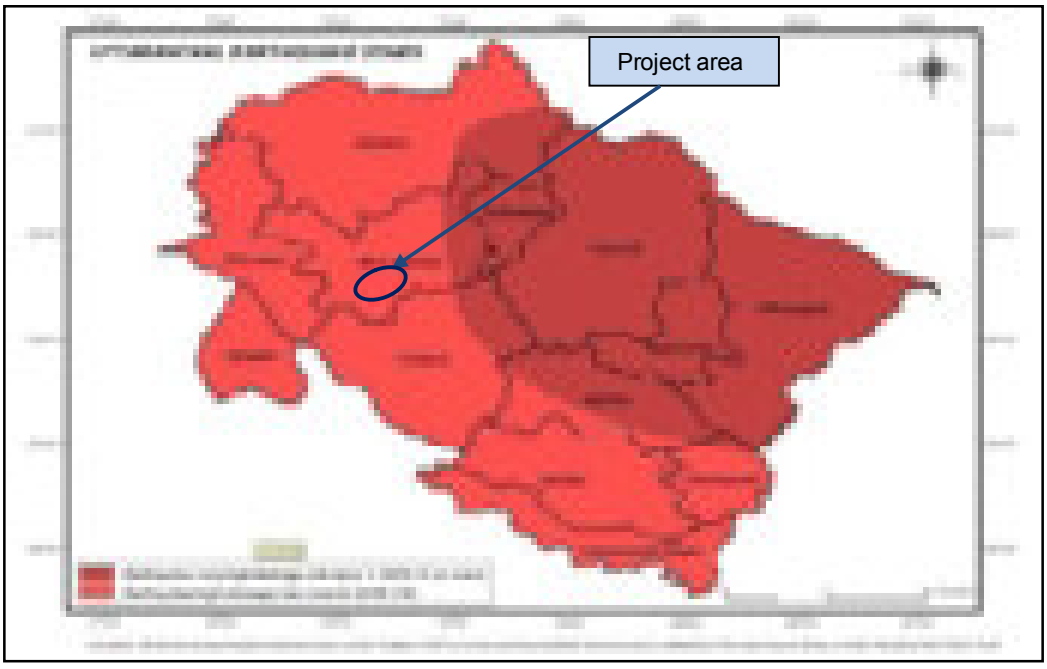


Figure 16: Earthquake zone of project area in Uttarakhand earthquake hazard zonation map

B. Ecology

Forestry

57. The flora of the district includes the vast range found in the Himalayas, varying from the sub-tropical species which grow in the outer ranges of low hills to the rich Alpine flowers in the north. Still, it can reasonably be termed to consist of mostly such trees as grow in its forests because large tracts of the land-surface in the district constitute forests. The pine, the oaks, the conifers, the sal, the deodar, the haldlu. the yew, the cypress, the rhododendron, the birch, the horse chestnut, the cycamore the willow, the alder and various types of fruit trees like the cornel, the figs, the kaiPhal, the mulberry, the kingora, the raspberry, the blackberry, currants,medlars, gooseberries, hazelnuts, apples, pears, cherries, apricots, plums, peaches, oranges, limes, bananas, pomegranates and walnuts are found in the district besides a variety of herbal plants bushes, scrubs and grass.

58. The flora of the district may be divided into six main botanical divisions : (1) the tropical dry deciduous forests, (2) the sal forests (3) the chir forests, (4) the oak forests, (4) the deodar, fir and spruce forests, and (5) the Alpine pastures.

59. The project are Devprayag is dominated by Sal Forests.These forests exist up to the altitude 0f 1,066 m., their best growths being found in the valley of the Chandan Rao in tahsil Devaprayag and in the valley 0f the Bandal in tahsil Tehri. Small tracts 0f the sal forests may also be seen in the neighbourhood 0f Muni ki Reti and Shivpuri in tahsil Devaprayag. Sal is highly gregarious. The upper limit of Sal is regulated to a great extent by frost. In excessively dry localities, it gives way to more xerophytic species. It does not extend beyond the outer ranges 0f the Himalayas even though the main river valleys in the northern part of the district are much below the maximum elavation at which this species may grow. It is commonly found up to the altitude of 762 m. on the southern aspects and 1,066 m. on the northern. The other chief trees found in these forests are sain, bakli, jhingan, haldu, kanju, sandhan, rohini and amaltas. The bakli is utilised for preparing charcoal. The wood of the sandhan is used for making agricultural implements. The khair trees are also met with in these forests.

60. For construction of new office building and clear water reservoir (near Tehsil) 0.36 ha of reserved forest has been acquired. Total 19 numbers of trees need to be cut for under sub-project. NOC obtained for the diversion of forest land for non forest purpose from the Govt. of Uttarkhnad, Dehradun on September 18th Feb 2016. As per instruction of the Divisional Forest Officer (DFO), Narendranagar an amount of Rupees 4,94,200.00 has been deposited by the PIU, UEAP,UJS for the diversion of 0.36 ha of forest land for non forest purpose and for plantation and maintenenace of 190 trees.(Refer appendix - II)

61. Details of 19 trees need to be cut are as follows-

    - Khair (*Acacia catechu*) – 14 nos.
    - Kanju trees (*Holoptelia integrifolia*) – 2 nos.
    - Bel (*Angel marmelos*) – 3 nos.

Biodiversity

62. The State of Uttarakhand is endowed with rich bio-diversity as manifested by its approximately 65 percent forest cover. The State has established six national parks and six wildlife sanctuaries for the conservation of flora and fauna. Such areas include the Nanda Devi National Park, Valley of Flowers, Gangotri National Park, Govind Pashu Vihar National Park, Rajaji National Park, Jim Corbett National Park, Kedarnath Wildlife Sanctuary, Askot Musk Deer Sanctuary, Mussoorie Sanctuary, Binsar Wildlife Sanctuary, Sanadi Sanctuary, and Govind Wildlife Sanctuary—all of which are being looked after by the Uttarakhand government. A positive remark on the State is that it maintains rich wildlife outside their protected areas.

63. The Himalayas represent one of the most fascinating biota (fauna and flora) all over the world, both in terms of quality and quantity. This is evident from the fact that more than 50 percent of all biota can be found only in the Himalayan region. Such fact is brought about by the region's uniqueness in terms of favorable climatic conditions, natural habitats, and soil types.

64. The State of Uttarakhand is represented by Biogeographic Zones 2B Western Himalaya and 7B Siwaliks[6] in this region. About 18.7 % of the total area under the Forest Department has been clearly earmarked for biodiversity conservation by the creation and management of 12 Protected Areas (PA) and a biosphere reserve in the State.

65. Variations in the topography of high mountain ranges and deep valleys and altitudes from sea-level portions give the project districts different habitats for a variety of fauna and in turn resulted in the enriched biodiversity in the region. The common wildlife reported from the forests includes Tigers, Panthers, Civet Cats, Leopard Cats, Jungle Cats, Himalayan Silver Fox, and the Jackal. Various species of deer including the Musk Deer and the Barking Deer also roam in the districts. Sambhar and Gural as well as the Bear and the Porcupine are also found in the project area. The flying mammal Bat is also common in the area. Other animals in the region include the Chipmunk, the Rhesus Monkey and the Flying Squirrel. Discussion with local people during the survey process generated reports on the presence of Leopards, Deers, Foxes, and Wild Pigs.

66. Except new office building and Clear Water Reservoir (CWR), no components of subproject is located inside or near a cultural heritage site, protected area, wetland, mangrove, estuarine, buffer zone of protected area or special area for protecting biodiversity.There are no rare, threatened, and endangered species (flora and fauna) within the subproject corridor of impact.The potential significant environmental impacts identified and assessed are related to construction time impacts.

67. The list of major flora and fauna of the project area has been given in table 5 and 6 of this report

[6] Negi, A.S., Status, Distribution and Management of Mountain Ungulates in Uttaranchal, Envis Bulletine, 2002

Table 7: List of Major Flora of Devprayag

Sr No	Local Name	Scientific Name
Trees		
1.	Buransh	*Rhododendron arboretum*
2.	Deodar	*Cedrus polycarpos*
3.	Chir	*Pinus roxburghii*
4.	Surai	*Cupressus tourulose*
5.	Padam	*Prunus cornuta*
6.	Mehal	*Pyrus pashia*
7.	Otis	*Alnus nepalensis*
8.	Ayar	*Lyonia ovalifolia*
9.	Kafal	*Myrica sapida*
10.	Akhrot	*Juglana regia*
11.	Bhimal	*Grewia optiva*
12.	Ritha	*Sapijdus mukorossi*
13.	Tun	*Toona ciliate*
14.	Nimla	*Ficus auriculata*
15.	Timur	*Zanthoxylum tamala*
16.	Kharik	*Celtis eriocarpa*
17.	Chamkhirik	*Carpinus viminea*
18.	Katmon	*Betula alnoides*
19.	Kajal	*Acer acuminatum*
20.	Katoj	*Castanopsis tribuloides*
21.	Kirmola	*Acer oblongum*
22.	Kandru	Ilese dipyrene
23.	Banj	*Quercus semicarpifolia*
Shrubs		
1.	Kala Hisalu	*Rubus lasiocarpus*
2.	Karoz	*Carissa spinarium*
3.	Kobra Plant	*Arisama helleborifollium*
4.	Kandali	*Urtica parviflora*
5.	Satavar	*Asparagus racemosus*
6.	Dudhi	*Hollerrhena antidysentricr*
7.	Bajradanti	*Potentilla fulgens*
8.	Banfasa	*Viola surpans*
9.	Bach	*Acorus calamus*
10.	Nakol	*Urticor dioica*
11.	Patyura	*Pteraacanthus angustifrons*
12.	Dudhia	*Taraxacum officinale*
13.	Vatula	*Flemingia fruticulose*
14.	Belmur	*Flacourtia indica*
15.	Nirghesi	*Delphinium denudatum*
16.	Silfoda	*Bergenia gossypina*
17.	Jula	*Gerbera grassypina*
18.	Jatamasi	*Nardostachys grandiflora*
Grasses		
1.	Dub	*Cynodon dactylon*
2.	Kush	*Sucharum spontanour*
3.	Gol ringal	*Chimonobambusa falcate*
4.	Tachita	*Apluda muticr*
5.	Dev ringal	*Thamnocalamus faclouri*
6.	Jhugra ringal	*Arundinaria jaunsarensis*
7.	Thamgil	*Thamnocalamus spathiflorus*

Table 8: List of Major Fauna

S.. No.	Wild Animals	
	Local Name	**Scientific Name**
1	Guldar	*Panthera Pardus*
2	Kala Bhalu	*Selenarctos thibetanus*
3	Ghural	*Memorhaedus goral*
4	Kakar	*Muntiacus muntjak*
5	Khirao	*Capricornis sumatraensis*
6	Jangli Suar	*Sus-scrofa cristatus*
7	Chitrola	*Martes flarigula*
8	Langoor	*Presbyits entellus*
9	Khargosh	*Lepus nigricollis*
10	Sehi	*Hystrix indica*
11	Gidar	*Canis aureus indicus*
12	Jangli Billi	*Felis chaus*
13	Gilehri	*Eurambulus pennanti*
14	Bandar	*Macaques mulatta*
S. No	**Birds**	
	Local Name	**Scientific Name**
1	Chir Fijent	Catreus wallichii
2	Kalij Fijent	*Lophura Leucomelana*
3	Koklaj Fijent	*Pucrassia macrolophus*
4	Kala Irgal	*Letinaetus makavensis*
5	Karorla	*Urocissa erythsorhyncha*
6	Ullu	*Strix aluco nivicola*
7	Baaj	*Flaco severaus*
8	Kala Titar	*Francolinus francolinus*
9	Papiha	*Cuculus varius*
10	Tota	*Psittacula humalayana*
11	Chakor	*Alectoris graeca chuker*
12	Hariyal	*Treron spenura*
13	Pashchimi Tregopan	*Tragopan meloccephalus*
14	Bulbul	*Pyconotus cafer*
15	Maina	*Aerioctheres tristis*
16	Fakhta	*Streptobelia orientalis meena*
17	Gidh	*Gyps himalayensis*
18	Kauwa	*Carvus macrornynchos*
19	Saat Bahen	*Teyrdoides striatus*
20	Neelkanth	*Garrulus Lanaclatus*

Fishery

68. Fish abound in almost all streams of the district and riparian villages find in it an important supplement to their ordinary food. The common species found here are asela or saul, mahasher, kalabans or karaunch and fucta or phar kata. Other species found in the district include gadara, gadiyal or guluwa, tarra, symplu and nama, nawoo or japa. No nterference with fishery activities is envisaged by execution of the proposed subprojects.

Socio-Economic Environment

Social and Cultural Development

69. The State of Uttarakhand occupies a total land area of 53,483 sq. km. which is 1.73 percent of India's total land area. Demographically, the State has a population of 10,086,292 as per the 2011 census consisting of 51 percent males and 49 percent females. Out of these, 7,036,954 people live in rural areas spreading over 16,623 revenue villages settled in 39,967 habitations. The habitation's population is scattered between small streams and rivers and is spread over 20 to 70 degree slopes of the Himalayan and the Lesser Himalayan regions.

70. The State is divided into Garhwal and Kumaon divisions. Administratively, the State is divided into 13 districts, 49 tehsils and 95 blocks. Garhwal division has seven hill districts with one located in the foothills (Haridwar). Kumaon division, on the other hand, has six districts—one in the foothills (Udham Singh Nagar). There are 16,177 villages in the State and 7,227 gram panchayats. Of the total number of villages, 5,868 are not connected to all weather roads.

71. The schedule caste and schedule tribe population in the State is significant, averaging 17.9 percent and three percent respectively. The population density is 159 persons per sq.km.—considerably lower than the national average of 324 persons per sq.km. Rural population constitutes about 74% while urban population composes the remaining 26% of State's total populations. About 70% of the State population lives below the poverty line which is way above the national average of 46%. Literacy rate in the State is 71.6%.

72. The State recorded 19.2% decadal growth during the 1991-2001 census period which is close to the national growth rate of 21.3 %. The district of Nainital registered the highest decadal growth rate with 32%, followed by Udham Singh Nagar with 27.8%.

Land Use and Land Use Pattern

73. The land use pattern of Uttarakhand is strongly governed by the following: elevation, climate, mountainous terrain, lithological type, topography, surface hydrology, sunlight in the fields of forestry and agriculture, alpine meadows, sparse vegetation (scrub), grazing land, barren land, and human settlement. The human settlements are mainly located in the shallow water zones or around the localities nearer to springs.

74. Forest is the main land use in the State and nearly 65 % of the geographical area is under the varying forest densities (cover). Tree line is clearly demarcated above 2900 m elevation. Agriculture is confined to areas of low reliefs which are underlined by weak rock formation (i.e. schists, phyllites, weathered gneisses, and crushed quartzite). The cultivated land, approximately 11.5 % of the total geographical area, is either terraced/semi-terraced or plain. Other land use categories such as meadows, grazing lands, and scrubs do not exhibit definite relationship with lithology. It is also observed that the south-facing hill slopes are covered by lush green forests.

Table 9: Land Utilisation in Uttarakhand

Sl. No.	Land-use	Period / Year	Unit	Statistics
1.	Total Reported Area	2006-07	Hectare	5,666,878
2.	Forest Area/Forest land	2006-07	Hectare	3,465,057
3.	Culturable Waste Land	2006-07	Hectare	366,713
4.	Fallow Land	2006-07	Hectare	108,132
	(i) Current Fallow	2006-07	Hectare	44,064
	(ii) Fallow Land other than Current Fallow	2006-07	Hectare	64,068
5.	Barren & Unculturable Land	2006-07	Hectare	311,849
6.	Land under Non-agricultural Uses	2006-07	Hectare	160,649
7.	Permanent Pasture & Other Grazing Land	2006-07	Hectare	220,286
8.	Land under Misc., Tree Crops and Groves not included in Net Area Sown	2006-07	Hectare	269,042
9.	Net Area Sown	2006-07	Hectare	765,150

Source: Uttarakhand at a Glance 2009-10, Govt. of Directorate of Economics and Statistics

Health

75. The Total Fertility Rate of the State is at 3.6 while the Maternal Mortality Ratio is at 517 (SRS 2001-03). Both of which are higher than the national average. The sex ratio in the State is 962 slightly higher than the 933 All-India. Comparative figures of major health and demographic indicators are mentioned below.

Table 10: Health Indicators of Uttarakhand

S.No.	Item	Uttarakhand	India
1	Total population (Census 2001) (in millions)	8.5	1,028.61
2	Decadal Growth (Census 2001) (%)	20.41	21.54
3	Crude Birth Rate (SRS 2007)	21.0	23.5
4	Crude Death Rate (SRS 2007)	6.7	7.5
5	Total Fertility Rate (SRS 2006)	3.6	2.9
8	Sex Ratio (Census 2001)	962	933

Source: RHS Bulletin, March 2007, M/O Health & F.W., GOI

76. The health infrastructure of the State is described in succeeding Table. There are only 34 Obstetricians / Gynecologists and 18 Pediatricians in the State. Such numbers are way below the estimated State requirement of 49 each. Some of the essential requirements of the new State include basic primary health care, pre and post-natal care, and nutritional status and preventive care. Accessibility to health services with the aid of improved road conditions is essential to put progress in the health indicators of the State. Post disaster 2013 water supply facility provided to population in and around the sub-project area has been adversely affected. With better water supply system and delivery of appropriate quantity and quality of water, health scenario will also improve.

Table 11: Health Infrastructure of Uttarakhand

Particulars	Required	In position
Sub-centre	1,294	1,765
Primary Health Centre	214	232
Community Health Centre	53	49
Multipurpose worker (Female)/ANM at Sub Centres & PHCs	1,997	1,785
Health Worker (Male) MPW(M) at Sub Centres	1,765	656
Health Assistant (Female)/LHV at PHCs	232	159
Health Assistant (Male) at PHCs	232	147
Doctor at PHCs	232	182

Source: RHS Bulletin, March 2007, M/O Health & F.W., GOI

Literacy

77. In terms of the population's literacy, Uttarakhand recorded an overall literacy rate of 71.6% in 2001, marking a significant improvement from 57.7% in 1991. Meanwhile, the overall literacy rate in rural areas is 68.1%. The suceeding Table shows the literacy of Uttarakhand. The male literacy rate is 83.30% and female literacy rate is 59.60% which is comparatively high from the national average. It indicates that the rural population needs more education facilities to bridge the gap with that of the urban areas.

Table 12 : Literacy Rate in Uttarakhand

Literacy Rate 2001	% of Total Population
Total	71.60
Males	83.30
Females	59.60
Scheduled Caste	
Total	63.40
Males	77.30
Females	48.70
Scheduled Tribes	
Total	63.20
Males	76.40
Females	49.40

School education	
Percentage of Pre- Primary/Primary schools to total institutions	69.76
Percentage of Middle schools to total institutions	19.75
Percentage of High schools/Higher Secondary to total institutions	10.48

Source: Uttarakhand at a glance 2006-07

78. The general enrollment and access to primary schools has seen a tremendous boost in the last decade. Such improvements are brought by the increased availability of functional primary schools and the initiation of the Education Guarantee Scheme in the State. Cultural and Archaeological Resources

79. The State of Uttarakhand has a great range of cultural practices. Festivals and cultural activities are being celebrated throughout the year in the State. The major fairs and festivals of the Garhwal region include the Hatkalika Fair, Tapkeshwar Fair, Surkhanda Devi Mela, Kunjapuri Fair, Lakhawar Village Fair, and Mata Murti Ka Mela. Baikunth Chaturdasi Mela is a famous fair celeberated in Srinagar. On the other hand, major fairs and festivals in the Kumaon region consist of Uttarayani Mela, Shravan Mela (Jageshwar), Kartik Poornima at Dwarahat, Kasar Devi fair, and Nanda Devi melas.

80. There are no heritage sites listed by Archaeological Survey of India (ASI) within the study area hence, the proposed project activities do not have any adverse impact on these sites. There are few small temples/ shrines located along the project corridors, but none of them will be affected by the subproject and the construction activity is restricted to the available land. . In terms of the area's common property resources (CPR) such as public wells, water tanks, play grounds, common grassing grounds or pastures, market areas and community buildings, none will be affected by sub-project.

Economic Development

Transportation and Communication

81. Transportation system is a key factor in the socio-economic development of any State. Roads are logically the critical inputs to the growth of all the sectors. Aside from road systems, the State of Uttarakhand is connected to other states via rail and air transportation systems. Dehradun, Haridwar and Kathgodam are the major railway stations connected to various parts of the country. Jolly Grant near Dehradun is the lone airport present in the State. As per statistical data from 2006-07, Uttarakhand has a total road network of 23,274 km of which 2,228.90 km comprises the National Highway (1,328.30 km with State PWD and 900.60 km with BRTF); 1,553.00 km comprises the State Highway; 579.85 km covers the MDR; 7,154.88 km comprises the ODR (6723.90 km with State PWD and 430.98 km with BRTF), and 7,250.53 km to the Village Road. Light vehicle roads constitute of about 2,633 km.

82. Density of road length per 100 sq. Km. is 45 km which is very low compared to the national average of 97 km. Only about seven percent of the roads in the State are built in two-lane standards while 50 percent are paved. About a third of the higher class paved roads are in poor condition and over 70 percent of the light-vehicle roads need to be repaired or rehabilitated. Due to the lack of road connectivity, vast areas of the State are inaccessible. Such problem influences the population to 'chunk' in far flung areas of the

State remaining to be under-developed and devoid of educational and health facilities and employment opportunities.

83. The road density per 100 sq. km. of the total area in Garhwal region is 30 km whereas road density in Kumaon region is 37 km. In terms of population, Garhwal region has 234 km of roads per lakh and the corresponding figure in Kumaon is 266 km. Motor vehicles has increased with the annual growth rate of 11 percent accounting to 44,7000 vehicles in 2003. PWD is the principal agency responsible for the management of roads in the State.

Industrial Development

84. The State has very few industrial units mainly because of lack resources. In the hilly terrains, industries promoted include food processing, fruit processing, medicinal/herbal plants, and horticultural/floriculture-based industries. In the plain districts of Haridwar, Udham Singh Nagar, and other places, capital intensive and high-value addition industries are being encouraged by the government. In 2003-04, there were 178 large and medium-scale industries with total investment of Rs. 500,700 lacs providing employment to about 44,000 employees. Small scale industries, on the other hand, employ about 129,782 of the population.

85. In recent years, Uttarakhand has emerged as one of the attractive industrial destinations in India. In this regard, the government is encouraging private participation in all industrial activities in the State. The New Industrial Policy announced in 2003 by the State government puts in place the regulatory framework for Uttarakhand's industrialisation. The New Industrial Policy indicates that private resources may be tapped while promoting integrated Industrial States in Uttarakhand. The State government provides assistance in establishing small and medium sized agro parks, food parks, and the likes which in turn are expected to provide common infrastructure facilities for storage, processing, grading, and marketing.

Energy and Electric Power Potential

86. Uttarakhand has an estimated hydro power potential of approximately 20,200 MW. However, only 1,130 MW has been tapped at present. Meanwhile, 4,170 MW projects are under implementation and 3,800 MW projects are allotted to Central, State and private sectors. Thirty-nine projects with a potential of 6,374 MW have been identified for PFR under PMs Hydro Initiatives.

Although Uttarakhand is a power surplus State, a lot needs to be done to harness the untapped potential and sale the surplus power to make this a GDP driver sector for the State.

Aesthetic and Tourism

87. Tourism is one of the strong pillars of the State economy. The State has high growth potential for tourism, be in nature, wildlife, adventure or pilgrimage tourism. The State received 10.5 million domestic tourists in the year 2000-01, 11.6 million in the year 2001-02, and 12.9 in the year 2002-03, registering an average growth of 10.7 percent. Expenditure on schemes for tourism development and promotion in the State has progressively increased over the years. In the current five year plan, about Rs. 860 million have been spent, which is about 10 times the amount spent during 1980-85. Some of the major destinations with tourism potential include Haridwar (called ‘The

Gateway of God'), Rishikesh (the birth place of Yoga), Dehradun, Mussoorie, Almora, Kedarnath, Badrinath, Yamunotri, Gangotri, Jim Corbett National Park, Nainital, Ranikhet, and Pithoragarh.

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Environmental impacts related to siting

88. Water supply infrastructure was screened using the ADB's rapid environmental assessment (REA) checklist for Water Supply.The individual environmental screening checklist is provided in **Appendix 1** of this report.

89. **No significant environmental impacts related to siting**. Project area section is not located inside or near a cultural heritage site, protected area, wetland, and mangrove, estuarine, buffer zone of protected area or special area for protecting biodiversity but some component of the sub-project falling under reserve forest (NOC obtained). There are no rare, threatened, and endangered species (flora and fauna) within the subproject corridor of impact. Only 0.36 ha of forest land needs to be acquired for construction of office building. Total 19 numbers of trees need to be cut for under sub-project. NOC obtained for the diversion of forest land for non forest purpose from the Govt. of Uttarkhnad, Dehradun on September 18th Feb 2016. As per instruction of the Divisional Forest Officer (DFO), Narendranagar an amount of Rupees 4,94,200.00 has been deposited by the PIU, UEAP,UJS for the diversion of 0.36 ha of forest land for non forest purpose and for plantation and maintenenace of 190 trees.

B. Screening of Environmental Impacts

90. **Potential significant environmental impacts.**. The potential significant environmental impacts are related to the excavation and disposal of earth during construction and inconvenience to local commuter during laying of pipes on the roads.

91. The beneficial impacts still outweighs the potential environmental impacts. The beneficial impact includes better water quality and reliability of supply.

Table 13: Screening of Environmental Impacts

Sl.No.	Environmental Attributes	Pre-Construction Stage	Construction Stage	Operation Stage
1.	**Physical Environment**	No Impact	No Impact	No Impact
	Geography	No Impact	No Impact	No Impact
	Topography, Geology and Soils	No Impact	No Impact	No Impact
2.	**Climate and Meteorology**	No Impact	No Impact	No Impact
3.	**Ambient Air**	No Impact	Reversible	No Impact

	Quality		and Insignificant during Construction Stage	
Sl.No.	**Environmental Attributes**	**Pre-Construction Stage**	**Construction Stage**	**Operation Stage**
4.	**Ambient Noise Level**	No Impact	Reversible and Insignificant during Construction Stage	No Impact
5.	**Hydrology**	No Impact	No Impact	No Impact
	Water Drainage	No Impact	Reversible and Insignificant during Construction Stage	No Impact
	Water Quality	No Impact	No Impact	No Impact
6.	**Seismology**	No Impact	No Impact	No Impact
7.	**Ecology**	No Impact	No Impact	No Impact
	Forestry	Impact due to acquisition of 0.36 ha of forest land	No Impact	No Impact
	Biodiversity	No Impact	Impact due to felling of 19 mature trees of forest land	No Impact
	Biosphere Reserves	No Impact	No Impact	No Impact
8.	**Socio-Economic**	No Impact	No Impact	No Impact
	Social and Cultural Development	No Impact	No Impact	No Impact
	Land Use and Land Use Pattern	No Impact	No Impact	No Impact
	Health	No Impact	No Impact	No Impact
	Literacy	No Impact	No Impact	No Impact

	Transportation and communication	No Impact	No Impact	No Impact
	Industrial Development	No Impact	No Impact	No Impact
Sl.No.	**Environmental Attributes**	**Pre-Construction Stage**	**Construction Stage**	**Operation Stage**
9.	**Cultural and Archaeological Resources**	No Impact	No Impact	No Impact
10.	**Aesthetic and Tourism**	No Impact	No Impact	No Impact

C. Impact and mitigation measure during planning and design phase

92. There are no significant adverse environmental impacts on topography, soil and geographic significance during the planning and design phase based on the environmental screening of the sub-project in Devprayag. For construction of office building and CWR acquisition of 0.36 forest reserve land obtaoined from Govt. Of Uttarakhand.

92. Impacts on Climate, Ambient Air Qaulity, Noise Level, Seismic, Economic, Cultural and Aesthetics are insignificant in the planning and design stage.

93. Environmental Attributes and Project Activity and its Impacts and mitigation has been summerised as in Table 12 of this report

Table 14: Environmental Attributes and Project Activity and its Impacts and mitigation

Environmental Attributes and Project Activity and its Impacts	**Mitigation**
Project Establishment and pre construction activity and its social Impacts	Open liaison channels shall be established between the Site owner, operator, the contractors and interested and affected parties such that any queries, complaints or suggestions pertaining to environmental management aspects can be dealt with quickly and by the appropriate person(s).
	A communications strategy is of vital importance in terms of accommodating traffic during laying of pipes on road. In case of road closure together with the proposed detour needs to be communicated via advertising, pamphlets, radio broadcasts, road signage, etc

	Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.
	Storage facilities, elevated tanks and other temporary structures on site shall be located such that they have as little visual impact on local residents as possible.
	In areas where the visual environment is particularly important (e.g. along commercial/ tourism routes) or privacy concerns for surrounding buildings exist, the site may require screening. This could being the form of shade cloth , temporary walls, or other suitable materials prior to the beginning of construction.
	Special attention shall be given to the screening of highly reflective materials on site.
Lack of sufficient planning to assure long term sustainability of the improvements and ensure protection of the assets created and the architectural/archaeological character of the surroundings	Design will include provisions for ensuring effective maintenance and protection of the assets created so as to ensure the long term sustainability.
Layout of components and its location to avoid impacts on the aesthetics, sensitive environmental areas / attributes of the site	The project components siting will avoid impacts on the aesthetics of the site, ensure minimal impacts and in compliance with statutory and regulatory requirements. The contractor, FPIU/ IA and DSC will identify any direct or indirect intervention of primary or secondary activity before establishment of any project components on the ground.
Selection of materials and construction technologies, if not carefully chosen, will adversely impact the aesthetic appeal of the destinations	Selection of materials will be according to specification and from approved sources Material selection would be done keeping in view that no asbestos (except as allowed), and CFC is used. Contractors shall prepare a source statement indicating the sources of all materials (including topsoil, sands, natural gravels, crushed stone, asphalt, clay liners etc), and submit these to the Engineer for approval prior to commencement of any work Where materials are borrowed (mined), proof must be provided of authorization to utilize these materials from the landowner/material rights owner and the Department of Geology

	and Mining Procurement of all material according to the material specification of the contract document and sourced from licensed and approved sources. A signed document from the supplier of natural materials shall be obtained confirming that they have been obtained in a sustainable manner and in compliance with relevant legislation
Socio cultural resources- Ground disturbance can uncover and damage archaeological and historical remains	There is not such location is anticipated on the project site. In case of chance of finding such location, Consult Archaeological Survey of India (ASI) and/or concerned dept. of Uttarakhand Govt. as applicable to obtain an expert assessment of the archaeological potential of the site; Consider alternatives if the site is found to be of medium or high risk; Develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognised and measures are taken to ensure they are protected and conserved.
Integration of energy efficiency and energy conservation programs in design of sub-project components	The detailed designs for the sub-project components shall ensure that environmental sustainability principles, including energy efficiency, resource recycling, waste minimization, rainwater harvesting etc.
Site clearance activities, including delineation of construction areas	Any removal of vegetation or tree felling shall be done after taking statutory permissions if required. All works shall be carried out such that the damage or disruption of flora other than those identified for cutting is minimum. Preliminary estimate indicates felling of 19 nos. trees and accordingly atleast 190 trees need to planted Only ground cover/shrubs that impinge directly on the permanent works or necessary temporary works shall be removed with prior approval from the Environmental Expert of DSC All areas used for temporary construction operations will be subject to complete restoration to their former condition with appropriate rehabilitation procedures.as per the rehabilitation plan prepared by the contractor and approved by the EE of DSC.
Blockage of access in residential area,	Contractor will identify such location in the

commercial area and sensitive location like school, college, hospitals and court	preconstruction stage and prepare plan approved by DSC to minimize inconvenience to the people.
Diversion of 0.36 ha of forest land for non forest purpose and cutting of 19 trees for construction of office building and WR	Diversion of land as per The forest conservation Act 1980. (Refer appendix – II) Compensatory forestation and plantation of 190 trees
Slop protection near reservoir and intake well	Retaining wall will constructed near reservoir and intake well

D. Impacts and Mitigation Measures during Construction Phase

94. Majority of the impacts will occur during the construction phase. These impacts, to be described in the succeeding sections are classified according to major components of the environment – physical, biological, air, water, and socio-economic. These impacts were mainly drawn from screening of impacts described in the introduction of this Chapter.

Impact on Physical Environment, Geography, Topography, Geology and Soil

95. The constructions of all components of the sub-project are at the existing location and not requiring additional land. So the impact on location related impact is insignificant.

Impact on Climate and Meteorology

96. The project components do not have impact on the climate and meteorology of Devprayag.

Ambient Air Quality

97. The handling of material, excavation of earth for laying pipes, emission of air pollutants from operation construction vehicles causes air pollution. Since the scale of construction activity is not significant, so the impact is also not very significant. Periodic air quality monitoring to ensure emissions comply with standards will be conducted as per the agreed environmental monitoring plan

Ambient Noise Level

98. The operation of construction vehicles and equipments will generate noise. Since this operation will be located and limited to the construction site. The beatking of carriage way of road also generated noise. This activity will be limited to day time. So, the impact due to noise is insignificant and limited to the construction period only. Monitoring of noise levels in potential problem areas as per the monitoring plan will be carried out.

Drainage

99. The disposal of soil and excavation of road sides may impact the drainage. This impact will be insignificant since the exaction of road sides will be covered in the same day and disposal of excavated earth will be on the low laying area so that impact on drainage is minimum. Monitoring of water quality as per the monitoring plan will be carried out.

100. The mitigation measures of each project components are provided below-

Environmental Attributes and Project Activity and its Impacts	**Mitigation**
Impacts due to operation of construction Camps and its Location, Selection, Design and Layout	Siting of the construction camps, labour camp and stockpiles shall be as per the guidelines of UEPPCB, ULB, village panchayat and any other applicable guideline to the local site. The contractor will assess the impact of the construction camp and should be acceptable to the FPIU/ IA/PMU. Construction camps shall not be proposed within 500m from the sensitive receptors, nearest settlements to avoid conflicts and stress over the infrastructure facilities with the local community. Location for stockyards for construction materials shall be identified at least 300m away from watercourses. Construction camps will be located away from settlements and drainage from and through the camps will not endanger any domestic or public water supply. Construction camps including sanitation facilities must be adequately drained. Sewage management though septic tanks and solid waste management though local ULB system or other alternate measures.
Impacts due to poor supply of poor drinking water to the workers involved in construction.	Sufficient supply of potable water to be provided and maintained as per the standards, requirements, test methods and sampling procedure according to IS: 10500. If the drinking water is obtained from an intermittent public water supply then storage tanks will be provided. The cleanliness of the storage tanks will be ensured and all measures to be taken to avoid any water contamination.
Impacts on waste disposal from the construction site and construction camp.	Pre-identified disposal location (identified by Contractor in compliance to relevant regulation and approved by EE-DSC) shall be part of Comprehensive Waste Disposal Plan Solid Waste Management Plan to be prepared by the Contractor in consultation

	and with approval of Environmental Specialist of DSC. Contractor shall ensure that waste shall not be disposed off near the water course or agricultural land, Orchards and Natural Habitats like Grasslands.
Impacts on local environmenment due to loss of natural resource of earth due to poor storage.	Stockpiling of construction materials and excavated earth or silt in case of construction of river bed filtration does not impact obstruct the drainage and Stockpiles will be covered to protect from dust and erosion.
Impacts due to construction traffic on access to Site	Contractors shall ensure that all side and mitre drains and scour check valves on access and haul roads are functioning properly and are well maintained. Contractors shall ensure that access roads are maintained in good condition by attending to potholes, corrugations and storm water damage as soon as these develop. If necessary, staff must be employed to clean surfaced roads adjacent to construction sites where materials have been spilt. Unnecessary compaction of soils by heavy vehicles must be avoided; construction vehicles must be restricted to demarcated access, haulage routes and turning areas. Cognizance of vehicle weight / dimensions must be taken when using access constructed out of certain materials. e.g. paved surfaces / cobbled
Impacts on increased load on water supply source due to construction work.	The contractor shall use ground/surface water as a source of water for the construction with the written consent from the concerned Department. To avoid disruption/ disturbance to other water users, the Contractor shall extract water from fixed locations and consult DSC & line agencies before finalizing the locations. The Contractor shall provide a list of locations and type of sources from where

	water for construction shall be extracted. The Contractor shall need to comply with the requirements of the State Ground Water Department for the extraction and seek their approval for doing so and submit copies of the permission to DSC.
Imapcts due to Soil/land Erosion	Slope protection measures will be undertaken as per design to control soil erosion. The Contractor shall not in any way modify nor damage the banks or bed of streams, rivers, other open water bodies and drainage lines adjacent to or within the designated area Earth, stone and rubble is to be properly disposed of so as not to obstruct natural water pathways over the site. i.e.: these materials must not be placed in storm water channels, drainage lines or rivers. There shall be a periodic checking of the site's drainage system by DSC, FPIU/IA and PMU to ensure that the water flow is unobstructed.
Water Pollution from Construction Wastes	The Contractor shall take all precautionary measures to prevent entering of wastewater into streams, water bodies or the irrigation system during construction. Contractor shall not wash his vehicles in river/stream water and shall not enter riverbed nearby the water resource area for that purpose. Mixing / decanting of all chemicals and hazardous substances must take place either on a tray or on an impermeable surface. Waste from these shall then be disposed of to a suitable waste site in accordance with Hazardous Wastes (Management, Handling and Transboundary movement) Rules, 2008 and amendments till date and applicable norms Site staff shall not be permitted to use any stream, river, other open water body or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing or for any construction or related activities. Municipal water (or another source approved by the Engineer) shall instead be used for all activities such as washing of equipment or

	disposal of any type of waste, dust suppression, concrete mixing, compacting etc.
Water Pollution from Fuel and Lubricants	The Contractor shall ensure that all construction vehicle parking locations, fuel/ lubricants storage sites, vehicle, machinery and equipment maintenance and refueling sites shall be located at least 300 m away from rivers/streams and irrigation canal/ponds if any. Contractor shall ensure that all vehicle/machinery and equipment operation, maintenance and refueling shall be carried out in such a manner that spillage of fuels and lubricants does not contaminate the ground. Wastewater from vehicle parking, fuel storage areas, workshops, wash down and refueling areas shall be collected and separated through an oil interceptor before discharging it on land or into other treatment system as per specified standards and UEPPCB and ULB norms if any.
Soil Pollution due to fuel and lubricants, construction waste	The fuel storage and vehicle cleaning area will be stationed such that spillage of fuels and lubricants does not contaminate the ground. All pollution parameters will be monitored as per monitoring plan. Wastewater from vehicle parking, fuel storage areas, workshops, wash down and refueling areas shall be collected and separated through an oil interceptor before discharging it on land or into other treatment system
Generation of dust	The contractor will take every precaution to reduce the levels of dust at construction site. Regular sprinkling of water and Stockpiles of soil will be kept covered in such a manner to minimize dust generation
Emission from Construction Vehicles, Equipment and Machinery	All vehicles, equipment and machinery used for construction shall confirm to the relevant Bureau of India Standard (BIS) norms. The discharge standards promulgated under the Environment Protection Act, 1986 shall be strictly

	adhered to. The use of silent /quiet equipment compliant with India ambient noise standards and standards specified for manufacturers shall be encouraged in the sub Project. The Contractor shall maintain a record of PUC for all vehicles and machinery used during the contract period which shall be produced for verification whenever required.
Noise Pollution	The Contractor shall confirm that all Construction equipment used in construction shall strictly conform to the MoEF/CPCB noise standards and all Vehicles and equipment used in construction shall be fitted with exhaust silencers. At the construction sites noisy construction work such as crushing, operation of DG sets, use of high noise generation equipment shall be stopped during the night time between 10.00 pm to 6.00 am. Noise limits for construction equipment used in this project will be in conformity to the BIS/SPCB/CPCB standards Regular monitoring of ambient noise levels to ensure compliance to Uttarakhand Environment Protection & Pollution Control Board standards.
Material Handling at Site	Workers Employed on mixing cement, lime mortars, concrete etc., will be provided with protective footwear and protective masks and goggles. Workers, who are engaged in welding works, will be provided with welder's protective eye-shields. Workers engaged in stone breaking activities will be provided with protective goggles, masks, and clothing. Stockpiles shall not be situated such that they obstruct natural water pathways. Stockpiles shall not exceed 2m in height unless otherwise permitted by the Engineer.

	If stockpiles are exposed to windy conditions or heavy rain, they shall be covered either by vegetation or cloth, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases. All concrete mixing must take place on a designated, impermeable surface The use of any toxic chemical will be strictly in accordance with the manufacturer's instructions and applicable regulations. The Engineer will be given at least 6 working days notice of the proposed use of any chemical. A register of all toxic chemicals delivered to the site will be kept and maintained up to date by the contractor.
Damage, and disturbance to other infrastructure in the construction site	Confirm location of infrastructure. Finalize alignment in coordination with agencies like Uttarakhand Power Corporation Limited, Bharat Sanchar Nigam Limited, etc. Ensure prior permission of respective agency Realign pipelines, if required and subsequently revise IEE Provide public information in case of service disruptions
Disposal of Construction Waste / Debris / Cut Material	The Contractor shall confirm that Safe disposal of the construction waste will be ensured in the pre-identified disposal locations. In no case, any construction waste will be disposed around the project site indiscriminately.
Disruption / cessation of existing water supply systems due to construction activity..	Care be taken during improvement of existing water supply systems, so that disruption in existing water supply would not occur. Tentative schedule of closure should be known to affected people prior to cessation of water supply. In case disruption of water supply exceeds the intimated schedule, arrangement for supply of potable water should be made.
Safety Measures During Construction	Personal Protective Equipment for workers on the project and adequate safety

	measures for workers during handling of materials at site will be taken up. The contractor has to comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress. The contractor has to comply with all regulations for the safety of workers. Precaution will be taken to prevent danger of the workers from fire, etc. First aid treatment will be made available for all injuries likely to be sustained during the course of work. Contractor shall also organize periodic visits by a qualified registered medical practitioner to the site and workers camp. Contact information of Doctor, availability & location of first aid box shall be displayed in appropriate language both at work site and workers camp. The Contractor will conform to all anti-malaria instructions given to him by the Engineer. The Contractor will also ensure that the interests of the community are preferably not disturbed, and if unavoidable then disturbed to the minimum. Provide traffic management personnel, barricade, appropriate signage and safety information in and around the construction site and prevent local people entering into the construction site.
Clearing of Construction of Camps and Restoration	Contractor to prepare site restoration plans for approval by the Engineer. The plan is to be implemented by the contractor prior to demobilization. On completion of the works, all temporary structures will be cleared away, all rubbish burnt, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the Contractor's expense, to the entire satisfaction of the Engineer and facility owner.
Risk of archaeological chance finds	Strictly follow the protocol for chance finds in any excavation work;

	Request FPIU/DSC or any authorized person with archaeological field training to observe excavation; Stop work immediately to allow further investigation if any finds are suspected; and Inform FPIU/DSC, and take any action they require ensuring its removal or protection in situ.
Conflict with locals	Contractor shall ensure that mostly the local labourers are employed and migratory laborer shall be employed only in case of unavoidable circumstances.

E. Impacts during Operation Phase

Environmental Attributes and Project Activity and its Impacts	**Mitigation**
Impact on Environmental Conditions due to operation of water supply system	The periodic monitoring of the ambient air quality, noise level, water (both ground, surface water) quality and soil, in the subproject area as suggested in pollution monitoring plan through an approved monitoring agency.
Increased Pollution due to the better water supply.	The subproject involves renovation and rehabilitation of existing system, augmentation of water supply is envisaged for 10 years project population and to fulfill the deficit of water supply to user as per 135 lpcd. Subproject does not envisage improvement in distribution system to end users as such very little increase is pollution load is anticipated. Sewage generated will be handled by the prevalent existing sewage management system of the town.
Algal Growth in Reservoir	Proper and regular cleaning of reservoir & provision of bleaching shall be ensured.
Risk of contamination in water.	Regular monitoring of water quality as per IS 10500, 2012. Chlorine should be added in sufficient quantity so that residual chlorine within permissible limit is available in pipeline and user end .
Management of Chlorine stock	Chlorine stock shall be maintained in cool, dark and locked rooms, near the

	reservoir/treatment site and be handled with proper care and under safety measure.
Unhygienic condition due to poor maintenance of sanitation facilities and irregular solid waste collection	Jal Sansthan will carry out maintenance of the existing toilets, and carry out the regular collection and disposal of wastes as per norms. New facilities proposed to be created under UEAP will cater to additional load.

F. Economic Development

101. After the disaster, there is significant economic loss mainly due to loss of life and livelihood and tourism activity. This rehabilitation of water supply scheme will bring positive impact interms of health and economic activity. The restoration of water supply will bring the supply level of pre-disaster stage and give support to the local economy.

VI. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

A. Public participation during the preparation of the IEE

102. The public participation process included identifying interested and affected parties (stakeholders); informing and providing the stakeholders with sufficient background and technical information regarding the proposed development; creating opportunities and mechanisms whereby they can participate and raise their viewpoints (issues, comments and concerns) with regard to the proposed development; giving the stakeholders feedback on process findings and recommendations; and ensuring compliance to process requirements with regards to the environmental and related legislation. The public consultation was organised on 10 July 2014 at 10.30 am in the payas Ganga as common place for the local people. The public consultation held in the presence of Assistant Engineer and Junior Engineer of UJS. The details and outcome are given in **Appendix III.**

103. Stakeholder consultation and participation with various stakeholders is an integral part of the environmental and social impact assessment and also part of regulatory requirement of EIA Notification, 2006 and ADB requirements. The stake holders of the project include project affected communities (directly or indirectly affected) and institutional stake holders such as PCB, local bodies, Water Resource Department, Environmental Department, Mines and Geology Department, Forest Department, etc. Consultations at micro- and macro-level (e.g. District/State level institutional consultations) helped planners to integrate the short term and long terms requirements of the local, regional, state and national goals in to the planning process. The regional, state and national goals are generally set by the legislations and policies by controlling or limiting the activities in order to reduce and nullify the adverse impact generated by infrastructure projects.

104. The following methodologies were adopted for carrying out public consultation

[i] Local communities, Individuals affected, traders and local shopkeepers who are directly affected were given priority while conducting public consultation.
[ii] Walk-through informal group consultations along the proposed subprojects area
[iii] One to one meetings were generally held with a few members of local communities. These consultations sometimes focused on one or more specific issues in a given section (link) of the project corridor. Focus group consultations were conducted with a sample section of the community with a good representation from the affected communities. Such meetings usually provide substantial information about the community concerns.

105. During consultation the following general opinions/suggestions were noted: i) Most of the people were not happy with the existing water infrastructure post June 2013 disaster and they need improvement of the water supply scheme, ii) wanted early restoration of facility iii) minimum disturbance to the local people due to construction activity in the town, iv) minimum loss to the trees v) minimum disturbance to traffic

B. Future consultation and Disclosure

106. The public consultation and disclosure program will remain a continuous process throughout the subproject implementation and shall include the following

C. Consultation during Detailed Design

107. Focus-group discussions with affected persons and other stakeholders to hear their views and concerns, so that these can be addressed in subproject design wherever necessary. Regular updates on the environmental component of the subproject will be kept available at the PIU/PMU of UEAP.

108. FPIU/PMU will conduct information dissemination sessions at major habitations and solicit the help of the local community leaders/prominent citizens to encourage the participation of the people to discuss various environmental issues.

109. The FPIU/PMU, with assistance of DSC will conduct information dissemination sessions in the subproject area. During EMP implementation FPIU, DSC, and PMU shall organize public meetings and will apprise the communities about the progress on the implementation of EMP in the subproject works

D. Consultation during Construction

110. Public meetings with affected communities (if any) to discuss and plan work programs and allow issues to be raised and addressed once construction has started.

111. Smaller-scale meetings to discuss and plan construction work with local communities to reduce disturbance and other impacts, and provide a mechanism through which stakeholders can participate in subproject monitoring and evaluation.

E. Project Disclosure

112. A communications strategy is of vital importance in terms of accommodating traffic during laying of pipes. Local communities will be continuously consulted regarding location of construction camps, access and hauling routes and other likely disturbances

during construction. In case of road closure together with the proposed detours will be communicated via advertising, announcements, road signage, etc.

113. For the benefit of the community the IEE will be will be disclosed to the affected people and other stakeholders in a form and language(s) understandable to them at an accessible place in a timely manner and made available at: (i) PIU/PMU office; (ii) District Magistrate Office; and, (iii) DSC office. It will be ensured that the hard copies of IEE are kept at such places which are conveniently accessible to citizens as a means to disclose the document and at the same time creating wider public awareness. Electronic version of the IEE will be placed in the official website of the SDMA UEAP and the official website of ADB after approval of the IEE by ADB. The PIU will issue Notification on the locality-wise start date of implementation of the subproject. Copies of the IEE will be kept in the PMU/PIU office and will be distributed to any person willing to consult the IEE.

Public Disclosure

114. The IEE report will be disclosed in the English language at PMU, Jal Sansthan division office and will also be available in the website of ADB. The full reports will also be available to interested parties upon request from PMU.

VII. GRIEVANCE AND REDRESS MECHANISM

115. A joint social and environmental redress mechanism will be implemented under the project. Grievances and suggestions from local and affected people may come-up related to inappropriate implementation of the project and components of EMP. The expected range of grievances to be handled through this mechanism will encompass but not limited to the following: i) nuisance from noise, dust, and temporary blocking of access; ii) contamination of receiving water from runoff; iii) emissions from increase vehicular traffic and stationary sources like construction machineries; iv) conflict between local residents and migrant workers; v) ownership of vegetation for clearing; and vi) damage compensation. These issues will be addressed through acknowledgement, evaluation and corrective action and response approach. Grievances from public or stakeholders concerning the project and EMP implementation will be received by the concerned Executive Engineer of UEAP division. The Executive Engineer shall refer the application to Construction Supervision Consultants (DSC) who then assess the grievances/suggestions and if they are found to be genuine and acceptable, will be resolved at division level itself within 15 to 30 days from the date of receipt. In case, the issue is unable to be resolved, the matter will be forwarded to the PMU, UEAP (Head quarter). This mechanism is non-judicial in nature and does not preclude the affected people coursing their grievances to the courts. The corrective action will be started as per the action plan indicated to the stakeholder. The action taken and the outcome shall form a part of quarterly report to ADB.

VIII. ENVIRONMENTAL MANAGEMENT PLAN

A. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN (EMMP)

116. The Environmental Management and Monitoring Plan (EMMP) designed will guide the environmentally-sound construction of the subproject and ensure efficient lines of communication between the Design & Supervision Consultants (DSC) – also an Engineer for the project, Contractors, Field Project Implementation Unit (FPIU), and Project Management Unit (PMU). Uttarakhand Jal Sansthan is implementing agency (IA) and will implement the Project through its field PIU's. The EMMP identifies the three phases of development as: (i) Pre Construction (ii) Construction Phase; and (iii) Post Construction/Operational Phase.

117. The purpose of the EMMP is to ensure that the activities are undertaken in a responsible non-detrimental manner with the objectives of: (i) providing a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site; (ii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iii) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (iv) ensure that safety recommendations are complied with.

118. A copy of the EMMP must be kept on site during the construction period at all times. The EMMP will be made binding on all contractors operating on the site and will be included within the Contractual Clauses. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance. It shall be noted that the Supreme Court of India * mandates those responsible for environmental damage must pay the repair costs both to the environment and human health and the preventive measures to reduce or prevent further pollution and/or environmental damage. (The polluter pays principle).[7]

119. The Contractor is deemed not to have complied with the EMMP if:

(i) Within the boundaries of the site, and site extensions, there is evidence of contravention of clauses;
(ii) If environmental damage ensues due to negligence;
(iii) The contractor fails to comply with corrective or other instructions issued by the Engineer/PMU/FPIU within a specified time; and
(iv) The Contractor fails to respond adequately to complaints from the public.

Institutional Arrangements

120. The institutional arrangements specify the arrangements for the implementation of environmental provisions of the proposed subproject. The Executing Agency (EA), State Disaster Management Authority (SDMA) will work closely with the Implementing Agency (IA) Uttarakhand Jal Sansthan for effective implementation of environmental safeguards related requirements of the sub projects. The institutional arrangements and responsibilities are detailed below.

[7] *Writ petition no 657 of 1995. The Supreme Court, in its order dated Feb.4, 2005 that "The Polluter Pays Principle means that absolute liability of harm to the environment extends not only to compensate the victims of pollution, but also to the cost of restoring environmental degradation. Remediation of damaged environment is part of the process of sustainable development."*

121. The subproject will be implemented and monitored by Uttarakhand Jal Sansthan as Implementing agency and implemented through its Field PIU's supported by DSC (also working as Engineer) and overall management support shall be provided by PMU, UEAP.

122. The Safeguard Staff of UEAP SDMA (EA) in PMU & IA will monitor the implementation of environmental covenants with assistance of Engineer (DSC).

123. UEAP SDMA (EA) shall be responsible for ensuring compliance to environmental requirements of the ADB as well as central/state governments and reporting the same to ADB. A relevant portion of EMMP will be a part of contract with the civil works contractors engaged for execution of the works. The primary responsibility of implementation of EMMP is of the IA during pre-construction and operation and maintenance phases; and of the civil works contractor during the construction phase as defined in the EMMP. The responsibility of supervision of EMMP implementation is of the DSC; and it would guide the IA and the civil works contractors in this regard. , DSC with IA and EA, UEAP will act as monitoring agency as delegated in EMMP. All applicable statutory environmental clearances, consents, and/or permits (at national, state and local levels) as required for the implementation of the subproject would be obtained by the IA or by the civil works contractor in line with India's national/state/local laws and regulations, and in accordance with ADB's SPS 2009 requirements . Redressal of grievances shall be the responsibility of UEAP SDMA (EA). Apart from the mechanism for the grievances receiving and redressal at the level of EA, the provision shall be kept in the EMP of the subprojects wherein the contractor will depute one Environmental Safeguard Officer who shall be responsible for implementation of EMP, reporting and grievance redressal on day-to-day basis. The grievances/complaints received at the level of contractor shall be recorded on the Complaints Register and the same shall be forwarded to the DSC (Engineer of the Contract) within 48 hours along with the details of action taken to redress the grievance. The Team Leader of DSC shall immediately try to resolve the issues and forward the details to the FPIU / IA. If the action taken by Contractor and DSC is found to be inadequate, then necessary instructions shall be issued by the FPIU. IA for implementation of rectification measures.

UEAP, SDMA (PMU)

- Complies with all applicable legislation and is conversant with the requirements of the EMMP;
- Assesses all activities requiring special attention as specified and/or requested by the Engineer (DSC) and/or Safeguards Staff of UEAP SDMA for the duration of the Contract;
- May, on the recommendation of the EE DSC and/or Safeguards Staff of UEAP SDMA, through the DSC order the Contractor to suspend any or all works on site if the Contractor or his subcontractors/ suppliers fail to comply with the said contractual stipulations with respect to environment and EMMP.
- Act as overall monitoring agency.
- Addressing complaints and redressal of grievances.

UEAP, IA / FPIU

- Ensures along with Engineer (DSC) that EMMP and all necessary environmental stipulations are included in bidding documents and Contract documents with Contractor.

- Complies with all applicable legislations and is conversant with the requirements of the EMMP;
- Assesses all activities requiring special attention as specified and/or requested by the Engineer (DSC) and/or Safeguards Staff of UEAP PMU as Implementing agency for the duration of the Contract;
- Ensures that the Contractor conducts all activities in a manner that minimizes disturbance to directly affected residents and the public in general, as advised by the Engineer and/or Safeguards Staff of UEAP PMU & IA.
- May, on the recommendation of the EE DSC and/or Safeguards Staff of UEAPPMU & IA, through the DSC order the Contractor to suspend any or all works on site if the Contractor or his subcontractors/ suppliers fail to comply with the said contractual stipulations with respect to environment and EMMP.
- Act as supervising & monitoring agency as delegated in EMMP.
- Carries out public consultations, addresses complaints and responsible for redressal of grievances.

The Engineer (DSC)

- Guides EA, IA, FPIU and Contractors with respect to environmental regulations and associated requirements, and facilitates ensuring compliance with those;.
- Arranges information meetings for and consults with interested and affected parties about the impending construction activities;
- Maintains a register of complaints and queries by members of the public at the site office. This register is forwarded to the Project Manager of FPIU on weekly basis
- Enforces and monitors compliance the requirements of the EMMP on site;
- Assesses the Contractor's environmental performance in consultation with Environmental Expert
- Documents in conjunction with the Contractor, the state of the site prior to commencing construction activities.
- Documents state of implementation of EMMP and clearly delineate if any item of EMMP is pending partially or fully before issue of completion certificate of the work.

Environmental Expert of Engineer (DSC)

- Briefs the Contractor about the requirements of the Environmental Specification and/ or EMMP, as applicable;
- Facilitates statutory compliance related activities for the IA and Contractors;
- Advises the Engineer about the interpretation, implementation and enforcement of the Environmental Specification and other related environmental matters;
- Monitors and report on the performance of the contractor/project in terms of environmental compliance with the EMMP to the Engineer and UEAP, SDMA-PMU;
- Provides technical advice relating to environmental issues to the Engineer.
- Organise and ensure public consultation and information disclosure are done as per the EMMP and ADB requirements. Monitor complaints and grievances are handled as per the Grievance Redressal Mechanism and report the same as per the environmental reporting.
- Receives complaints/grievances from public, discuss Team Leader (TL) DSC, FPIU & IA and take steps for implementation of remedial measures in consultation with the TL (DSC), and reports to the Engineer (DSC) on the status in its each monthly progress report till satisfactory resolution.

The Contractor

- Appoints one full time suitably qualified and experienced Environmental Safeguard Officer for implementation of EMMP including Environment Health & Safety (EHS) measures, community liaisoning, reporting and grievance redressal on day to day basis.
- Complies with all applicable legislations, is conversant with the requirements of the EMMP, and briefs staff about the requirements of same;
- Ensures any sub-contractors/ suppliers who are utilized within the context of the contract comply with the environmental requirements of the EMMP. The Contractor will be held responsible for non-compliance on their behalf;
- Supplies method statements for all activities requiring special attention as specified and/or requested by the Engineer or Environmental Expert (of Engineer) during the duration of the Contract;
- Provides environmental awareness training to staff;
- Bears the costs of any damages/ compensation resulting from non-adherence to the EMMP or written site instructions;
- Conducts all activities in a manner that minimizes disturbance to directly affected residents and the public in general, and foreseeable impacts on the environment.
- Ensures that the Engineer is timely informed of any foreseeable activities that will require input from the Environmental Expert (of Engineer)
- Receives complaints/grievances from public, discuss with DSC, FPIU & IA and take steps for implementation of remedial measures in consultation with the Engineer (DSC), and reports to the Engineer (DSC) on the status in its each monthly report till satisfactory resolution.

124. The proposed sub-project will be implemented by the IA & FPIU, Uttarakhand Jal Sansthan**.** The FPIU will be responsible for supervision and monitoring of day-to-day implementation of subprojects including EMMP.

125. For monitoring of environmental parameters as outlined in the EMMP, appropriate monitoring agencies would be engaged by the contractor (cost has been included in each contract based on subproject specific monitoring plans) or by the IAs for the monitoring works not included in the civil works contracts (cost included in the budget given in table VIII-2).

B. Environment Management

126. All works undertaken towards protection of environmental resources as part of the EMMP and as part of good engineering practices while adhering to relevant specifications will be deemed to be incidental to works being carried out and no separate payment will be made unless otherwise specified explicitly. The costs towards environmental management as per EMMP unless otherwise provided as a separate head, will be deemed to be part of the bill of quantities (BOQ) of the project. The scope of works of the contractor towards the implementation of the environmental provisions shall be as follows:

- Abide by all existing Environmental regulations and requirements of the Government of Uttarakhand and Government of India, local level ULBs and Gram Sabha etc. during implementation
- Compliance with all mitigation measures and monitoring requirements set out in the EMMP.

- Submission of a method statement detailing how the subproject EMMP will be complied with. This shall include methods and schedules of monitoring.
- Monitoring of project environmental performance including performance indicators defined therein, and periodic submission of monitoring reports.
- Compliance with all measures required for construction activities in sensitive areas, in line with the regulatory requirements of these protected areas, and the guidelines set forth in the management plans for these areas.
- Compliance with all regulatory requirements associated with proximity of the sub-project to the International Borders based on assessment of Contractor in consultation with the Engineer DSC.
- Compliance of all safety rules and regulations applicable at work, and provision of adequate health and safety measures such as water, food, sanitation, personal protective equipment, workers insurance, and medical facilities besides all social and community related requirements as stipulated in EMMP.

127. The detailed provisions for specific environmental issues shall be as outlined in the EMMP table on impacts and mitigation measures. Key clauses are outlined in the following sections.

Quarrying

128. The contractor will identify and seek prior approval of the engineer for quarryingoperations. Quarrying will be carried only from locations approved by the Department of Geology & Mining and State Pollution Control Board and no new quarries will be opened for the purposes of the project. Any deviation from the provisions will be immediately notified and approval of the engineer is to be sought.

129. The Contractor shall maintain all stockpiles, and spoil disposal areas so as to assure the stability and safety of the works and that any adjacent feature like houses and community assets especially along hill slopes are not endangered, and to assure free and efficient natural and artificial drainage, and to prevent erosion. Stockpiling of materials (, fill material, gravel, aggregates, and other construction materials) shall not be allowed during rainy season unless covered by a suitable material. Storage on private property will be allowed if written permission is obtained from the owner or authorized lessee.

130. Quarries shall be sited, worked, and restored in accordance with the specifications and as per the closure plan (approved by Engineer). Spoils shall be disposed of at approved disposal sites prepared, filled, and restored in accordance with the related specification requirements.

Debris Disposal

131. Dismantling of existing structures: Debris Disposal shall be maximum utilized and disposed as per norms after consultation with DSC/FPIU/PMU Safeguard Specialist. Due care shall be taken that any material falling under hazardous waste category is

disposed in accordance with Hazardous Wastes (Management, Handling and Transboundary movement) Rules, 2008 and amendments till date & applicable norms.

Precautions for protection of Environmental Measures

132. The Contractor shall ensure that construction activities do not result in any contamination of land, air or water by polluting substances or cause noise generated by the activities. For cleaning activities and operation of equipment, the Contractor will utilize such practical methods and devices as are reasonably available to control, prevent and otherwise minimize air/noise pollution.

133. Unless otherwise provided in the specifications, the Contractor shall ensure that no trees or shrubs or other vegetation are felled or harmed except those required to be cleared for execution of the works for which all statutory permissions have been obtained. The Contractor shall protect trees and vegetation from damage to the satisfaction of the Engineer. Preliminary estimation indicates that 19 nos. of trees need to be fell and contractor will planted atleast 38 trees as per compensatory afforestation rule.

Air, Water, Noise Pollution and Soil Contamination

134. All works will be carried out without unreasonable noise and air, water and soil pollution. Subject and without prejudice to any other provision of the Contract and the law of the land and its obligation as applicable, the Contractor will take all precautions outlined in the EMMP to avoid the air, water, soil and noise pollution.

135. The Contractor shall monitor the environmental parameters periodically as specified in the monitoring plan and report to the Engineer.

136. The Contractor shall reduce the dust emission due to construction activities by regular water sprinkling in the affected areas.

137. All the construction equipment and vehicles shall have Pollution under Control (PUC) Certificate to ensure that no air pollution is caused due to operation of their equipment and vehicles.

138. All the construction equipment and vehicles should remain all time in good conditions up to satisfaction of site engineers.

139. The Contractor shall indemnify and keep indemnified the Employer from and against any liability for damages on account of noise or other disturbance created while carrying out the work, and from and against all claims, demands, proceedings, damages, costs, charges, and expenses, whatsoever, in regard or in relation to such liability.

Occupational & Community Health and Safety During Construction

140. The Contractor shall, in accordance with the safety and health provisions specified in the EMMP, provide workers with a safe and healthy working environment, in the work areas, through application of preventive and protective measures consistent with international good practices, as reflected in internationally recognized standards. The contractors, engineer, IAs and the EA will take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work by-

- Providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances;
- Providing appropriate equipment to minimize risks and requiring and enforcing its use;
- Training workers and other staff; and providing them with appropriate incentives to use and comply with health and safety procedures and protective equipment;
- Documenting and reporting occupational accidents, diseases, and incidents;
- Having emergency prevention, preparedness, and response arrangements in place.
- Provide first aid facilities in all the work sites and workers camp and having qualified first aider to give first aid at the time of any accident. Contractor shall also organize periodic visits by a qualified registered medical practitioner to the site and workers camp. Contact information of Doctor, availability & location of first aid box shall be displayed in appropriate language both at work site and workers camp.
- Contractor should provide safe drinking water, clean eating and resting areas, separate toilets for male and female work force and sufficient amenities at work site and workers camps as per prevalent Labor law and EMMP. Contractor will ensure proper sanitation and would provide soak pits and septic tanks for disposal of waste water and sewage.
- Contractor should have prepared emergency response plan (to be approved by Engineer) with full details and methods of emergency response during any accident and shall have and display the emergency contact numbers at site.
- Contractor should follow all the applicable rules and regulations for workers health and safety.

141. The Contractor will also ensure that the interests of the community are disturbed to the minimum as envisaged in the EMMP. Provide barricade, signage and safety information in and around the construction site and also to prevent local people entering into the construction site.

Post Construction Clearance

142. On completion of work, wherever applicable, the Contractor shall clear away and remove from the sites all constructional plant, surplus materials, rubbish, scaffoldings, and temporary works of every kind and leave the whole of the sites and works in a clean condition as per agreed redevelopment plan to the satisfaction of the Engineer.

143. Construction camp sites and any other sites temporarily occupied during construction shall be cleared as specified in the contract and handed over to the Owner. It will be ensured by the contractor that the site handed over is in line with the conditions of temporary acquisition signed by both parties. Contractor would obtain and furnish (to FPIU) a certificate to this effect from the owner.

C. Environmental Monitoring Plan

144. To ensure the effective implementation of mitigation measures and Environmental Management Plan during construction and operation phase of the sub-project, it is

essential that an effective Environmental Monitoring Plan be followed as given in Table below.

145. Monitoring is an essential component for sustainability of any developmental project. It is an integral part of any environmental assessment process. The monitoring program consists of performance indicators, reporting formats and necessary budgetary provision. The contractors monitoring methods and parameters should be in accordance with the norms prescribed by the Uttarakhand Environment Protection and Pollution Control Board (UEPPCB) & CPCB which ever has stringent standards for air, water, soil and noise. Indicators and Targets for Environmental Performance are provided in the table 16 in Section G of this EMMP. The frequency of sampling and selection of sampling sites are sub-project specific.

146. The monitoring will be carried out by the contractor through approved agency accredited by National Accreditation Board for Testing and Calibration Laboratories and will be supervised by the Environmental Expert of the Design & Supervision Consultant. The monitoring plan is outlined in Table 15 below.

Table 15: Environment Monitoring Plan

Indicators	Parameters to be Monitored	Frequency	Responsibility
Pre- Construction Stage			
Legislation, permits and Agreements	Permissions,/ NoCs/Consents other statutory requirement	Once in Pre-Construction Stage	Contractor, DSC, IA & EA.
Environmental Baseline Data Generation	Ambient Air Quality, Noise level, Water Quality & Soil characteristics as per parameters outlined in EMMP.	Once in Pre-Construction Stage	Contractor
Debris disposal	Safe disposal of construction wastes including bituminous wastes	Random checks	Contractor
Construction Stage			
Legislation, permits and Agreements	Permissions,/ NoCs/Consents other statutory requirement	Continuous	Contractor, DSC, IA & EA.
Dust suppression	No. of tankers for water sprinkling, Timing of sprinkling, Location of sprinkling (log books to be maintained)	Random checks	Contractor
Ambient air quality	PM_{10}, $PM_{2.5}$), SO_2, NO_x, HC	Once in a Quarter where work is in progress and near sensitive receptors; and at the construction camp sites (except monsoon) for the entire construction period	Contractor, to be monitored through approved Monitoring Agency
Ambient noise	Equivalent Day & Night Time Noise Levels	Once in a quarter where work is in progress and near	Contractor, to be monitored

Indicators	Parameters to be Monitored	Frequency	Responsibility
		sensitive receptors during construction stage	through approved Monitoring Agency
Water Quality	TDS, TSS, pH, Hardness, BOD, Faecal Coli form	Once in a quarter where work is in progress and near sensitive receptors during construction stage	Contractor, to be monitored through approved Monitoring Agency
Soil	Available Nitrogen, Phosphorus, Carbon, heavy metals (including Lead) and Pesticides	Once in a quarter where work is in progress and near sensitive receptors during construction stage	Contractor, to be monitored through approved Monitoring Agency
Heritage Protection, if needed	Visual Inspection of works, compliance with ASI regulations and norms	Continuous	DSC/ASI/FPIU
Occupation Health and Safety	Usage of PPE on site, adequacy of equipment. Testing of drinking water for compliance to standards specified in IS:10500.	Continuous and quarterly for drinking water	Contractor
Establishing Medical facilities	Access to health facilities for the construction workers	Continuous	Contractor
Accident record	No. of fatal accidents at work site, No. of injuries, No. of disabilities	Continuous	Contractor
Post construction clearance of site	Physical field verification and Satisfaction certificate from owner: Whether temporary locations for workers camp, site office, batching plant and other construction locations are restored to pre-project conditions as per approved closure plan	Post construction	Contractor
Operation & Maintenance Stage			
Water quality	All parameters as per UEPPCB & CPCB standards	Once in year during operation stage	PMU, SDMA
Disposal of Solid Waste	Proper disposal of Solid Waste (domestic) generated shall be ensured in accordance with the prevalent norms		

Budget covered in subsequent cost Table, however, would be finalized based on subproject specific requirements. Contractor will obtain a copy of approved IEE and keep available at construction site and site office(s) for proper implementation of IEE & EMMP.

C. Environmental Budget

147. As part of good engineering practices in the project, there have been several measures as erosion prevention, rehabilitation of borrow areas, safety, signage, provision of temporary drains, etc., the costs for which will be included in the design costs (site development cost) of specific subprojects. Therefore, these items of costs have not

been included in the IEE budget. Only those items not covered under budgets for construction are included in the IEE budget.

148. The Contractor's cost for site establishment, preliminary, construction, and defect liability activities will be incorporated into the contract agreements, which will be binding on him for implementation and Uttarakhand Jal Sansthan as Implementing Agency and DSC to ensure the compliance. The air, soil, water quality, and noise level monitoring during construction and defect liability phases will be conducted by the contractor for which provision has been kept in Environmental budget of EMMP.

149. These are small construction projects, therefore, it is not expected to cause much significant air, water, soil and noise pollution. The main EMMP cost will arise from monitoring of environmental parameters (air, soil, water and noise).

150. The costs of water sprinkling for dust suppression and providing personal protective equipment to construction workers shall be borne by contractor as part of conditions of contract. In addition the sources of funds for Mitigation measures during construction stage including monitoring during construction stage are also to be borne by the contractor. These are deemed to be included as part of the contract price amount quoted by the contractor for the works. The costs for generation of baseline data and monitoring shall be borne by the contractor. The locations for baseline data generation & monitoring shall be identified during IEE preparation. The baseline data will be generated prior to commencing with civil works. The costs of components for monitoring during operation and maintenance stage and the capacity building costs are to be funded by the PMU. The EMMP cost is given in the Table 14 below.

151. Most of the mitigation measures require the contractors to adopt good site practice, which should be part of their normal procedures already, so there are unlikely to be major costs associated with this compliance. Only those items not covered under budget for construction are included in the IEE budget. The IEE costs include mitigation, monitoring and capacity building costs. The summary budget for the environmental management costs for the subproject based on construction period stipulated in the bidding document is presented in Table below:

Table 16 : Environmental Management & Monitoring Costs

Sl. No.	Particulars	Stages	Unit	Total No.	Rate (INR)	Cost (INR) *	Source of fund
A.	Legislation, permits and Agreements	Consent to Establish and Consent to Operate for plants and machinery of the contractor					The cost for clearances, permits and consents required by IA & Contractors shall be borne by them respectively.
B.	Public consultations and information disclosure	Pre Construction phase Construction		Lump sum	5,00,000	5,00,000	Implementing agency

Sl. No.	Particulars	Stages	Unit	Total No.	Rate (INR)	Cost (INR) *	Source of fund
		phases					
	a. Environmental Baseline Data Generation						
1.	Ambient Air Quality monitoring	Pre-Construction	Per Sample	9	10000	90,000	
2.	Noise Quality monitoring			9	2,000	18,000	
3.	Water Quality monitoring			4	9,000	36,000	Contractors cost
4.	Soil			9	8000	72,000	
D.	**Environmental Monitoring**						
1	Air quality	Construction	Per sample	(5 No of Location X 3 seasons in year X 1 sample per location)	10,000	150,000	Contractors cost
2	Water quality		Per sample	(4 No of Location X 3 seasons in year 1 sample per location)	9000	108,000	Contractors cost
3	Noise Levels		Per location	(5 No of Location X 3 seasons in year X 1 sample per location)	2000	30,000	
4	Soil			4 No of Location X 3 seasons in year X 1 sample per	8000	96,000	Contractors cost

Sl. No.	Particulars	Stages	Unit	Total No.	Rate (INR)	Cost (INR) *	Source of fund
				location)			
5.	Dust Suppression at subproject sites	construction and defect liability phases	lump sum		lump sum	500,000	Contractors cost
6	Ambient Air Quality	Operation/ Defect Liability Period	Per Sample	(3 No of Location X 3 seasons in year X 1 sample per location)	10000	90,000	Implementing Agencies cost/ Contractors cost
7	Water quality		Per year	(2 Nos. of Location X 3 seasons in year 1 sample per location)	9000	54,000	Implementing Agencies cost/ Contractors cost
8	Ambient Noise Quality		Per Sample	(3 No of Location X 3 seasons in year X 1 sample per location)	2000	18,000	Implementing Agencies cost/ Contractors cost
E.	**Capacity Building (Includes cost estimates for entire sub project area not included in the package costs)**						
1	Capacity Building expenses 2 sessions	EMP Training at Site Implementation of EMMP for field PIUs and Engineer			50,000	1,00,000	PMU/DSC
					Total INR	18,62,000	

D. Environmental Monitoring and Reporting

152. The PMU will monitor and measure the progress of EMMP implementation. Safeguards Staffs of IA / FPIU will undertake site inspections and document review to verify compliance with the EMMP and progress toward the final outcome. Environment and Safety Officer of the Contractor will submit the monitoring of EMMP to the DSC/Engineer on day to day basis. DSC / Engineer will submit monthly EMMP monitoring and implementation reports to FPIU, who will take follow-up actions, if necessary. FPIU/IA

will submit quarterly monitoring and implementation reports to PMU. The PMU will submit semi-annual monitoring reports to ADB based on reporting of FPIU/ IA and its safeguards staff assessment of the implementation performance and its verification by the PMU safeguards specialist. PMU will also take corrective actions as required.

153. Monitoring reports will be posted in a location accessible to the public.

154. ADB will review project performance against the EA's commitments as agreed in the legal documents. The extent of ADB's monitoring and supervision activities will be commensurate with the Project's risks and impacts. Implementation of social and environmental safeguards related requirements will be integrated into the project performance management system. ADB will monitor projects on an ongoing basis until a project completion report is issued.

Table 17: Standardized EMMP to guide the contractor in mitigating environmental impacts

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
1.	**Site Establishment and Preliminary Activities Impacts**				
1.1	Legislation, Permits and Agreements	In all instances, EA, IA contractors and consultants must remain in compliance with relevant environmental legislation of India at the national, state and local levels.	1. Permissions,/ NoCs/Consent requirement– IA/PMU 2. Permissions / NoCs/Consents requirement for equipment/machineries and material sourced from licensed/ approved quarries etc – Contractor	PMU	IA, Contractor
		Acquisition of 0.36ha forest land and tree felling permission	NOC and land acquisition from forest dept.	PMU	IA
		Proof of compliance to statutory requirements must be forwarded by the facility owner and/or contractor to PMU/FPIU in relation to hot mixing, stone crushers, diesel generators etc	ESO-Contractor, Engineer, & Environmental Expert of DSC (EE)	PMU	IA, Contractor
		A copy of the EMP must be kept on site during the construction period	ESO-Contractor, Engineer & EE	FPIU, IA & PMU	IA, Contractor
1.2	Education of site staff on general and Environmental Conduct[8]	Ensure that all site personnel have a basic level of environmental awareness training	ESO-Contractor and EE EE to deliver	IA & PMU	Contractor, IA,

[8] These points need to be made clear to all staff on site before the work commences.

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with their task	Safety and environment officer of Contractor and EE	FPIU, IA & PMU	IA, Contractor
		No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the Contractor	Contractor and EE	FPIU, IA & PMU	IA, Contractor
		All employees must undergo safety training and wear the necessary protective clothing /equipment.	Contractor and EE	IA & PMU	IA, Contractor
		A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: • No alcohol / drugs to be present on site; • Measures for abatement of noise due to construction related activities and conduct of work force. • Construction staff are to make use of the	Contractor and EE	IA & PMU	IA, Contractor

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		facilities provided for them, as opposed to ad-hoc alternatives (e.g. use of firewood for cooking, the use of surroundings as a toilet facility are forbidden) • Trespassing on private / commercial properties adjoining the site is forbidden • Other than pre approved security staff, no workers shall be permitted to live on the construction site. No worker may be forced to do work that is potentially dangerous or for what he / she is not trained to do.			
1.3	Social Impacts[9]	Open liaison channels shall be established between the Site owner, operator, the contractors and interested and affected parties such that any queries, complaints or suggestions pertaining to environmental management aspects can	Environment and Safety officer of Contractor with the Engineer, EE & FPIU	IA & PMU	Contractor

[9] It is important to take notice of the needs and wishes of those living or working adjacent to the site. Failure to do so can cause disruption to work.

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		be dealt with quickly and by the appropriate person(s).			
		A communications strategy is of vital importance in terms of accommodating traffic during laying of pipes. The road closure together with the proposed detour needs to be communicated via advertising, pamphlets, radio broadcasts, road signage, etc	Contractor with the Engineer, EE & FPIU	IA & PMU	Contractor
		Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.	Contractor with the Engineer, EE & FPIU	IA & PMU	Contractor
		Storage facilities, elevated tanks and other temporary structures on site shall be located such that they have as little visual impact on local residents as possible.	Engineer and EE	IA & PMU	
		In areas where the visual environment is particularly important (e.g. along commercial/ tourism routes) or privacy concerns for surrounding buildings exist, the site may require screening. This could being the form of shade cloth ,	Engineer and EE	IA & PMU	Contractor

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		temporary walls, or other suitable materials prior to the beginning of construction.			
		Special attention shall be given to the screening of highly reflective materials on site.	EE	IA & PMU	Contractor
1.4	Lack of sufficient planning to assure long term sustainability of the improvements and ensure protection of the assets created and the architectural/archaeological character of the surroundings	Design will include provisions for ensuring effective maintenance and protection of the assets created so as to ensure the long term sustainability.	Contractor, Engineer, EE and FPIU	IA/ PMU	IA, Contractor
2.	**Design Impacts and Pre-construction Impacts**				
2.1	Layout of components and its location to avoid impacts on the aesthetics, sensitive environmental areas / attributes of the site	The project components siting will avoid impacts on the aesthetics of the site, ensure minimal impacts and in compliance with statutory and regulatory requirements. The contractor, FPIU/ IA and DSC will identify any direct or indirect intervention of primary or secondary activity before establishment of any project components on the ground.	Engineer, EE and FPIU	IA & PMU	IA & PMU

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
2.2	Selection of materials and construction technologies, if not carefully chosen, will adversely impact the aesthetic appeal of the destinations	Selection of materials will be according to specification and from approved sources Material selection would be done keeping in view that no asbestos (except as allowed), and CFC is used. Contractors shall prepare a source statement indicating the sources of all materials (including topsoil, sands, natural gravels, crushed stone, asphalt, clay liners etc), and submit these to the Engineer for approval prior to commencement of any work Where materials are borrowed (mined), proof must be provided of authorization to utilize these materials from the landowner/material rights owner and the Department of Geology and Mining Procurement of all material according to the material specification of the contract document and sourced from licensed and approved	Engineer, EE and FPIU	IA & PMU	IA & PMU

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		sources. A signed document from the supplier of natural materials shall be obtained confirming that they have been obtained in a sustainable manner and in compliance with relevant legislation			
2.3	Socio cultural resources- Ground disturbance can uncover and damage archaeological and historical remains`	There is not such location is anticipated on the project site. In case of chance of finding such location, Consult Archaeological Survey of India (ASI) and/or concerned dept. of Uttarakhand Govt. as applicable to obtain an expert assessment of the archaeological potential of the site; Consider alternatives if the site is found to be of medium or high risk; Develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognised and measures are taken to ensure they are protected and conserved.	Engineer, EE and FPIU	Contractor, IA & PMU	IA, Contractor
2.4	Integration of energy efficiency and energy conservation programs in design of sub-	The detailed designs for the sub-project components shall ensure	Engineer, EE and FPIU	IA & PMU	IA & Contractor

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
	project components	that environmental sustainability principles, including energy efficiency, resource recycling, waste minimization, rainwater harvesting etc.			
2.5	Site clearance activities, including delineation of construction areas	Any removal of vegetation or tree felling shall be done after taking statutory permissions if required. All works shall be carried out such that the damage or disruption of flora other than those identified for cutting is minimum. Only ground cover/shrubs that impinge directly on the permanent works or necessary temporary works shall be removed with prior approval from the Environmental Expert of DSC All areas used for temporary construction operations will be subject to complete restoration to their former condition with appropriate rehabilitation procedures.as per the rehabilitation plan prepared by the contractor and approved	Contractor,	Engineer, EE and FPIU	Contractor

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		by the EE of DSC.			
2.6	Blockage of access in residential area, commercial area and sensitive location like school, college, hospitals and court	Contractor will identify such location in the preconstruction stage and prepare plan approved by DSC to minimize inconvenience to the people.	Contractor	Engineer, EE and FPIU	Contractor
2.7	Slop protection near reservoir and intake well	Retaining wall will constructed near reservoir and intake site	Contractor	Engineer, EE and FPIU	The cost and specification is part the bill of quantity of the contract.
3	**Construction Impacts**				
3.1	Construction Camps - Location, Selection, Design and Layout	Siting of the construction camps, labour camp, stockpiles shall be as per the guidelines of UEPPCB, ULB, village panchayat and any other applicable guideline to the local site. The contractor will assess the impact of the construction camp and should be acceptable to the FPIU/ IA/PMU. below and details of layout to be approved by DSC. Construction camps shall not be proposed within 500m from the sensitive receptors, nearest	Contractor with the Engineer and EE	FPIU, IA & PMU	IA, Contractor

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		settlements to avoid conflicts and stress over the infrastructure facilities with the local community. Location for stockyards for construction materials shall be identified at least 300m away from watercourses. Construction camps will be located away from settlements and drainage from and through the camps will not endanger any domestic or public water supply. Construction camps including sanitation facilities must be adequately drained. Sewage management though septic tanks and solid waste management though local ULB system or other alternate measures.			
3.2	Drinking water availability	Sufficient supply of potable water to be provided and maintained as per the standards, requirements, test methods and sampling procedure according to IS:10500. If the drinking water is obtained from an	Contractor	Engineer and EE	Contractor

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		intermittent public water supply then storage tanks will be provided. The cleanliness of the storage tanks will be ensured and all measures to be taken to avoid any water contamination.			
3.3	Waste disposal	Pre-identified disposal location (identified by Contractor in compliance to relevant regulation and approved by EE-DSC) shall be part of Comprehensive Waste Disposal Plan Solid Waste Management Plan to be prepared by the Contractor in consultation and with approval of Environmental Specialist of DSC. The Environmental Specialist of DSC shall approve these disposal sites after conducting a joint inspection on the site with the Contractor. Wherever, possible Solid waste management shall be through local ULB system or other alternate measures. Contractor shall ensure that waste shall not be disposed off near the	Contractor with Engineer	FPIU, IA & PMU	Contractor

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		water course or agricultural land, Orchards and Natural Habitats like Grasslands.			
3.4	Stockpiling of construction materials	Stockpiling of construction materials and excavated earth or silt in case of construction of river bed filtration does not impact obstruct the drainage and Stockpiles will be covered to protect from dust and erosion.	Contractor with Engineer	FPIU, IA & PMU	Contractor
3.5	Access to Site	Contractors shall ensure that all side and mitre drains and scour check walls on access and haul roads are functioning properly and are well maintained. Contractors shall ensure that access roads are maintained in good condition by attending to potholes, corrugations and storm water damage as soon as these develop. If necessary, staff must be employed to clean surfaced roads adjacent to construction sites where materials have been spilt. Unnecessary compaction of soils by heavy vehicles	Contractor with Engineer	FPIU, IA & PMU	Contractor

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		must be avoided; construction vehicles must be restricted to demarcated access, haulage routes and turning areas. Cognizance of vehicle weight / dimensions must be taken when using access constructed out of certain materials. e.g. paved surfaces / cobbled entranceways.			
3.6	Quarry Operations	Contractor shall finalize the quarry for procurement of construction materials after assessment of the availability of sufficient quantity of materials, quality and other logistic arrangements. The Contractor shall obtain materials from approved quarries only after consent of the Department of Mines and Geology and District Administration. Adequate safety precautions will be ensured during transportation of quarry material from quarries to the construction site.	Contractor with Engineer	FPIU, IA & PMU	Contractor

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		Vehicles transporting the material will be covered to prevent spillage.			
3.7	Arrangement for Construction Water	The contractor shall use ground/surface water as a source of water for the construction with the written consent from the concerned Department. To avoid disruption/ disturbance to other water users, the Contractor shall extract water from fixed locations and consult DSC & line agencies before finalizing the locations. The Contractor shall provide a list of locations and type of sources from where water for construction shall be extracted. The Contractor shall need to comply with the requirements of the State Ground Water Department for the extraction and seek their approval for doing so and submit copies of the permission to DSC.	Contractor with Engineer	FPIU, IA & PMU	Contractor
3.8	Soil/land Erosion	Slope protection measures will be undertaken as per design	Contractor with Engineer	FPIU, IA & PMU	Contractor

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		to control soil erosion. The Contractor shall not in any way modify nor damage the banks or bed of streams, rivers, other open water bodies and drainage lines adjacent to or within the designated area Earth, stone and rubble is to be properly disposed of so as not to obstruct natural water pathways over the site. i.e.: these materials must not be placed in storm water channels, drainage lines or rivers. There shall be a periodic checking of the site's drainage system by DSC, FPIU/IA and PMU to ensure that the water flow is unobstructed.			
3.9	Water Pollution from Construction Wastes	The Contractor shall take all precautionary measures to prevent entering of wastewater into streams, water bodies or the irrigation system during construction. Contractor shall not wash his vehicles in river/stream water and shall not enter riverbed nearby the water resource area for that purpose.	Contractor with Engineer	Engineer, FPIU & PMU	Contractor

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		Mixing / decanting of all chemicals and hazardous substances must take place either on a tray or on an impermeable surface. Waste from these shall then be disposed of to a suitable waste site in accordance with Hazardous Wastes (Management, Handling and Transboundary movement) Rules, 2008 and amendments till date and applicable norms Site staff shall not be permitted to use any stream, river, other open water body or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing or for any construction or related activities. Municipal water (or another source approved by the Engineer) shall instead be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, concrete mixing, compacting etc.			
3.10	Water Pollution from Fuel and Lubricants	The Contractor shall ensure that all construction vehicle	Contractor	EE of DSC, Engineer, FPIU & PMU	Contractor

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		parking locations, fuel/ lubricants storage sites, vehicle, machinery and equipment maintenance and refueling sites shall be located at least 300 m away from rivers/streams and irrigation canal/ponds if any Contractor shall ensure that all vehicle/machinery and equipment operation, maintenance and refueling shall be carried out in such a manner that spillage of fuels and lubricants does not contaminate the ground. Wastewater from vehicle parking, fuel storage areas, workshops, wash down and refueling areas shall be collected and separated through an oil interceptor before discharging it on land or into other treatment system as per specified standards and UEPPCB and ULB norms if any.			
3.11	Soil Pollution due to fuel and lubricants, construction waste	The fuel storage and vehicle cleaning area will be stationed such that spillage of fuels and lubricants does not contaminate the ground.	Contractor	Engineer, FPIU & PMU	Contractor

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		All pollution parameters will be monitored as per monitoring plan. Wastewater from vehicle parking, fuel storage areas, workshops, wash down and refueling areas shall be collected and separated through an oil interceptor before discharging it on land or into other treatment system			
3.12	Generation of dust	The contractor will take every precaution to reduce the levels of dust at construction site. Regular sprinkling of water and Stockpiles of soil will be kept covered in such a manner to minimize dust generation	Contractor	Engineer, FPIU & PMU	Contractor
3.13	Emission from Construction Vehicles, Equipment and Machinery	All vehicles, equipment and machinery used for construction shall confirm to the relevant Bureau of India Standard (BIS) norms. The discharge standards promulgated under the Environment Protection Act, 1986 shall be strictly adhered to. The use of silent/quiet equipment compliant with India ambient noise	Contractor	Engineer, FPIU & PMU	Contractor

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		standards and standards specified for manufacturers shall be encouraged in the sub Project. The Contractor shall maintain a record of PUC for all vehicles and machinery used during the contract period which shall be produced for verification whenever required.			
3.14	Noise Pollution	The Contractor shall confirm that all Construction equipment used in construction shall strictly conform to the MoEF/CPCB noise standards and all Vehicles and equipment used in construction shall be fitted with exhaust silencers. At the construction sites noisy construction work such as crushing, operation of DG sets, use of high noise generation equipment shall be stopped during the night time between 10.00 pm to 6.00 am. Noise limits for construction equipment	Contractor with Engineer	EE, FPIU & PMU	Contractor

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		used in this project will be in conformity to the BIS/SPCB/CPCB standards Regular monitoring of ambient noise levels to ensure compliance to Uttarakhand Environment Protection & Pollution Control Board standards.			
3.15	Material Handling at Site	Workers Employed on mixing cement, lime mortars, concrete etc., will be provided with protective footwear and protective masks and goggles. Workers, who are engaged in welding works, will be provided with welder's protective eye-shields. Workers engaged in stone breaking activities will be provided with protective goggles, masks, and clothing. Stockpiles shall not be situated such that they obstruct natural water pathways. Stockpiles shall not exceed 2m in height unless otherwise	Contractor	Engineer, FPIU & PMU	Contractor

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		permitted by the Engineer. If stockpiles are exposed to windy conditions or heavy rain, they shall be covered either by vegetation or cloth, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases. All concrete mixing must take place on a designated, impermeable surface The use of any toxic chemical will be strictly in accordance with the manufacturer's instructions and applicable regulations. The Engineer will be given at least 6 working days notice of the proposed use of any chemical. A register of all toxic chemicals delivered to the site will be kept and maintained up to date by the contractor.			
3.16	Damage, and disturbance to other	Confirm location of infrastructure. Finalize	Contractor	Engineer, FPIU & PMU	Contractor

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
	infrastructure in the construction site	alignment in coordination with agencies like Uttarakhand Power Corporation Limited, Bharat Sanchar Nigam Limited, etc. Ensure prior permission of respective agency Realign pipelines, if required and subsequently revise IEE Provide public information in case of service disruptions			
3.17	Disposal of Construction Waste / Debris / Cut Material	The Contractor shall confirm that Safe disposal of the construction waste will be ensured in the pre-identified disposal locations. In no case, any construction waste will be disposed around the project site indiscriminately.	Contractor	Engineer, FPIU & PMU	Contractor
3.18	Disruption / cessation of existing water supply systems due to construction activity.	Care be taken during improvement of existing water supply systems, so that disruption in existing water supply would not occur. Tentative schedule of closure should be known to affected people prior to cessation of water supply. In case disruption of water supply exceeds the intimated schedule, arrangement for supply of	Contractor with Engineer and FPIU	EE, IA and PMU	IA, Contractor

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		potable water should be made.			
3.19	Safety Measures During Construction	Personal Protective Equipment for workers on the project and adequate safety measures for workers during handling of materials at site will be taken up. The contractor has to comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress. The contractor has to comply with all regulations for the safety of workers. Precaution will be taken to prevent danger of the workers from fire, etc. First aid treatment will be made available for all injuries likely to be sustained during the course of work. Contractor shall also organize periodic visits by a qualified registered medical practitioner to the site and workers camp. Contact information of Doctor, availability & location of first aid box	Contractor	Engineer, FPIU & PMU	Contractor

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		shall be displayed in appropriate language both at work site and workers camp. The Contractor will conform to all anti-malaria instructions given to him by the Engineer. The Contractor will also ensure that the interests of the community are preferably not disturbed, and if unavoidable then disturbed to the minimum. Provide traffic management personnel, barricade, appropriate signage and safety information in and around the construction site and prevent local people entering into the construction site.			
3.20	Clearing of Construction of Camps and Restoration	Contractor to prepare site restoration plans for approval by the Engineer. The plan is to be implemented by the contractor prior to demobilization. On completion of the works, all temporary structures will be cleared away, all rubbish burnt, excreta or other disposal pits or trenches filled in	Contractor	Engineer, FPIU & PMU	Contractor

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		and effectively sealed off and the site left clean and tidy, at the Contractor's expense, to the entire satisfaction of the Engineer and facility owner.			
3.21	Risk of archaeological chance finds	Strictly follow the protocol for chance finds in any excavation work; Request FPIU/DSC or any authorized person with archaeological field training to observe excavation; Stop work immediately to allow further investigation if any finds are suspected; and Inform FPIU/DSC, and take any action they require ensuring its removal or protection in situ.	Contractor	Engineer, FPIU & PMU	Contractor
3.22	Conflict with locals	Contractor shall ensure that mostly the local labourers are employed and migratory laborer shall be employed only in case of unavoidable circumstances.	Contractor	Engineer, FPIU & PMU	Contractor
3.23	Environment Safeguard Officer	Contractor shall appoint one full-time suitably qualified and experienced Environment and Safety Officer who shall be responsible for assisting contractor in	Contractor	Engineer, FPIU & PMU	Contractor

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		implementation of EMP, community liaisoning, consultations with interested/affected parties, reporting and grievance redressal on day-to-day basis. This environment and safety officer will be at site till all works related to the project including demobilization are completed.			
4	**Operation and Maintenance impacts**				
4.1	Environmental Conditions	The periodic monitoring of the ambient air quality, noise level, water (both ground, surface water) quality and soil, in the subproject area as suggested in pollution monitoring plan through an approved monitoring agency.	Pollution Monitoring Agency appointed by IA	SDMA, PMU	IA-UJS
4.2	Increased Pollution due to the better water supply.	The subproject involves renovation and rehabilitation of existing system, augmentation of water supply is envisaged for 10 years project population and to fulfill the deficit of water supply to user as per 135 lpcd. Subproject does not envisage improvement in distribution system to end users as such very little	IA, EA and Jal Sansthan	SDMA PMU & GoUK	IA -UJS

	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		increase is pollution load is anticipated. Sewage generated will be handled by the prevalent existing sewage management system of the town.			
4.3	Algal Growth in Reservoir	Proper and regular cleaning of reservoir & provision of bleaching shall be ensured. Water will be stored in Reservoir and chlorination will be done in the reservoir.	Uttarakhand Jal Sansthan / IA	SDMA PMU & GoUK	IA -UJS
4.4	Water Quality	Chlorine should be added in sufficient quantity so that residual chlorine within permissible limit is available in pipeline.	Uttarakhand Jal Sansthan / IA	SDMA PMU & GoUK	IA-UJS

ESO = Environment and safety officer of contractor , EE= Environmental Expert of Engineer (DSC), DSC= Design & Supervision Consultants, IA= Implementing Agency, EA= Executing Agency, FPIU= Field Project Implementation Unit.

E. PERFORMANCE INDICATOR

155. The performance indicator of implementation of environmental management and monitoring plan has been provided in below table.

Table 18: Performance Indicators of EMMP

Sl.No	Performance Indicators	Target	Achievement in Semi-annually and annually
1.	Budget	Environmental Budget (EMMP Budget)	Expenditure till date
Performance Indicators of Monitoring Plan			
2.	Ambient Air Quality	Total Number of samples as per Environmental Monitoring Plan	Total Number of samples collected
3.	Noise Level	Total Number of samples as per Environmental Monitoring Plan	Total Number of samples collected
4.	Water Quality	Total Number of samples as per Environmental Monitoring Plan	Total Number of samples collected
5.	Soil	Total Number of samples as per Environmental Monitoring Plan	Total Number of samples collected
	Safety of Workers	List of PPE as per the number labours	List of PPEs actually provided in the project
Performance Indicators of Environmental Management Plan			
6.	Permissions,/ NoCs/Consents requirement	Target timeline to obtain the permit/NoC/ consents and its validity	List of Permission and NoCs / consents obtained till date and status of its validity.
7.	Public Consultation	Total Number of planned Public Consultation with timeline and coverage of people.	Number of public consultation conducted till date and actual coverage of the people.
8.	Grievance redressal	Total number of complaints received, its timeline to response and resolution	Actual number of complaints resolved in percentage, response time.
9.	Issues raised in public consultation	Target to attend the issues raised in the Public Consultation	Status of compliance to the issues of Public consultation
10.	Information disclosure	List of information and locations where information to be disclosed	Actual locations where information has been disclosed.

Sl.No	Performance Indicators	Target	Achievement in Semi-annually and annually
11.	Education of site staff on Environmental training	Total Number of staffs to be trained	No of staff actually
12.	Capacity Building	Total number of sessions to be covered Total Number of contractors, PIUs and DSCs to be covered	Number of Sessions completed and Number of contractors, PIUs and DSCs.
13.	Implementation of EMP mitigation Measures	All items of Environmental Management Plan with timeline and its respective regulatory standards like for Amebient air Qaulity – NAAQS, 2009 standards, Drinking water – IS:10500 etc, Residual Chlorine – UEPPCB standards and CPHEEO manual for handling.	Implementation status of EMP items till date
14.	Reporting	List and number of Report to be submitted	List and number of reports submitted

F. CONCLUSION AND RECOMMENDATION

156. The initial environmental examination describes the environmental impact of all components of rehabilitation of water supply system subproject of Devprayag.

157. The locations of all project componets are within the Devprayag Town on the bank of Alaknanda river. There is no ecologically sensitive area nearby the site except location of few project components within the forest which require diversion of 0.36 ha of forest land for non forest purpose. Felling of approx 19 trees will be required. There is no impact on cultural and archaeological site expected from the project.

158. The construction activity will have impact on ambient air and noise environmental due operation of construction vehicles, equipments, excavation and disposal of earth. The laying of pipes in the residential area may cause inconvenience to the local people due obstruction on road and interrupted supply of water. Mitigation measures have been developed to reduce all negative impacts to acceptable levels. The implementation of mitigation measures has been suggested in the environmental management and monitoring plan If mitigation plan are implentted then impact will be insignificant.

159. The proposed subproject has been categorized as Category ‘B’ as per ADB SPS 2009 based on environmental screening and assessment of likely impacts of rehabilitation of water supply system of Devprayag. The initial environmental examination (IEE) ascertains that it is unlikely to cause any significant environmental impacts. Few impacts

were identified attributable to the proposed sub-project, all of which are localized and temporary in nature and easy to mitigate.

160. The initial environmental examination ascertains that the subject is unlikely to cause any significant environmental impacts. No additional studies or need of undertaking detailed EIA is envisaged at this stage. The Executing Agency shall ensure that EMP and EMoP is included in Bill of Quantity (BOQ) and forms part of bid document and civil works contract. The same shall be revised if necessary during project implementation or if there is any change in the project design and with approval of ADB.

.

APPENDICES

Appendix I

Rapid Environmental Assessment (REA) Checklist

Country/Project Title	India/ Uttarakhand Emergency Assistance Project
Sector/Division	Water Supply – Devprayag

Screening Question	Yes	No	Remarks
A. Project Siting Is the project area…			
Densely populated?	☐	☒	The habitation is on the slope of hill with population of about 20,115 and sparsely populated.
Heavy with development activities?	☐	☒	
Adjacent to or within any environmentally sensitive areas?			
• Cultural heritage site	☐	☒	No Cultural Heritage or notified archaeological site within 10 km from the project.
• Protected Area	☐	☒	Project does not fall within any protected area. Except 0.36 ha of land located within Reserved Forest
• Wetland	☐	☒	No wetland area available in the vicinity of the project site
• Mangrove	☐	☒	No mangroves available
• Esturine	☐	☒	No estuary is available
• Buffer zone of protected area	☐	☒	The proposed project does not fall within the buffer zones of wildlife sanctuary or national park or biodiversity reserves.
• Special area for protecting biodiversity	☐	☒	No such area
• Bay	☐	☒	No such area.
Potential Environmental Impacts Will the Project cause…			

Pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and soil erosion runoff?	☐	☒	There is no discharge of pollution laden in the upstream.
Impairment of historical/cultural monuments/areas and loss/damage to these sites?	☐	☒	No historical/cultural monuments/areas available.
Hazard of land subsidence caused by excessive ground water pumping?	☐	☒	No ground water abstraction is proposed.
Social conflicts arising from displacement of communities?	☐	☒	No additional land acquisition or displacement of people.
Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?	☐	☒	No other use of water
Unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?	☐	☒	Water will be supplied as per the drinking water standards
Delivery of unsafe water to distribution system?	☐	☒	Water will be supplied as per the drinking water standards
Inadequate protection of intake works or wells, leading to pollution of water supply?	☐	☒	
Over pumping of ground water, leading to salinization and ground subsidence?	☐	☒	No abstraction of ground water
Excessive algal growth in storage reservoir?	☐	☒	No such situation is anticipated as regular monitoring and maintenance will be done.
Increase in production of sewage beyond capabilities of community facilities?	☒	☐	Devprayag has an proposed STP of 1.5MLD capacity which is under construction.
Inadequate disposal of sludge from water treatment plants?	☐	☒	No additional sludge generation from WTPs.
Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisance and protect facilities?	☐	☒	The pump houses are at a location that is at some distance from the residential areas. Proper foundation will be designed for installing new higher capacity pumps.
Impairments associate with transmission lines and access roads?	☐	☒	The access to transmission lines is not difficult and all locations are approachable.

Health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.	☐	☒	A separate chlorine storage yard and chlorination room will be designed while rehabilitating the WTP
Health and safety hazards to workers from handling and management of chlorine used for disinfection, other contaminants, and biological and physical hazards during project construction and operation?	☐	☒	Adequate PPE shall be provided to the workers while working in such situations.
Dislocation or involuntary resettlement of people?	☐	☒	No resettlement is required since the proposed project is limited to the available land.
Social conflicts if workers from other regions or countries are hired?	☐	☒	No such situation is anticipated.
Noise and dust from construction activities?	☒	☐	An EMP will be devised and implemented at the time of construction to minimise the Noise and dust impact
Continuing soil erosion/silt runoff from construction operations?	☐	☒	No such situation is anticipated.
Increased road traffic due to interference of construction activities?	☐	☒	No such situation is anticipated.
Delivery of unsafe water due to poor O&M treatment processes (especially mud accumulation in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?	☐	☒	Backwashing of Filter beds is proposed to be based on SCADA and chlorine analysers will be installed on clear water pumping lines to monitor proper chlorination.
Delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?	☐	☒	No such situation is anticipated.
Accidental leakage of chlorine gas?	☐	☒	Chlorine will be stored as Hypochlorite solution to mitigate gas handling.
Excessive abstraction of water affecting downstream water users?	☐	☒	No such situation is anticipated.
Competing uses of water?	☐	☒	No competing source of water

Increased sewage flow due to increased water supply?	☒	☐	Since the city has Sewage treatment facility under implementation, the increased sewage flows will be taken care.
Increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant	☒	☐	Since the city has Sewage treatment facility under operation, the increased sullage flows will be taken care.
Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?	☐	☒	No such situation is anticipated.
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction?	☐	☒	No such situation is anticipated.
Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	☐	☒	No such situation is anticipated.

Climate Change and Disaster Risk Questions The following questions are not for environmental categorization. They are included in this checklist to help identify potential climate and disaster risks.	**Yes**	**No**	**Remarks**
Is the Project area subject to hazards such as earthquakes, floods, landslides, tropical cyclone winds, storm surges, tsunami or volcanic eruptions and climate changes?	√		The project area falls in the seismic zone IV as per Indian Seismic Zone map as per IS: 1893 (Part-1) 2002.

Could changes in temperature, precipitation, or extreme events patterns over the Project lifespan affect technical or financial sustainability (e.g., changes in rainfall patterns disrupt reliability of water supply; sea level rise creates salinity intrusion into proposed water supply source)?	√		Will be assessed and suitable mitigation measures will be proposed.
• Are there any demographic or socio-economic aspects of the Project area that are already vulnerable (e.g. High incidence of marginalized populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)?		√	Proposed project will not impact any marginalized population, rural-urban migrants, illegal settlement etc.
• Could the Project potentially increase the climate or disaster vulnerability of the surrounding area (e.g., by using water from a vulnerable source that is relied upon by many user groups, or encouraging settlement in earthquake zones)?		√	No such possibility of vulnerability increase of the surrounding area.

A proposed project is classified as category B

B. The Assessment checklist on the Categorization and Planning Requirement for this subproject?

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

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

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

☐ **Category FI.** A proposed project is classified as category FI if it involves investment of ADB funds to or through a FI .

Appendix I I

NOC for Forest Land Diversion

संख्या 10 / X4-16/1(800)/2015

प्रेषक,

मीनाक्षी जोशी,
अपर सचिव,
उत्तराखण्ड शासन।

सेवा में,

अपर प्रमुख वन संरक्षक / नोडल अधिकारी,
वन भूमि हस्तान्तरण, इन्दिरा नगर,
फारेस्ट कालोनी देहरादून।

वन एवं पर्यावरण अनुभाग-4 देहरादून: दिनांक: 18 फरवरी, 2016

विषय:- जनपद-टिहरी गढ़वाल में देवप्रयाग जल संस्थान के कार्यालय भवन के निर्माण हेतु 0.36 है0 वन भूमि का गैर वानिकी कार्यों हेतु उत्तराखण्ड जल संस्थान को 30 वर्षों की लीज पर दिये जाने के सम्बन्ध में।

महोदय,

उपरोक्त विषयक आपके पत्र संख्या-1883/FP/UK/WATER/8696/2015 दिनांक 02 जनवरी, 2016 के सन्दर्भ में मुझे यह कहने का निदेश हुआ है कि श्री राज्यपाल भारत सरकार, पर्यावरण एवं वन मंत्रालय के पत्र संख्या-08बी/यू0सी0पी0/08/69/2015/एफ0सी0/2101 दिनांक 30.12.2015 द्वारा प्रदत्त विधिवत स्वीकृति के आधार पर जनपद टिहरी गढ़वाल में देवप्रयाग जल संस्थान के कार्यालय भवन के निर्माण हेतु 0.36 है0 वन भूमि का गैर वानिकी कार्यों हेतु उत्तराखण्ड जल संस्थान को 30 वर्षों की लीज पर दिये जाने की विधिवत स्वीकृति निम्न शर्तों/प्रतिबन्धों के अधीन प्रदान करते हैं।

(1) वन भूमि की वर्तमान वैधानिक स्थिति में कोई परिवर्तन नहीं होगा।

(2) प्रयोक्ता एजेन्सी उक्त भूमि का उपयोग केवल कथित प्रयोजन हेतु ही करेगा तथा यह उक्त भूमि अथवा उसके किसी भाग को किसी अन्य विभाग,संस्था अथवा व्यक्तियों को हस्तान्तरित नहीं करेगा।

(3) निर्माण कार्य शुरू करने से पहले वन विभाग के सक्षम अधिकारी की अनुमति प्राप्त की जायेगी।

(4) प्रयोक्ता एजेन्सी के व्यय पर वन विभाग द्वारा प्रस्तावित परियोजना के दोनों ओर रिक्त पड़े स्थानों पर सघन वृक्षारोपण एवं 10 वर्षों तक उसका रखरखाव किया जायेगा।

(5) प्रयोक्ता एजेन्सी के अधिकारी/कर्मचारी अथवा ठेकेदार या उक्त व्यक्तियों के अधीन या उनसे सम्बन्धित कोई भी व्यक्ति किसी भी प्रकार की वन सम्पदा को क्षति पहुँचाता है, तो उसके लिए सम्बन्धित प्रभागीय वनाधिकारी द्वारा तदर्थ निर्धारित प्रतिकर, जो पूर्णतया अन्तिम एवं प्रयोक्ता एजेन्सी पर बाध्यकारी होगा, प्रयोक्ता एजेन्सी द्वारा देय होगा।

(6) उक्त वन भूमि प्रयोक्ता एजेन्सी के उपयोग में तब तक बनी रहेगी, जब तक कि प्रयोक्ता एजेन्सी को उसकी उक्त प्रयोजन हेतु आवश्यकता रहेगी। यदि प्रयोक्ता एजेन्सी को उक्त भूमि अथवा उसके किसी भाग की आवश्यकता न रहेगी, तो यथास्थिति उक्त भूमि अथवा ऐसा भाग, जो प्रयोक्ता एजेन्सी के लिए आवश्यक न रहे, वन विभाग को बिना किसी प्रतिकर भुगतान किये यथास्थिति वापस प्राप्त हो जायेगा।

(7) प्रयोक्ता एजेन्सी द्वारा उक्त भूमि पर निर्माण कार्य शुरू करने से पहले वन विभाग के सक्षम अधिकारी की अनुमति प्राप्त की जायेगी।

(8) वन विभाग तथा उसके अभिकर्ताओं को किसी भी समय जब वे आवश्यक समझें, हस्तान्तरित किये गये भूखण्ड पर प्रवेश करने व उसका निरीक्षण करने का अधिकार होगा।

(9) वन विभाग तथा उसके अभिकर्ता को किसी भी समय जब वे जब वे आवश्यक समझें,हस्तान्तरित किये गये भूखण्ड पर प्रवेश करने व उसका निरीक्षण करने का अधिकार होगा।

(10) मा0 उच्चतम न्यायालय/भारत सरकार द्वारा यदि भविष्य में एन0पी0वी0 की वर्तमान दरों में वृद्धि की जाती है, तो प्रयोक्ता एजेन्सी द्वारा एन0पी0वी0 क्षतिपूरक वृक्षारोपण, मलवा निस्तारण हेतु बढ़ी हुई धनराशि का भुगतान वन विभाग को यथासमय किया जायेगा व देय धनराशि को (ad-hoc CAMPA) कोष को हस्तान्तरित किया जायेगा।

(11) प्रयोक्ता एजेन्सी द्वारा जनपद कार्य बल की संस्तुतियों एवं भू-वैज्ञानिक के सुझावों का कड़ाई से अनुपालन किया जायेगा।

(12) प्रयोक्ता एजेन्सी द्वारा प्रस्तावित योजना का निर्माण एवं तदोपरान्त रख-रखाव के दौरान आस-पास के क्षेत्र की वनस्पतियों एवं जीव जन्तुओं को कोई नुकसान नहीं पहुँचाया जायेगा।

(13) प्रयोक्ता एजेन्सी द्वारा परियोजना निर्माण में कार्यरत मजदूरों/स्टाफ को रसोई गैस/ किरोसिन तेल की आपूर्ति की जायेगी, जिससे निकटवर्ती वनों की क्षति न हो।

(14) प्रयोक्ता एजेन्सी द्वारा प्रस्तावित स्थल/वन क्षेत्र के आस-पास मजदूरों/स्टाफ को लिए किसी प्रकार का कैम्प नहीं लगाया जायेगा।

(15) प्रयोक्ता एजेन्सी द्वारा प्रस्तावित वन भूमि के अतिरिक्त आस-पास की वन भूमि से परियोजना निर्माण के दौरान मिट्टी/पत्थर काटने एवं भरने का कार्य नहीं किया जायेगा।

(16) प्रयोक्ता एजेन्सी के व्यय पर मक डिस्पोजल का कार्य प्रस्तुत की गयी योजना के अनुसार वन विभाग की देख-रेख में किया जायेगा। प्रयोक्ता एजेन्सी द्वारा उत्सर्जित मलबे का निस्तारण चिन्हित स्थलों पर ही किया जायेगा व उत्सर्जित मलबे को किसी भी दशा में पहाड़ों की ढलान से नीचे/नदी में निस्तारित नहीं किया जायेगा।

(17) निर्माण कार्य के अन्तर्गत पातित होने वाले वृक्षों का पातन उत्तराखण्ड वन विकास निगम द्वारा किया जायेगा एवं आवश्यक न्यूनतम वृक्षों का ही पातन किया जायेगा।

(18) प्रयोक्ता एजेन्सी द्वारा उक्त शर्तों एवं अन्य सामान्य शर्तों को सम्मिलित करते हुए एक पट्टा विलेख का आलेख्य प्रस्तुत किया जायेगा, जिसे शासकीय हस्ताक्षरकर्ता से विधीक्षित करवाया जायेगा। ऐसे पट्टा विलेख के विधीक्षण हेतु न्याय (कन्वेयन्सिंग) अनुभाग के शासनादेश संख्या 198/7-जी-सी-89-3-89, दिनांक 19.08.1989 के अनुसार निर्धारित विधीक्षण शुल्क विलेख विधीक्षण से पूर्व लेखाशीर्षक-0070-- अन्य प्रशासनिक सेवायें-01-न्याय प्रशासन-501-सेवायें और सेवा फीस-01-की गयी सेवाओं के लिए भुगतान की उगाही के अन्तर्गत ट्रेजरी में जमा कर ट्रेजरी चालान की प्रति पट्टा विलेख के आलेख्य के साथ उपलब्ध करायी जायेगी। उपरोक्तानुसार प्रस्तुत पट्टा विलेख शासन द्वारा विधीक्षित किये जाने के उपरान्त ही निष्पादित किया जायेगा।

(19) प्रयोक्ता एजेन्सी द्वारा वन संरक्षण अधिनियम, 1980 के अन्तर्गत जारी हैण्ड बुक के Annexure-V में दिये गये मार्गदर्शी नियमों का कड़ाई से पालन किया जायेगा।

(20) प्रयोक्ता एजेंसी वन विभाग को वानिकी कार्यों के लिए निःशुल्क जलापूर्ति करेगा।

(21) उपरोक्त के अतिरिक्त भारत सरकार द्वारा निर्गत विधिवत स्वीकृति के आदेश दिनांक 30.12.2016 में उल्लिखित समस्त शर्तों का भी पालन सुनिश्चित किया जायेगा।

(22) प्रयोक्ता एजेन्सी द्वारा प्रस्ताव में निहित किसी भी निर्धारित शर्त का अनुपालन नहीं होने अथवा असंतोषजनक अनुपालन होने की स्थिति में भारत सरकार, पर्यावरण एवं वन मंत्रालय द्वारा स्वीकृति को निरस्त करने का अधिकार सुरक्षित है।

भवदीय,

(मीनाक्षी जोशी)
अपर सचिव।

संख्या: 10 (1)/X-4-16/1(300)/2016, तददिनांकित।

प्रतिलिपि निम्नलिखित को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित।

1. अपर प्रमुख वन संरक्षक (केन्द्रीय), भारत सरकार, पर्यावरण एवं वन मंत्रालय, क्षेत्रीय कार्यालय, एफ०आर०आई०, उत्तराखण्ड देहरादून।
2. महालेखाकार, लेखा एवं हकदारी, उत्तराखण्ड देहरादून।
3. सचिव, पेयजल विभाग उत्तराखण्ड शासन।
4. वन संरक्षक, भागीरथी वृत्त, मुनी की रेती।
5. जिलाधिकारी, टिहरी।
6. प्रभागीय वनाधिकारी, नरेन्द्रनगर वन प्रभाग मुनी की रेती।
7. अधिशासी अभियन्ता, उत्तराखण्ड जल संस्थान, देवप्रयाग टिहरी गढ़वाल।
8. निदेशक, राष्ट्रीय सूचना केन्द्र(NIC), उत्तराखण्ड सचिवालय परिसर,देहरादून को इस आशय से प्रेषित कि कृपया इस शासनादेश को एन०आई०सी० की वेबसाईट पर अपलोड करने का कष्ट करें।
9. गार्ड फाईल।

आज्ञा से,

(आर०के० तोमर)
संयुक्त सचिव।

Appendix III

Informal Public Consultaion

Informal Public Consultation & Focused Group Discussions

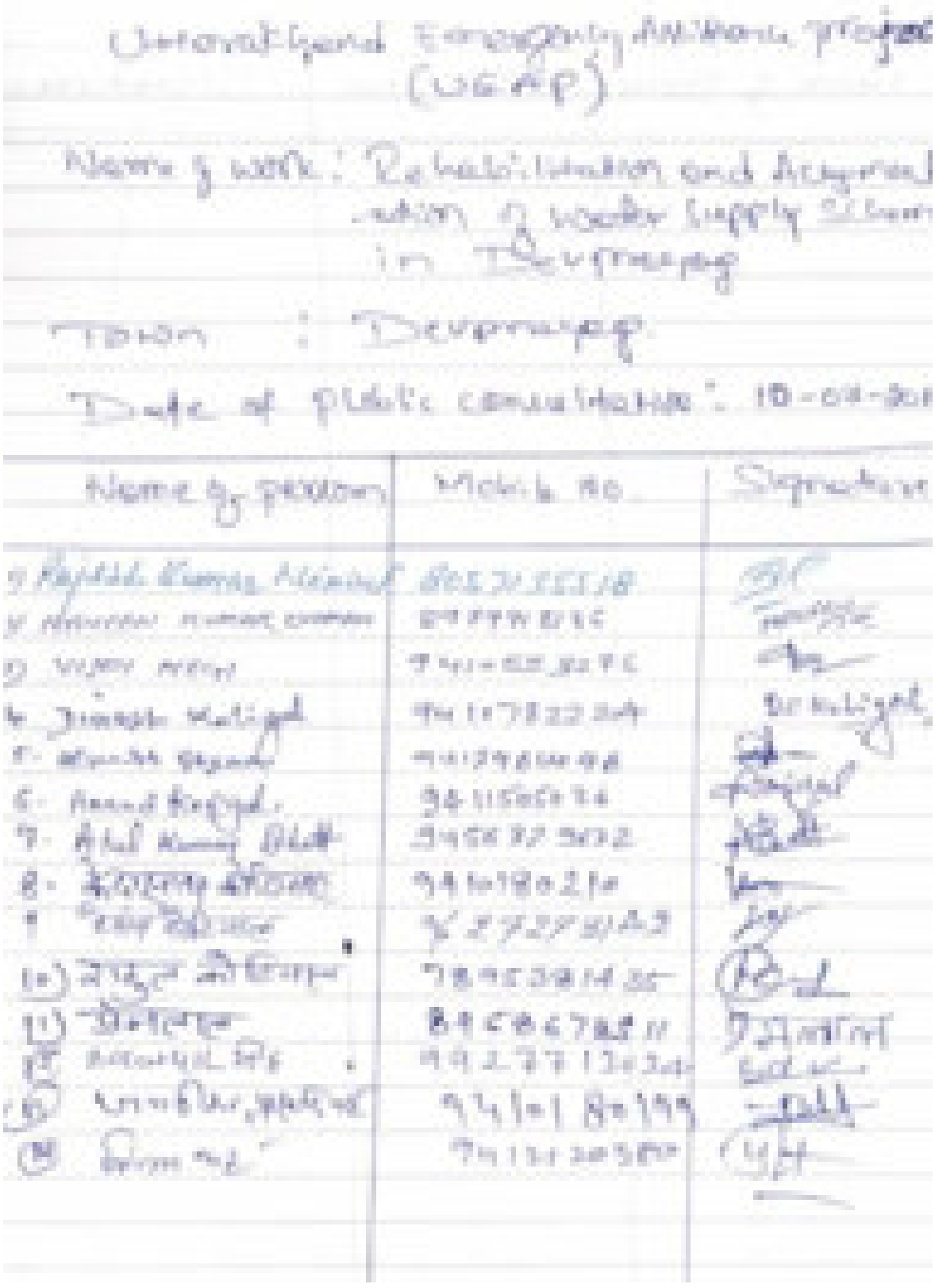
Name of the Sub-Project: Uttarakhand Emergency Assistance Project: Water Supply Sector
Location: Devprayag
Target Group : Local People
Date : 10 July 2014

Issues	**Participant's Opinion, Comments and Suggestions**
General perception about the Investment Program UEAP(WATER SECTOR)). Awareness about the Investment Program especially the Water Supply Distribution System component. Support of the people for the Investment Program.	Local people are aware of the water supply investment programme.
Support of local people for the proposed Water Supply Distribution System Component of the project.	All people gathered for consultations raised one voice for the renovation of water supply system in Devprayag.
Any critical issue or concern by the local people regarding this project?	The old water supply distribution line should be in place till the commissioning of new distribution line.
Any criteria you would like to see considered during project design, construction and operation stage?	During construction time the Executing Agency should conduct the work without affecting the common people. No suggestion for operation stage.
Do the village/ ward people face any problems of water supply to their houses?	Water supply to this Devprayag is so erratic that hardly people get clean water. Most of the time water is not coming to their houses due to less pressure.
If there is any problem related to these services, do you think that any up-gradation is necessary?	If water comes sometime with pressure, then also people find it with full iron content or bad smelling water.
Do you have any ideas on what is to be involved in the process of up-gradation?	No idea for the process of this up-gradation.
For this up-gradation, the road/ street/ path may be affected - What is your opinion on this? Is it acceptable?	Yes, it is acceptable to the local people but not for a prolonged period. The timing and period of work should be fixed and notified to the local people before the start of civil works.
What extent this total Water Supply Distribution System civil works will affect you?	This water supply distribution civil works will affect the normal business of shopkeepers and especially livelihood of vendors selling variety of items. Even some vendors raise the concern of getting two time meal for their families.
Who else is to be affected due to this up-gradation process?	Local residents will also be affected for commuting to their destinations.
How intense could be the effect?	The effect could be much intense if the distribution line kept open for longer period after excavation work. The local residents will find it difficult to go office, schools, hospitals or any other destinations.
Do you think the effect will be of a permanent nature?	The effect may likely be of temporary in nature.
If it is not, how intense will be the temporary effect?	The intensity of effect may be temporary in nature and minimum to the local residents.
The work will be executed in this part of the	Mostly ready to shift other side of the road by

Issues	Participant's Opinion, Comments and Suggestions
road/footpath. You may require shifting to other side of the road. Please give your comments and suggestions.	showing respect to Government work. If space and assistance provided for shifting to other side, APs have no problem.
During the time of execution of work will you shift to other side of road or any other place in the town?	Some people are positive to the idea of shifting to other side of the road and others are bit apprehensive of shifting and doing business. Because they afraid of customer loss.
In what way Executive Agency of GOU can assist you so that your daily business is not affected? What extra support you want from the Executing Agency of GOU?	They have no direct comment on this issue. But said that Government should think about their genuine problem and whatever possible way GoU can help them, it is welcome.
What are your perceived benefits from the Investment Program?	Only benefit may be un-interrupted purified water supply with good pressure. They may get good and hygienic water to drink.
Do you think that local labour force would like to participate in construction work?	Obviously, local unemployed labour force would like to participate in the construction work.
Do you think that the local people would like to get regular information regarding this Investment Program?	Yes, the local people would like to get regular information regarding this project and Investment Program.
Shortage of water for human consumption, irrigation, and other downstream uses? How extensive are they?	Shortage of drinking water takes place frequently due to leakage of pipe and non-availability of water pressure. Sometime the water smells bad and looks un-hygienic.
Any conflicts on water use rights and its social impacts?	No conflict yet on water use rights.
Protected areas (national park, protected forest, religiously sensitive sites, historical or archaeological sites near the project area around 3km), if any	No protected areas (national park, protected forest, religiously sensitive sites, historical or archaeological sites near to the sub-project area.
Perceived benefits from the project	Regular water supply system will be established for better facilities to the urban population.
Any Other Issues you may feel to share: (Demand of any support form Authority and whether they welcome the project, will there be cooperation from the local community during the implementation, security measures, etc).	They support this project and ready to bear any inconvenience. Measures should be taken to make reliable supply of water. The reliability of supply of water supply is mainly affected due to delayed restoration of pipelines damaged of local floods, landslides. It is etential to provide safe and reliable access so that resources for restoration can reach within time.
Is this consultation useful? Comments	Yes, it is useful

Source: Meeting with local people 10 July 2014

List of Participants and signatures - Public Consultation & Focused Group Discussions



Name & position	Mobile No	Signature
1)		
2)		
3)		
4)		
5)		
6)		
7)		
8)		
9)		
10)		
11)		
12)		
13)		
14)		

Public Consultaion Photographs (10 July 2014)

Appendix IV

Project Photographs

Plate-2: Pipes damaged during the disaster.

Plate -3: Pipes damaged in Devprayag

Plate-4: Access to the Source in Devprayag

Plate -5:Damaged pipes due to disaster

Plate -6: Proposed office building location within Forest near Tehsil

Plate -7: Access road to proposed office building