Initial Environment Examination

Project Number: 47229-001
July 2016

IND: Uttarakhand Emergency Assistance Project (UEAP)

Package No. UK /UEAP-CA /P3/Hanger/1-4: Construction of four Hangers
Package No. UK/UEAP-CA/MPH: Construction of MPH cum Rescue centres

Submitted by

Project implementation Unit –CA (Civil Aviation), Dehradun

Asian Development Bank

RVS

for logging pls

GM/AS

Fw: ADB Loan No. 3055 IND, Uttarakhand Emergency Assistance Project (UEAP): Submission of "IEE" Reports for Hangars and MPH in Gaucher , Nainisaini, Chinyalisaur & Sahastradhra (Package No. UK/UEAP-CA/P3/Hanger/1-4 and Package No. UK/UEAP-CA/MPH)

Amrit Ajay Sharma to: Girish Mahajan 07/01/2016 08:49 AM

Cc: Pooja Awasthi, Ashok Srivastava

Dear Sir,

Please find the attached above subjected IEE report for your review.

Pooja: Please logging the same.

Thanks & Regards,
Amrit Ajay Sharma

ASIAN DEVELOPMENT BANK
INRM
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Respected Sir,

Please find herewith the attached initial Environmental Examination (IEE) reports for Construction of Hangars (Package No. UK/UEAP-CA/P3/Hanger/1-4) and MPH (Package No. UK/UEAP-CA/MPH) in Gaucher, Nainisaini, Chinyalisaur & Sahastradhara for your kind perusal and approval.

With Regards,

PIU (Civil Aviation)
Doon Helidrome,
Sahastradhara Road,
Dehradun

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Environmental Examination

June 2016

India: 1- Construction of four Hangers in various districts of Garhwal and Kumaon region of Uttarakhand Package No. UK/UEAP-CA/P3/Hanger/1-4

2- Construction of MPH cum Rescue centres in various districts of Garhwal and Kumaon region of Uttarakhand Package No. UK/UEAP-CA/MPH

Abbreviations

ADB	Asian Development Bank
CA	Civil Aviation
CFE	Consent for Establishment
CFO	Consent for Operation
CPCB	Central Pollution Control Board
DoT	Department of Tourism
DSC	Design and Supervision Consultant
dB	Decibel
EA	Executing Agency
EARF	Environmental Assessment and Review Framework
EIA	Environmental Impact Assessment
EC	Environmental Clearance
EMMP	Environmental Management and Monitoring Plan
EMP	Environmental Management Plan
FATO	Final Approval and Take Off Area
GoI	Government of India
GoU	Government of Uttarakhand
GRC	Grievance Redressal Committees
Ha	Hectare
IAF	Indian Air Force
IEE	Initial Environmental Examination
ITBP	Indo-Tibetan Border Police
JRDNA	Joint Rapid Damage and Needs Assessment
Leq	Sound Level
MoEFCC	Ministry of Environment, Forests and Climate Change
NAAQM	National Ambient Air Quality Monitoring
NDRF	National Disaster Response Force
NGO	Non Government Organization
NOC	No-Objection Certificate
O&M	Operation and Maintenance
PIU	Project Implementation Unit
PMU	Project Management Unit
PWD	Public Works Department
REA	Rapid Environmental Assessment
SAR	Sub-Project Appraisal Report
SEIAA	State Environmental Impact Assessment Authority
SDMA	State Disaster Management Authority
SPCB	State Pollution Control Board
SPS	Safeguard Policy Statement
UCADA	Uttarakhand Civil Aviation Development Authority
UEAP	Uttarakhand Emergency Assistance Project
UEPPCB	Uttarakhand Environmental Protection and Pollution Control Board
UJS	Uttarakhand Jal Sansthan
VECs	Valued Environmental Components

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
µg/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

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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. The region is traditionally referred to as Uttarakhand in Hindu scriptures and old literature, a term which derives from the Sanskrit for Northern Country or Section. Uttarakhand by virtue of its geographical setting is vulnerable to minor ecological changes. Hence any activity disapproved by mountain ecosystem triggers a disaster. We cannot stop disaster to happen but can certainly take some steps to reduce its effects. Disasters are synonymous to damage of property, life and psyche of the people. If disasters cannot be averted, then reduction of losses of any type, caused by disaster becomes a focal point of the policy for disaster. So far, in the recent June, 2013 Uttarakhand has experienced major natural calamities in five main districts Rudraprayag (especially Kedarnath), Chamoli, Uttarkashi, Bageshwar and Pithoragarh (Dharchula).
2. Being part the Himalayan region, Uttarakhand is a disaster prone state. Landslides, forest fires, cloudbursts and flash-floods are seasonal in nature and this strike at a certain period of the year with high frequency. Natural disasters in the mountains are the most devastating and are unpredictable. Natural disaster of June 2013 resulted in huge damage of life, roads, tourism assets/infrastructure, rural & urban infrastructure in the state of Uttarakhand. This event also recorded a glacial lake burst/overflow related flash flood at Kedarnath causing a great number of loss of lives and severe damage of property enroute.
3. The Government of Uttarakhand (GoU) launched a massive emergency rescue and evacuation operation with assistance from the Indian Army, Indian Air Force (IAF), Indo-Tibetan Border Police (ITBP), the National Disaster Response Force (NDRF) and the local Police evacuating more than 110,000 people from these flood affected areas. The need to immediately start the

recovery and reconstruction work, especially in the most affected areas prompted the need for a rapid assessment to understand the nature of damages post-disaster. The Uttarakhand Government is committed to ensure the safety and well-being of its people and recognizes the necessity to continuously improve disaster risk reduction and management within the State.

4. Natural Disaster of June, 2013 has resulted in huge loss of lives of tourists/residents and severe damage to infrastructural facilities in the region, highlighting the requirement to strengthen the disaster preparedness by creating proper rescue/relief/evacuation mechanism through aerial route in such eventualities in the difficult Himalayan terrain.
5. Presently sub-project is being undertaken in Phase – III i.e. Construction of MPH cum Rescue centers in various districts of Garhwal and Kumaon region of Uttarakhand Package No. UK/UEAP-CA/MPH, and Construction of four Hangers in various districts of Garhwal and Kumaon region of Uttarakhand Package No. UK/UEAP-CA/P3/Hanger/1-4, no-objection Certificates (NOCs) for the sub-project have been obtained from the concerned authorities
6. Consistent with the Environmental Assessment and Review Framework, the proposed sub-project were screened using ADB rapid environmental assessment (REA) checklist. 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. The description of subproject is as follows:
7. Gauchar: Gauchar is the town located in Chamoli district of the state of Uttrakhand. The project is located near to Gauchar town, which 3 km from Gauchar main town. The Hanger site lies on a plain area.
8. Nainisani: Nainisaini is located in district Pithoragarh. Its a valley area and is about 07 km from the main town.
9. Chinyalisaur: Chinyalisaur is a small town and Tehsil Headquaters in Uttarakashi District. It’s a semi-urban settlement. Its located on pilgrim route to Gangorti and is surrounded by the small mountains in the bank of holi river Bhagirathi, the main tributary of river Ganga.
10. Shastradhara: Shastradhara is situated in the village Tarla nagaa village in Ripur Block of district Dehradun. The site is located near existing helipad.

11. Air Quality. The pristine environment and sparse population suggests that most part of the State have a very good air quality. The baseline data related to ambient air quality and noise level will be generated before commencement of civil work/construction.
12. Seismicity. The State constitutes one of the most active domains of the Himalayan region. Several damaging earthquakes have been recorded from this region. As such, the region is classified under high seismic zones V.
13. Forest. Uttarakhand is ranked 9th in all-India in terms of forest covered area with 24,508 km2 of forest land (As per State Forest Report 2013). The district of Uttarkashi, Chamoli Pithoragarh and Dehradun have the forest cover accounting for 50% of the state's total forest wealth.
14. Sensitive Ecosystem. The sub-project location is not located within or falls within any sensitive ecosystem. The project components will have no direct or indirect intervention on sensitive ecosystem of region.
15. Significant Environmental Impacts and Proposed Mitigation Measures. No environmental impacts related to siting have been identified in the environmental examination. The proposed sub-project is not located within or adjacent to the cultural heritage sites, protected areas, wetlands, mangroves, estuarine; core as well buffer zones of the protected areas or any special area for protecting biodiversity. There are no rare, threatened, and endangered species (flora and fauna) within the sub-project sites. The potential significant environmental impacts identified and assessed are related to construction time impacts.
16. Information Disclosure, Consultation, Participation, and Grievance and Redress Mechanism. Wide stakeholders' consultations and participation were observed during the environmental examination of UEAP. Project affected communities, government institutions, and non-governmental 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 on ADB website pursuant to the Bank's Public Communication Policy and in the SDMA website.

17. 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.
18. Conclusion. The initial environmental examination (IEE) ascertains that the sub-project 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 BOQ and forms part of bid document and civil

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 Mandakini, Bhagirathi, Pindar, Alaknanda, Tons , Yamuna, Kali and Saryu. Infrastructure facilities like roads & bridges, 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.

B. Uttarakhand Emergency Assistance Project (UEAP)

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 habitations and 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. The Natural Disaster of June, 2013 has resulted in huge loss of lives of tourists/local residents and severe damage to infrastructural facilities in the region, highlighting the requirement to strengthen the disaster preparedness by creating proper rescue/relief/evacuation mechanism through aerial route in such eventualities in the difficult Himalayan terrain.
4. Based on the request of India, a Joint Rapid Damage and Needs Assessment (JRDNA) 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 Project (UEAP) has been formulated as a multi-sector emergency loan in sector loan modality. The executing agency (EA) for the UEAP will be Government of Uttarakhand (GoU) and State Disaster Management Authority (SDMA). The primary implementing agencies (IAs) will be Public Works Department (PWD) for roads & bridges, and trekking routes including eco-trails. The Department of Tourism (DoT) for tourism infrastructure, Uttarakhand Civil Aviation Development Authority (UCADA) for helipads; and Uttarakhand Jal Sansthan (UJS) for urban water supply, or any successor here to.

Some other state agencies such as Forest Department, Kumaon Mandal Vikas Nigam Limited, and Garhwal Mandal Vikas Nigam Limited are likely to be entrusted with some works under UEAP under these primary IAs. While the disaster affected almost all districts within the state, the main focus of the assessment was on five districts that were most affected: Bageshwar, Chamoli, Pithoragarh, Rudraprayag, and Uttarkashi. However, to strengthen the disaster preparedness capability and to restore visitor's faith/confidence in the tourism safety through provision of better connectivity and presence of rescue, relief, and evacuation mechanisms, as per the indicative list of sub-projects in PAM under "Section - II". Tourism Amenities and Helipads and associated amenities" and its Sub-section 1. The main theme of PIU (CA) is to "Construction and Upgradation of Helipads, Heliports or Helidromes with other associated facilities in the state of Uttarakhand.

C. Purpose of the Environmental Assessment

5. The main purpose of this IEE is to provide environmental assessment of the proposed construction of Hanger and MPH facilities in existing airstrips at Gauchar, Nainisaini, Chinyalisuar and at proposed Helipad site Sahatradhara. The purpose of this 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 minimize the adverse environmental impacts, if any, associated with construction and operation. The key environmental impacts on natural and human environments have been assessed.

6. The Objectives of this Initial Environmental Examination (IEE) are as follows:
   - Assess the existing environmental conditions in the sub-project locations including the identification of environmentally sensitive areas and valued environmental components (VECs).
   - Assess the proposed planning and developmental activities to identify their potential impacts, evaluate the impacts, and determine their extent.
   - Assess the compliance with ADB's environmental safeguard requirements and applicable environmental laws of GOI & GOU.

- To incorporate environmental mitigation measures in the project design and preparation of environmental management and monitoring plan (EMMP) for the project.

7. This IEE has been carried out to ensure that the potential adverse environmental impacts are appropriately addressed in line with *ADB Safeguard Policy Statement, 2009.*

D. Extent of IEE

8. 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 constructions of the project component. IEE also covers the indirect impacts of these tow sub-projects components. Assessment is carried out for all components of environment covering terrestrial and aquatic ecology, soil, water, noise and socio-economic aspects.

E. Contents of IEE

9. The IEE has been largely structured as per SPS, 2009 ADB's Environmental Assessment Guidelines (2003) and environmental safeguards. Following the introduction of this report contains seven more sections including (ii) Policy, Legal and Administrative Framework, (iii) Description of Project, (iv) Description of the Environment, (v) Anticipated Environmental Impacts and Mitigation Measures, (vi) Information Disclosure, Consultation, and Participation, (vii) Environment Management Plan and Grievance Redress Mechanism, and (viii) Conclusion and Recommendation. This IEE is based on field reconnaissance surveys, secondary sources; review of legal requirements, identification of impacts and mitigation measures, impact assessment and institutional review and public consultations undertaken specifically for this study was also undertaken.

F. Methodology

10. The overall methodology for the Environmental Examination comprises the following stages:

(A) Field reconnaissance survey to assess the sub-project locations simultaneously to identify the critical environmental attributes.

(B) Stakeholders Meeting and Preliminary Public Consultation to get their feedback related to sub-project.

(C) Collection and review of readily available secondary data (other informations, khasra khatoni and revenue maps etc.) especially from Revenue and Forest Departments.

(D) Superimposing technical data on the design aspects over baseline status to identify the nature of potential negative impacts and suggesting feasible mitigation measures for minimization of those impacts

(E) Identification of method, implementation of suggested mitigation measures and environmental monitoring to develop an Environmental Management and Monitoring Plan (EMMP).

(F) Preparation of Environmental Safeguard Reports such as IEE, EIA, EMP and Recommended Mitigation Measures as per project need.

11. All above mentioned tasks and sub-project's feasibility were assessed based on the Rapid Environmental Assessment (REA) Checklists.
12. The reconnaissance survey of the sub-project locations was undertaken to determine the existing status of the various 'Valued Environmental Components' (VECs) of the area. The baseline data was collected from primary as well as secondary sources. The different environmental components such as physical, environmental and ecological resources such as topography, geology, hydrology, climate and land use, flora and fauna were studied in detail to establish the baseline conditions. The objectives of reconnaissance survey are described below.

- *To provide information about general baseline environmental setting of the project area with respect to the physical environment and ecological resources in the project specific location.*
- *To identify and collect various informations on potential impacts of sub-project and the characteristics of the impacts in terms of pre-construction, construction and operation phases of the project.*
- *To determine strategy for formulation of EMMP.*
- *To determine and use of sustainable methods and appropriate technologies for minimization of environmental as well as social impacts as far as possible.*

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

13. 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.
14. Specifically for the Uttarakhand Emergency Assistance Project (UEAP: ADB), the following environmental laws and regulations are applicable (***Table II - 1***).

Table II-1: Applicable Environmental National and State Requirements for UEAP (ADB)

Sl.No	Clearances	Acts/Rules/Notifications/Guidelines and Application to Sub-projects	Concerned Agency	Applicable to Contract	Responsibility	Status of Compliance
A. Pre-construction Stage						
1	Environmental Clearance	EIA Notification, 2006 amended till date, promulgated under Environment (Protection) Act 1986 The Notification and its latest amendment entails requirement of prior environmental clearance to the projects listed in schedule of this notification.	State Environmental Impact Assessment Authority (SEIAA). If not constituted then MoEF.	No	No	Not required
2	Forest Clearance for felling of trees and acquisition of forest land.	As per the Forest Conservation Act (1980): (i) If the forest land exceeds 20 ha then prior permission of Central Government is required; (ii) If the forest land is between 5-20 ha, then permission form the Regional Office of Chief Conservator is required; (iii) If the forest land is below or equal to 5 ha land, the State Government may give permission. (iv) 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. Besides these conditions: (v) Uttaranchal Van- Panchayat Rules (2005)	District Level Committee constituted by the State Govt. Van-Panchayat is a local level body, which is advised by the Forest Department. The NOC in this regard is issued by the Concerned Vanpanchayat Sarpanch, Chairman (Municipality) and District Magistrate.	No No	PIU (Civil Avaiation) PIU (Civil Aviation)	Not Required Not Required

Sl.No	Clearances	Acts/Rules/Notifications/Guidelines and Application to Sub-projects	Concerned Agency	Applicable to Contract	Responsibility	Status of Compliance
3	Permission for Working in Protected Area	The Indian Wildlife (Protection) Act, 1972, amended 1993, The Wild Life (Protection) Amendment Act, 2002. This Act provides guidelines for protection of Wild animals, birds and plants etc. 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 specified 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.	Protected Area Authority and Wildlife Board	No	No	Not Required
4.	Permission for Working in Protected Area	The Ancient Monuments and Archaeological Sites and Remains Act, 1958, and the rules, 1959 provide guidance for carrying out activities, including conservation, construction and reuse in and around the protected monuments.	Archaeological Survey of India	No	PIU (Civil Aviation)	Not required
B. Construction Stage						
1.	Discharge of waste water	The Water (Prevention and Control of Pollution) Act 1974 and The Water (Prevention and Control of Pollution) Rules 1975. The Act and Rules outlines the activities which are prohibited on account of their potential to cause water pollution. Pollution from various sources needs to be controlled as per this Act and Rules.	Uttarakhand Environmental Protection and Pollution Control Board, Dehradun	Yes	Civil Work Contractor	Contractor will obtain prior approval (if required)
2	Permission for Sand Mining from river bed	Mines and Minerals (Regulation and Development) Act, 1957 as amended in 1972.	River Board Authorities/ Department of Mining Govt. of Uttarakhand	Yes	Civil Work Contractor	Contractor will obtain prior approval from the concerned authority.
3	Consents to establish & operate Hot and Batch Mixing Plants & Stone	Air (Prevention and Control of Pollution) Act 1981	Uttarakhand Environmental Protection and Pollution Control Board – Dehradun	Yes	Civil Work Contractor	

Sl.No	Clearances	Acts/Rules/Notifications/Guidelines and Application to Sub-projects	Concerned Agency	Applicable to Contract	Responsibility	Status of Compliance
	Crushers.					
4	Authorization for Disposal of Hazardous Waste	Hazardous Waste (Management and Handling) Rules 1989 as amended 2003	Uttarakhand Environmental Protection and Pollution Control Board – Dehradun	No	Civil Work Contractor	Not required
5	Consent for Disposal of Sewage from Labour camps	Water (Prevention and Control of Pollution) Act 1974	Uttarakhand Environmental Protection and Pollution Control Board – Dehradun	No	Civil Work Contractor	Not required
6	Use of Fly ash within 100 kms around Thermal Power plants	Fly Ash Notification, 1999 & its amendment in 17 August 2003.	MoEF	No	Civil Work Contractor	Not required
7	Pollution Under Control Certificate	Central Motor and Vehicle Act, 1988	Department of Transport, Govt. of Uttarakhand	Yes	Civil Work Contractor	Contractor will obtain prior approval before start of Construction work.
8	Installation of Generators	The Air (Prev. & Con. of Pollution) Act, 1980	Uttarakhand Environment Protection and Pollution Control Board - Dehradun	Yes	Civil Work Contractor	
9	Employing Labour/workers	The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996,	District Labour Commissioner	Yes	Civil Work Contractor	Contractor will obtain the Labour licence before commencement of work
10	Permission for extraction of boulder and sand from river beds	Mines & Minerals (Regulation and Development) Act, 1957 and its amended in 1972	Department of Mines and Geology. Government of Uttarakhand	No	Civil Work Contractor	Not required
11	License for Storing Diesel and other explosives	Petroleum Rules, 2002. Hazardous Waste (Management and Handling) Rules 1989.	Commissioner of Explosives and Uttarakhand Environmental Protection and	No	Civil Work Contractor	Not required

Sl.No	Clearances	Acts/Rules/Notifications/Guidelines and Application to Sub-projects	Concerned Agency	Applicable to Contract	Responsibility	Status of Compliance
			Pollution Control Board, Dehradun			
C. Implementation Stage						
1	Consent to Establish & Cosent to Operate for Installation of Generators	The Air (Prev. & Con. of Pollution) Act, 1980	Uttarakhand Environment Protection and Pollution Control Board, Dehradun	Yes	PIU (Civil Aviation)	

DESCRIPTION OF THE PROJECT

A. Project Location

The Locations of the proposed construction of Hangers and MPH for Phase-III and SAR MPH 02 is given in ***Table III-1-2*** and ***Figure-1*** for the location of the site.

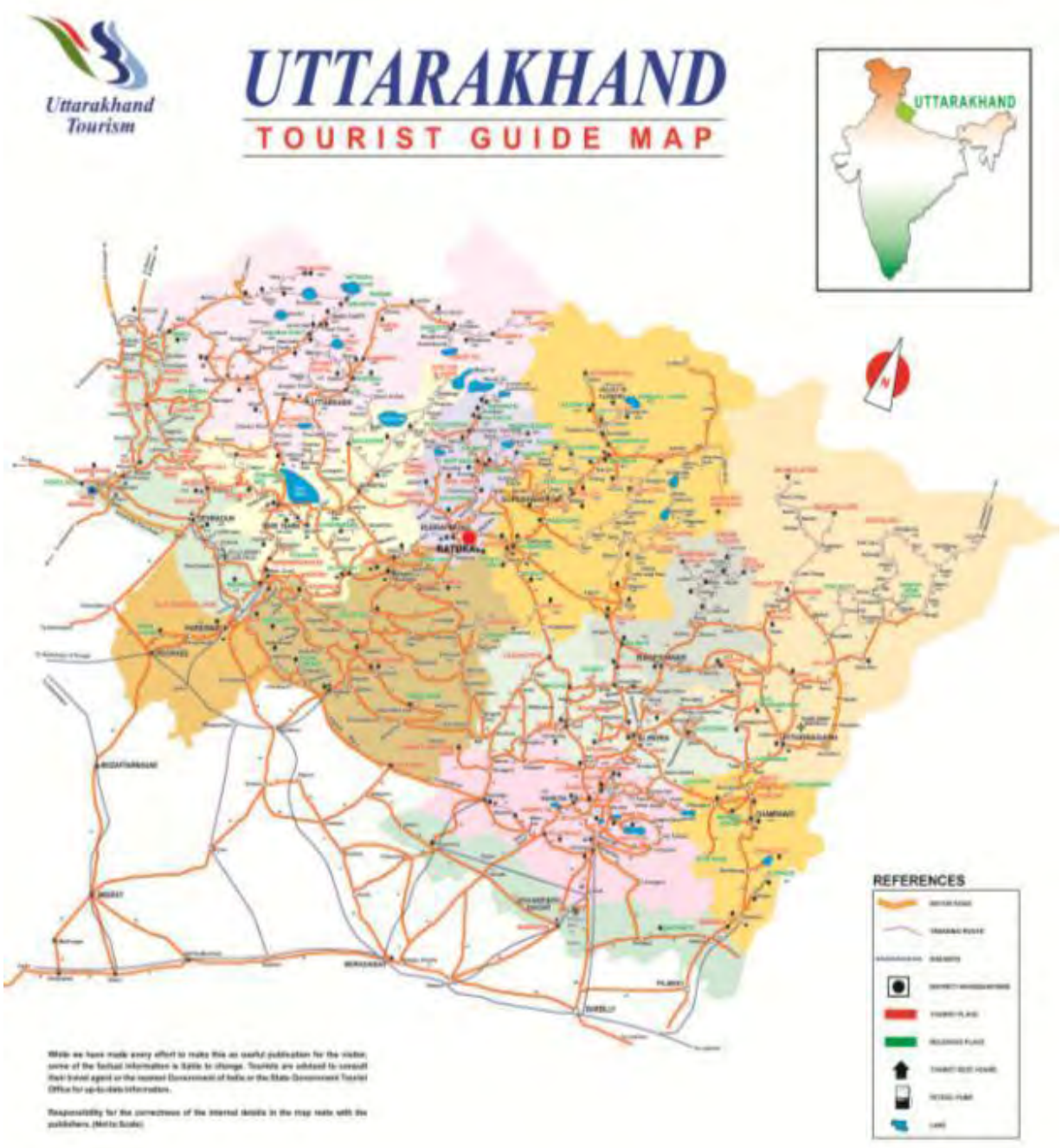


Figure 1: Map Showing Locations for Proposed Hangers and MPH at proposed sites of Gauchar, Nainisanini, Chinyalisaur and Shatradhara

Table III-1: Details of Hanger proposed in Phase – III (UEAP: ADB)

Sl. No.	Sub-Project Location	Proposed Hanger Category	Geographical Location	Total Area (m^2) available	Status of Land	Status of NOC	Diversion of Forest	Status of Environmental & Social (R&R) issues
1.	Gauchar	30MX 30M	30°18'14.34" N 79°02'11.34" E	1000	Government	NOC obtained	No	No
2	Nainisaini	30MX 30M	29°35'.38.83 "N 80°14'22.48" E	27840	Government	NOC	No	No
3	Chinyalisaur	30MX 30M	30°34'55. 45"N 78°19'.23.90 "E	27840	Government	obtained NOC	No	No
4	Shastradhara	30MX 30M	30°29'41.28" N 77°47' 9.36"E	4880	Government	obtained NOC	No	No
TOTAL		4		***61560***	***-***	***4***	***-***	***-***

Table III-2: Details of MPH proposed in Phase – II (UEAP: ADB)

Sl. No.	Sub-Project Location	Proposed Hanger Category	Geographical Location	Total Area (m^2) available	Status of Land	Status of NOC	Diversion of Forest	Status of Environmental & Social (R&R) issues
1.	Gauchar	MPH20	30°18'14.34" N 79°02'11.34" E	1000	Government	NOC obtained	No	No
2	Nainisaini	MPH20	29°35'.38.83 "N 80°14'22.48" E	27840	Government	NOC	No	No
2	Chinyalisaur	MPH20	30°34'55. 45"N 78°19'.23.90 "E	27840	Government	obtained NOC	No	No
4	Shastradhara	MPH20	30°29'41.28" N 77°47' 9.36"E	4880	Government	obtained NOC	No	No
TOTAL		4		***61560***	***-***	***4***	***-***	***-***

Note: *The area given in the above table refers to the total area under ownership of IA at that particular site. Out of that land the proposed infrastructure construction have to be undertaken as per the requirement.*

The proposed disaster preparedness area coverage is for pilgrim destinations parts of "Char Dham Circuit," as well as various other tourism destinations and settlements in the other 03 districts of the Uttarakhand that needs to be supported with enhanced disaster preparedness measures.

B. Proposed Category of the Project

17. Pursuant to the requirements of the ADB Safeguard Policy Statement (2009) proposed "Construction of Helipads with associated facilities" 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 Civil Aviation Development Authority (UCADA). Consistent with the Environmental Assessment and Review Framework (EARF), the sub-project was screened using the ADB rapid environmental assessment (REA) checklist.
18. The environmental screening revealed that no protected or sensitive areas were traversed. There are no rare, threatened, and endangered species (flora and fauna) within the sub-project corridor of impact. All impacts are site specific, and all impacts can be readily mitigated supporting a category "B" classification.

C. Background of the Proposed Sub-Project

i. Gauchar (District – Chamoli)

18. Gauchar is the town located in Chamoli district of the state of Uttrakhand. The project is located Gauchar town, which is about 50.50 km from Gopeshwar the headquarter of district Chamoli.
19. The hanger and MPH site lies on a plain area on the edge of the valley with high terrain on its two sides. A MPH 20 and Hanger 30X30 Mtr category is proposed to this site.
20. The project is not located within or adjacent to the core and buffer zones of any national park, wildlife sanctuary, biosphere reserve and other critically environmental habitats such as wetlands, eco-sensitive zone (ESZ) *etc*.

ii Nainisaini (District – Pithoragarh)

18. Nainisaini is the town located in Pithoragarh district of the state of Uttrakhand. The project is located Gauchar town, which is about 7 km from Pithoragarh the headquarter of district Pithoragarh.
19. . The hanger and MPH site lies on a plain area on the edge of the valley with high terrain on its two sides. A MPH 20 and Hanger 30X30 Mtr category is proposed to this site.

The project is not located within or adjacent to the core and buffer zones of any national park, wildlife sanctuary, biosphere reserve and other critically environmental habitats such as wetlands, eco-sensitive zone (ESZ) *etc*.

iii Chinualisaur (District – Uttarkashi)

20. Chinualisaur is the town located in Uttarkashi district of the state of Uttrakhand. The project is located Chinualisaur town, which is about 50 km from Uttarkashi the headquarter of district Uttarkashi.
21. . The hanger and MPH site lies on a plain area on the edge of the valley with high terrain on its two sides. A MPH 20 and Hanger 30X30 Mtr category is proposed to this site.

The project is not located within or adjacent to the core and buffer zones of any national park, wildlife sanctuary, biosphere reserve and other critically environmental habitats such as wetlands, eco-sensitive zone (ESZ) *etc*.

iv. Sahtradhara (District – Dehradun)

18. Sahatradhara is the town located in Dehradun district of the state of Uttrakhand. The project is located Dakpatthar town, which is about15 km from Dehradun the headquarter of district Dehradun.
19. The hanger and MPH site lies on a plain area on the edge of the valley with high terrain on its two sides. A MPH 5 and Hanger 30X30 Mtr category is proposed to this site.

    The project is not located within or adjacent to the core and buffer zones of any national park, wildlife sanctuary, biosphere reserve and other critically environmental habitats such as wetlands, eco-sensitive zone (ESZ) *etc*.

D. Project Implementation Schedule

20. The implementation period for the UEAP is upto March 2017.

E. Technical Specification:

20. The following points are considered for designing of proposed Hanger and MPH. The standard & recommended practices (SARP) from DGCA CAR section 4 series B part-II and part II which are based on ICAP SARP Annex 14 vol-II "Helipad 2104 have been considered for designing, as per DGCA CAR of 2005.

    a. For calculating the Hanger and MPH sizes paved area & load bearing strength and following other points have been taken in to consideration:

        I. The critical Design requirements of Helicopter MI-17 helicopter, Light Helicopter Helipads (H4 Category) Helipads (H3 Category), Heliports (H2 Category).

        II. The critical Design requirements of MPH 20 and MPH 05 category.

        Since the Hanger and MPH are being proposed to be constructed for catering the requirements for emergencies due to any kind of natural calamities, then in these situations the adequate safety measures have been taken into consideration.

        Keeping the view the above mentioned safety factor into consideration, load bearing capacity of 15 Tons has been taken in to account for the complete paved area.

    b. Considering the above mentioned points the "Paved Area" sizes for the MPH and Hangers have been calculated at SAR stage for design purpose and being analyzed accordingly for IEE purposes also.

    c. In addition to the above the following points are to be considered while designing the helipad:

        A "Safety Area" of 10 meters all around the paved area of FATO shall be considered. The safely area should be obstruction free, well drained, level, free from stones and debris. Good quality of grass to be planted on the safety area to suppress any dust rise, flying

debris due to rotor down wash. The safety area surface shall be suitable for any forced landing. The “Slopes” on the paved area shall be sufficient to prevent accumulation of water on the surface, but shall not exceed 3 percent in any direction. The location wise technical specification of the sub-project is given below.

Table III-2: Technical Specification of the Sub-Project (MPH)

Sl. No.	Sub-Project	Districts	MPH Category	Hanger Category	Minimum Area Available for construction (m^2)
1.	Gauchar	Chamoli	MPH 20	30MX 30M	1000
2.	Nainisaini	Pithoragarh	MPH 20	30MX 30M	27840
3.	Chinyalisaur	Uttarkashi	MPH 20	30MX 30M	27840
4	Sahatradhara	Dehradun	MPH 5	30MX 30M	4880
					61560

IV. DESCRIPTION OF THE ENVIRONMENT

A. Physical Environment

22. This section presents a brief description of the existing environment including its physical, ecological resources, and socio-economic development of the Sub-projects. Broad aspects on various environmental parameters such as geography, geology, physiography, climate, meteorology, seismology, ecology, socio-cultural and economic developmental parameters have been compiled from different government agencies like the Forest Department, Wildlife Department, State Environment Protection, and Pollution Control Board and Metrological Department etc.

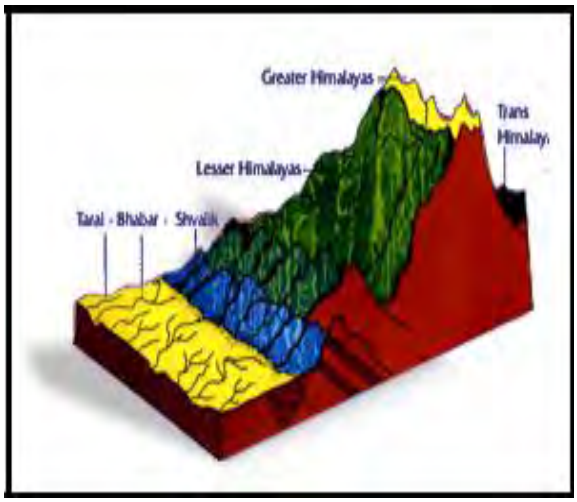
1. Geography

23. 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, these are; Pithoragarh, Almora, Nainital, Bageshwar, Champawat, Uttarkashi, Udham Singh Nagar, Chamoli, Dehradun, Pauri, Tehri Garhwal, Rudraprayag, and Haridwar. Geographically, the state lies in the northern Himalayas between 28^{o}53'24" to 31^{o}27'50" North latitude and 77^{o}34'27" to 81^{o}02'22" East longitude. Details of the geo-spatial locations of the proposed project sites are mentioned in the **Table III-1.** The State has geographical area of 53,483 Km^{2} and a population of about 1.01 crore as per census 2011.

Figure 2: Location of Districts in Uttarakhand

24. Uttarakhand is divided into two regions and also called administrative divisions, basically following terrains: the Kumaon and Garhwal. The Kumaon division located south east of the state and composed of Almora, Bageshwar, Champawat, Nainital, Pithoragarh, and Udham Singh Nagar. The Kumaon region is part o the vast Himalayan track and the sub-mountains of Terai and Bhabhar. The region is drained by Gori, Dhauli, and Kali from the Tibetan mountains, and Pindari and Kaliganga which ultimately joins Alaknanda River. Out of total 04 proposed sites 03 are in Garhwal division; each in the Chamoli, Uttarkashi, and Dehradun district while 01 site is situated in Kumaon region i.e. Pithoragarh District. Generally the terrain of proposed sites in different districts is extremely rugged and mountainous. River Alaknanda, Dhauli, Kali and Bhagirathi are the main tributaries of the Ganges, Tons of Yamuna and main drainage systems of the region.
25. The State is part of the Western Himalaya. Geographically, the Kumaon zone of the Western Himalaya can be divided into four zones *viz.*

(A) Tarai-Bhabar-
Shivalik (Sub-Himalayas)
(B) Lesser-Himalayas
(C) Greater-Himalayas
(D) Trans-Himalaya (Tethys)



South of Lesser Himalayas, it is the outermost zone overlooking the foot-hills and the plains. The altitude ranging from 750-1,200 metres, the Shiwaliks are the foot-hills just above the Bhabar and Tarai, once famous for the swamps and insalubrious climate, inhabited by Tribal people only, now reclaimed and developed into a fertile land, supporting a large population. While the northern zone is composed of Gneisses and Granites, this has a great complexity of structure, having the most favorable climatic condition for human habitation. The elevation varying from 1,000 metres to 3,500 metres from low lying river valleys to peaks close to the Great Himalayas, the Lesser Himalayas, with moderately steep slopes, consists of many fertile and flat river valleys.

26. The sub-projects fall within this zone, which is the most populated zone. This region is watered by the Rivers like Alaknanda, Pinder, Kosi, Gomti, Saryu, Ramganga and Kali. The banks of these rivers locally called as 'seras' are highly fertile. The major Lesser Himalayan settlements are Almora, Bageshwar Chamoli, Champawat, Rudraprayag, Pauri, Tehri, Haldwani *etc.* are situated in this region. The cross profiles of the fluvial valleys show convex form with steep valley sides, interlocking spurs descending towards the main channel, hanging valleys, water falls and rapids and terraced agricultural fields on the gentle slopes on the valley sides. The clustering of villages is confined mainly on the gentle slopes of the ridges on the fluvial terraces.
27. The northern most zone consisting of perpetually snow-covered ranges between 3,500 to 4800 metres, although the snow-line rises to 5,400 metres, during summers at some places. The zone contains a number of glaciers, Pindari, Milam, Nandakot, Kafni, Sundardhung, Gori etc. which originate to a number of Snowfed Rivers like Alaknanda, Bhagirathi, Pinder, Gori Ganga *etc.*

2. Geology

28. According to Gansser (1964), the Himalayas may be sub-divided into five geographical divisions from west to east. In their longitudinal structure, the Himalayas are divided (from north to south) by a series of parallel tectonic zones. The ‘Sub’ or ‘Outer-Himalayas’ forming the foot-hill zone are delimited in the south by the large fans of Ganges alluvial deposits, whereas the northern edge is a clearly outlined tectonic feature—the Main Boundary Fault—genetically linked with Miocene metamorphism in the Himalayas.
29. The Lesser Himalayas are composed of tectonically compressed blocks of Paleozoic and Mesozoic crystallines, metamorphics, and sedimentary rocks. The Main Central Thrust is a major tectonic feature of the Himalayas and has brought the crystalline rocks of the Higher Himalayas over the younger sedimentaries.
30. The Greater/Higher Himalayas consist of a single lithological range with an average height exceeding 6,000 m. The width of this zone, mostly composed of granites and gneisses, is 24 Km. The Central Crystallines occupy the core or the 'axis' of lithological this range, and were considered to be Tertiary intrusive accompanying the compression movements responsible for the uplift of the Himalayas, by some earlier workers. The recent view, however, is that they are mostly Paleozoic or Precambrian in age and represent a geanticline between the unfossiliferous sediments of the Lesser Himalayas to the south and a highly fossiliferous sequence of the Tethys zone in the north. The stratigraphic order in the Tethys zone is well known because of the well preserved fossils such as productus, ophiceras and the likes.

3. Physiography

31. 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 has international borders with Nepal and China. Uttarakhand consists of 13 districts *viz*., Pithoragarh, Almora, Nainital, Bageshwar, Champawat, Uttarkashi, Udham Singh Nagar, Chamoli, Dehradun, Pauri, Tehri Garhwal, Rudraprayag and Haridwar.

B. Pedology

32. The soils are natural, dynamic, heterogeneous, non-renewable resource, which support plant and animal life. Most of the soil in Uttarakhand state is organic in nature but in some areas it content high proportion of minerals.
33. The soils developed from rocks like granite, schist, gneiss, phyllites, shales, slate etc. under cool and moist climate.
34. Very steep to steep hills and Glacio-fluvial valleys are dominantly occupied with very shallow to moderately shallow excessively drained, sandy-skeletal to loamy-skeletal, neutral to slightly acidic with low available water capacity soils. They have been classified as Lithic/Typic Cryorthents. These soils are in general under sparse vegetation.
35. The baseline data on soil quality at each proposed site for construction will be generated by the contractor before commencement of construction works. The details of the sites is given in ***Table IV-1***
36. During construction the sampling locations proposed are, where the construction/ restoration/repair work will be done.

Table IV-1: Locations for Generation of Baseline Data for Soil Sample

S. No.	Sub-Projects	No. of Sampling	Sampling Locations
1.	Gauchar	2	At project location Hanger & MPH
2	Nainisaini	2	At project location Hanger & MPH
3	Chinyalisaur	2	At project location Hanger & MPH
4	Shastradhara	2	At project location Hanger & MPH

C. Climate and Meteorology

37. The State of Uttarakhand, with its highly varying topographical features, has shown an equally variegating climatic condition, ranging from hot and sub-humid sub-tropical in the southern tract of Bhabhar to temperate, cold alpine, and glacial climates in the northern part of the high mountains.
38. Factors such as elevation, slope, and proximity of glaciers, forests, mountain peaks and ridges and direction of mountain ranges together give rise to the great variations in climatic conditions, even at the micro and local levels. These attributes determine the temperature range as well as the distribution of rainfall.
39. 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. The hilly terrain of the Himalayan region has snow cover

and is severely cold during winter with snowfall normally occurring during the months of December to March. The climatic conditions of Almora, Nainital, Pithoragarh, Chamoli, Uttarkashi, Pauri and Dehradun are humid and cold.

40. As per the Central Ground water board, the climate of proposed districts varies from Sub-tropical monsoon type (mild inter, hot summer) to tropical upland type (mild winter, dry winter, short warm summer). The northern, north-western, north-eastern and western part of the district is perennially under snow cover; here the climate is sub-arctic type as the area is represented by lofty Himalayan Range. Severe winter and comparatively higher rainfall are the characteristic features of the northern part. The year may be divided into four seasons *viz.*, the cold winter season (December to February), the hot weather season (March to May), south-west monsoon season (June to September) followed by post monsoon season (October to November).
41. Larger part of the targeted districts in the subproject are situated on the southern slopes of the outer Himalayas, monsoon currents can penetrate through trenched valleys, the rainfall reaches its maximal in the monsoon season that spans betweens June to September. Rainfall, spatially, is highly variable depending upon the altitude. In the Lesser Himalayan Zone (1000-3000 m. amsl) maximum rainfall occurs about 70 to 80% in southern half. August is the rainiest month. Rainfall rapidly decreases after September and it is the least in November. About 55 to 65% rainfall occurs in the northern half in Central Himalayan Zone. About 17% of the annual precipitation occurs in winter season. The winter precipitation is in association with the passage of the western disturbances
42. And is mostly in the form of snowfall, particularly at higher elevations. The precipitation during the pre-monsoon month, which is about 7% of the annual total and the post-monsoon months, is frequently associated with thunder storms. The precipitation scenario of the targeted districts to be covered under the subproject is given in the table place below.

Precipitation scenario in the Sub project area

S.No	Sub project area	Average annual Precipitation
1.	Chamoli	1489.10
2.	Pithoragarh	1502.00
3.	Uttarkashi	1693.00
4.	Dehradun	1896.00

D. Ambient Air Quality and Noise Level

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 sub-project areas and hence any other source of atmospheric air pollution is not expect The air pollution level is well within the permissible limits because there are no major sources of pollution in the sub-project region. The baseline data on ambient air quality will be generated by the contractor before commencement of construction work. The proposed locations of air quality monitoring at pre-construction stage (baseline data) are as

follows as per CPCB guidelines. The air parameters to be monitored are $PM_{2.5}$, PM_{10}, SO_2, NO_x and CO.

Table IV-2: Locations for Generation of Baseline Data for Ambient Air Quality (AAQ) and Noise Levels

Sl. No.	Sub-Project	No. of Stations	Sampling Locations	
			Station – 1	Station – 2
1.	Gauchar	2	Nearest Village (*i.e.* Gauchar)	At project location Hanger & MPH
2.	Nainisaini	2	Nearest Village (*i.e.* Nainisaini	At project location Hanger & MPH
3.	Chinyalisaur	2	Nearest Village (*i.e.* Chinyalisaur	At project location Hanger & MPH
4.	Sahtradhara	2	Nearest Village (*i.e.* Sahtradhara	At project location Hanger & MPH

44. During construction the sampling will be conducted where the construction/restoration work will be done.

45. 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 towns is almost calm except on some busy routes of Uttarakhand.

46. During the construction period, a temporary increase in the noise levels are expected as there will be movement of construction machineries and construction activities to be done in the proposed sites. Suitable noise barriers in the form of vegetation and timely scheduling of construction activities will help to minimize these effects better.

47. It was observed that ambient noise scenario in residential, commercial, and sensitive areas in the study area are quite low in general. The baseline data on ambient air quality will be generated by collection of representative samples by the contractor before commencement of construction works. The selection of sampling location will be representative of residential, commercial, institutional, industrial and sensitive locations. The proposed locations of Equivalent Day & Night Time Noise Levels at pre-construction stage (Baseline data) will be same as that indicated in ***Table IV-2***.

Sl. No.	Sub-Project	No. of Stations	Sampling Locations	
			Station – 1	Station – 2
1.	Gauchar	2	Nearest Village (*i.e.* Gauchar)	At project location Hanger & MPH
2.	Nainisaini	2	Nearest Village (*i.e.* Nainisaini	At project location Hanger & MPH
3.	Chinyalisaur	2	Nearest Village (*i.e.* Chinyalisaur	At project location Hanger & MPH
4.	Sahtradhara	2	Nearest Village (*i.e.* Sahtradhara	At project location Hanger & MPH

E. Hydrology

48. Uttarakhand has tremendous water resources such as glaciers, lakes, rivers and other water bodies. Most of these have tourism importance like Milam, Pindari, Sunder Dhunga and Heeramani Glaciers; Seven lakes in Nainital; and some wetlands. However these water bodies are located far from the sub-project sites.
49. Generally, there has been an overall decline in water resources in the State. Hydrological studies over the last decades confirm the diminishing water resources and the worsening crises as caused by the following factors which have resulted in the decrease in underground seepages. These have directly contributed to the reduction of water availability in and reduction of discharge in nallas as well as extensive disappearance of springs-the region's primary source of drinking water.
    - There has been a diminishing regulatory effect of glaciers of the Great Himalayan zone.
    - There is a long-term decreasing trend of stream discharges.
    - The capacities of the lakes have dwindled. Surface runoff on the hillsides has shown high increase.
    - There has been an increase in floodwater and decrease in base flow water in channels and rivers.
    - Extensive soil erosion and landslips are recurring phenomena in the region.

1. Water Drainage

50. The region of Uttarakhand is well drained by numerous rivers and rivulets locally known as Gad (river) and Gadhera (rivulet). The water resources of this region are of singular importance not only for the region but also for the whole Gangetic plains of north India. There are three main river systems are: (i) the Bhagirathi – Alaknanda basin – Ganges basin, (ii) The Yamuna – Tons basin, and (iii) the Kali basin.

2. Water Quality

51. 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 waste water, and runoffs from chemical fertilizers and pesticides. No proper sewage treatment facilities exist in the sub-project sites. The increasing pollution of water bodies constitutes the biggest threat to general public health and biodiversity of the state. At present, there is limited information available on the quality of fresh water resources of Uttarakhand State. Based on limited records, the water quality of Uttarakhand's rivers, rivulets, and other natural water bodies is generally good and no major source of water pollution was found. The hand pumps, natural water seepage in

hilly areas locally called as “Naula”, dhara 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 streams. The baseline data on water quality will be generated by collection of representative samples by the contractor before the commencement of construction activity. The main parameters will be monitored are TDS, TSS, pH, Hardness, BOD and Faecal Coli Form, etc.

Table IV-3: Locations for Generation of Baseline Data for Water Quality

Sl. No.	Sub-Project	No. of Stations	Sampling Locations	
			Station – 1	Station – 2
1.	Gauchar	2	Nearest Gauchar) Village (*i.e.*	At project location Hanger & MPH
2.	Nainisaini	2	Nearest Nainisaini Village (*i.e.*	At project location Hanger & MPH
3.	Chinyalisaur	2	Nearest Chinyalisaur Village (*i.e.*	At project location Hanger & MPH
4.	Sahtradhara	2	Nearest Sahtradhara Village (*i.e.*	At project location Hanger & MPH

F. Mineral Resources

52. Uttarakhand is not very rich in the field of mineral resources. Moreover, it is also part ecologically sensitive area, extensive quarrying is not practiced in the state. However, there are some minerals sparsely distributed in the state, which includes limestone, magnesite, gypsum, iron ore, graphite and copper.
53. It has been estimated that there are deposits of limestone, dolomite, magnesite, rock phosphate, gypsum, and soap stone in different areas of the State. Some of the major mineral deposits are indicated in the ***Table IV-4***

Table IV-4: Availability of important minerals (million tonnes)

S. No.	Name of Mineral	Quantity (million tonnes)
1.	Lime stone	430.5
2.	Marble	6.4
3.	Rock Phosphate	25.0
4.	Barytes	0.085
5.	Grayphite	10.7
6.	Dolomite (superior)	30
7.	Magnesite	70.294
8.	Copper	1.6
9.	Soap stone	26.64
10.	Gypsum	0.195

Source: *http://rrtd.nic.in/Uttrakhand.htm*

54. The other common minerals, which are found in the State are the following:

I. **Asbestos:** This is of the amosite variety and can be used for the production of asbestos, cement bricks, laboratory asbestos sheet and paper, but it is considered as low economic importance.

II. **Magnestic:** This is of an average quality is crystalline in nature, and is found associated with crystalline dolomites and sometimes with soapstone. The Magnesium carbonate found here is also of average quality and its mineralisation has also been reported in some districts of Uttarakhand.

III. **Soap stone or Steatite:** This is white saponaceous stone resembling pipe clay is obtained in as lenticular body and is associated with mineral pyrites, which adds a color to it, and in places with magnesite. it can be mined for use as filler in soap and in the cosmetic industries. In the past various utensils were made of it which, when polished, has the appearance of marble.

IV. **Copper:** The copper mines in uttarakhand are extensive and of reputed during the period of Hindus and The Gorkhas rules. All the rich mines have since being exhausted and at present they do not offer a fair field for the employment of capital.

V. **Iron:** Small and sporadic occurrence of iron are known to occur in several parts of district but are of hardly any economic importance. Iron ore, rich in haematite, and magnetic ore, with haematite and siderite, also occur in Uttarakhand.

VI. **Graphite:** In past, this mineral also known as plumbago, found mostly in patti Lohba, was used as a dye but no large deposits have been noticed for a long time.

VII. **Gypsum:** This mineral is found on the bank of some rivers and was used in the past for the manufacture of saucers and bowls. When ground to a fine powder it is known as “Plaster of Paris” and can be used for a number of purposes.

VIII. **Lead:** Deposits of this metal were fairly numerous in the past but it is found in somewhat inaccessible places and has long since ceased to be worked.

IX. **Slate:** This is dense, fine grained metamorphic rock, which is produced from fine clay, can be split into thin, smooth plates and is quarried throughout Uttarakhand except of some plains Districts. It is suitable for roofing purposes, the thin dark blue slates being some of what inferior in quality.

X. **Building Stone:** Stone which can be used for building purposes is available in most parts of Uttarakhand State. Sand stone is found in abundance in the lower hills. Gneiss and chlorite schists, which are frequently used for building purposes.

Y. **XI. Sulphur:** This is yellow coloured mineral, also known as brimstone is found in the form of green sulphate of iron and is obtainable from iron pyrites and copper

mines, its presence being characterised by a small as of rotten eggs. Sulphur springs also occur in many parts of Uttarakhand State.

XII. Bitumen: The brownish white natural sulphate of alumina known as Shilajit is found in rocks at a fairly high altitude and occur in small lumps which generally have an admixture of red sand and micaceous stone embedded in them. It is used in Ayurvedic medicine and during the season when there is an influx of pilgrims, it fetches good income to those who deal in its business and collection from the nature.

55. Besides the above minerals, some other minerals found in small quantities such as antimony, arsenic, lignite or brown marble, mica and silver.

G. Seismology

56. 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.

57. 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 region is classified under high seismic zones IV and V. The proposed helipad site is located in the Seismic Zone V. The modified mercalli intensity broadly associated with the zone V is IX. The seismic zones of India are represented in ***Figure – 3*** given below.

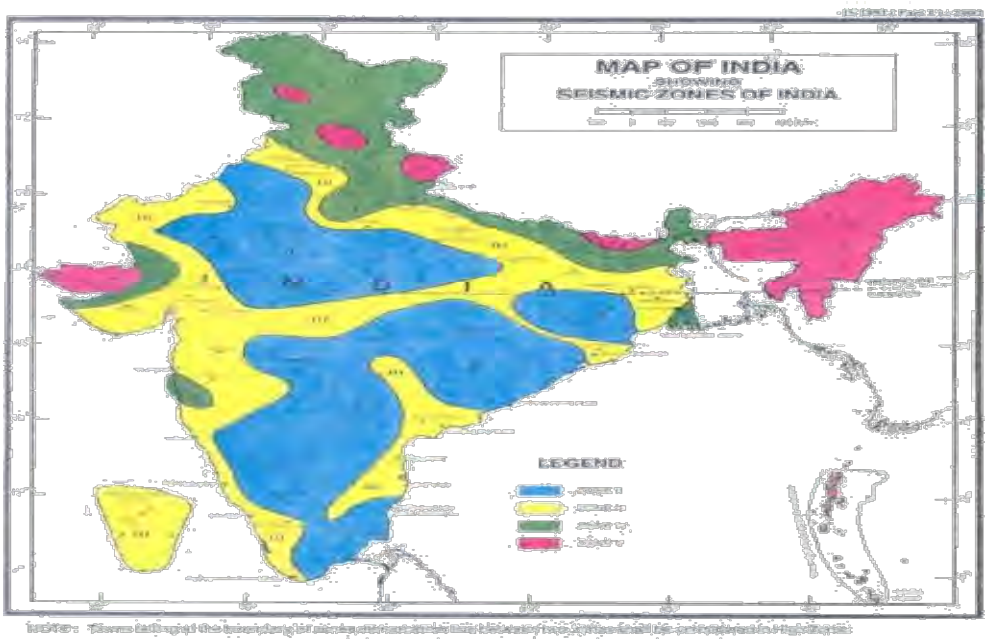


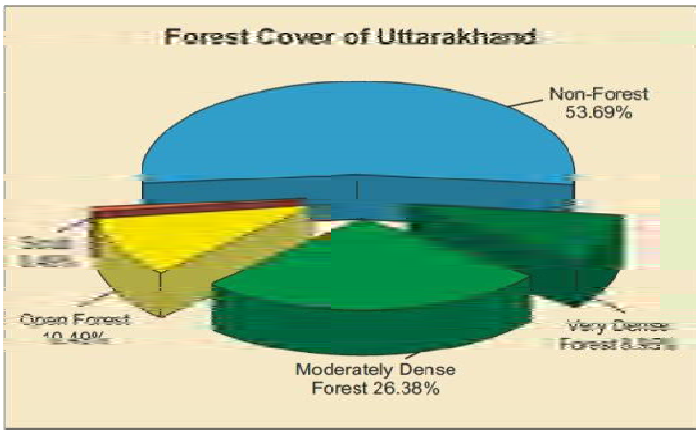
Figure – 3: Seismic Zones of India

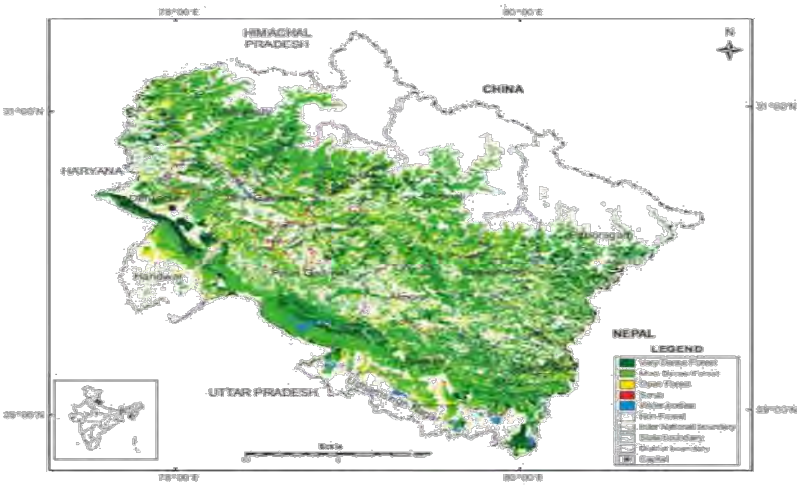
H. Ecology

1. Forests

58. According to the India State Forest Report 2013, the recorded forest area of the Uttarakhand state is 24,508 Km^2, which constitutes 45.82% of its total geographical area. The Very Dense Forests constitute of 4,785 km^2, Modedate dense forest of 14,111 km^2 and Open Forest of 5,612 km^2.

59. The Garhwal region has more forest cover with 14,639 km^2 compared to the Kumaon region with 9,869 km^2. However, they are almost equal in terms of distribution over its territory with 45% and 47% of covered with forest. The district of Pauri Garhwal, Uttarkashi, Nainital, and Chamoli have the largest forest cover accounting for 50% of all the state's total. The forest covers of Uttarakhand state are shown in ***Figures – 4 & 5*** and the district-wise forest cover are given in ***Table IV-5***.





61. **60. Table IV-5: District-wise Forest Cover, Uttarakhand**

Divisions	Districts	Geographical Area (Km^2)	Forest Cover (Km^2)			Total Forest	% of GA
			Very Dense	Moderate Dense	Open Forest		
Garhwal	**Chamoli**	**8,030**	**441**	**1,573**	**686**	**2700**	**39.23**
	Dehradun	**3,088**	**583**	**695**	**332**	**1,610**	**52.17**
	Pauri Garhwal	5,329	520	2,095	676	3,291	61.76
	Rudraprayag	1,984	241	592	297	1,130	56.96
	Tehri Garhwal	3,642	298	1,232	618	2,148	58.96
	Uttarkashi	**8,016**	**570**	**1,957**	**618**	**3,145**	**39.23**
	Haridwar	2,360	25	333	257	615	26.06
Divisions	**Districts**	**Geographical Area (Km^2)**	**Forest Cover (Km^2)**			**Total Forest**	**% of GA**
			Very Dense	**Moderate Dense**	**Open Forest**		
Sub-total	***7 Districts***	***32,449***	***2,678***	***8,477***	***3,484***	***14,639***	***45.11***
Kumaon	**Pithoragarh**	**7,090**	**571**	**1,113**	**416**	**2,100**	**29.62**
	Bageshwar	2,246	197	883	305	1,385	61.67
	Almora	3,139	222	927	428	1,577	52.04
	Nainital	4,251	605	1,899	570	3,074	72.31
	Champawat	1,766	337	576	274	1,187	67.21
	Udham Singh Nagar	2,542	175	236	135	546	21.48
Sub-total	***6 Districts***	***21,034***	***2,107***	***5,634***	***2,128***	***9,869***	***50.38***
Total	**13 Districts**	**5,3483**	**4,785**	**14,111**	**5,612**	**24,508**	**45.82**

Source: India State Forest Report, 2013

Note: (i) Very Dense Forest: *All lands having tree canopy cover > 70%.*

(ii) Moderate Dense Forest: *Tree canopy cover between 40%-70%.*

(iii) Open Forest: *Tree canopy cover between 10%-40% and*

(iv) Degraded Forest: *Tree canopy cover <10%.*

60. Forest type mapping using satellite data has been undertaken by the "Forest Survey of India" with reference to the classification given by Champion and Seth (1968). As per this assessment, the state has 34 forest types, which belong to eigth forest type groups, *viz.*

- Tropical Moist Deciduous,
- Tropical Dry Deciduous,
- Sub-tropical Pine,
- Himalayan Moist Temperate Forests,
- Himalayan Dry Temperate Forests,
- Sub-Alpine Forests,
- Moist Alpine Scrub and
- Dry Alpine Scrubs.

A wide variety of trees are found in Uttarakhand State. Some prominent tree species enumerated in this section based on their altitudinal gradients above mena sea level. Some notable tree species are Poplar (*Populus ciliata*) and Eucalyptus (*Eucalyptus citriodora*) due to their fast growing and large market demands, and Khair (*Acacia catechu*), Sal (*Shorea robusta*), Seesam (*Dalbergia sissoo*) *etc.* for their ecological and economic importance. which are highly adapted to sandy soil are being used to stabilize river banks and islands in river beds. Oak (*Quercus* sp.) is another important species considered to be amongst the best wood in the world specially for making agriculture implements due to its good compactness with twisted fibers. The State Govt. of Uttarakhand has declared the oak tree (*Quercus leuchotrichophora*) 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. The Chir-Pine (*Pinus roxburghii*) is an excellent source of resin in Uttarakhand, which is used in production of terpentine oil. The Deodar (*Cedrus deodara*) grows in the temperate to alpine area that is found between 1800 to 2400 m (amsl). Its oil has an impotant medicial property generally used in skin diseases and disorders. The predominant top-canopy (tree) species of the State forests have been described in ***Table IV-6*** given below.

Table IV- 6: Predominant top-canopy (tree) species according to altitude (m. amsl)

Sl. No.	Name of Some Common Tee Species of Uttarakhand			Altitude (m. amsl)
	Vernacular	**English Name**	**Botanical Name**	
1.	Cheed	Chir-Pine	*Pinus roxburghii*	600-1800
2.	Kail	Blue-Pine	*Pinus wallichiana*	1800-2400
3.	Banj	Himalayan Oak Tree	*Quercus incana*	1700-2000
4.	Deodar	Himalayn Cedar Tree	*Cedrus deodara*	1800-2400
5.	Raga	Himalayan Low Level Fir	*Abies pindrow*	2100-2900
6.	Raga	Himalayan High Level Fir	*Abies spectabilis*	2900-3600
7.	Thuner	Himalayan Yew	*Texus baccata*	2400-2700
8.	Bhojpatra	Himalayan Birch	*Betula utilis*	3000-3500
9.	Kathbhoj	Himalayan Birch	*Betula alnoides*	2800-3200
10.	Moru	Oak Tree	*Quercus dilatata*	2000-2500
11.	Kharsu	Oak Tree	*Quercus semicarpifolia*	2200-2400
12.	Spruce	Spruce	*Picea smithiana*	2400-2900
13.	Surai	Cypress	*Cupressus torulosa*	2300-2400
14.	Pangar	Horse Chestnut	*Aesculus indica*	1800-2100
15.	Buransh	Rose Wood	*Rhododendron arboretum*	1600-2000
17.	Simaru	Rose Wood	*Rhododendron campanulatum*	2200-3000
18.	Kachnar	Orchid Tree	*Bauhinia variegate*	600-900

19.	Shal	Shal Tree	*Shorea robusta*	600-750
20.	Sagwan	Teak	*Tectona grandis*	600-750

2. Agriculture

62. Agriculture is the main economic activity in the State as per latest land-use statistics. The total reported area for agricultural activity is 55.66 lakh hectares. In the hills, the major crops grown include wheat, paddy, mandua, ramdana and potato whereas in the plains the major crops are wheat, paddy, pulses, and sugarcane.

63. The pattern of land ownership is unlike that found in the rest of India. Most of the Uttarakhand farmers are owner-cultivators. Tenant farming and share cropping are rare while land holdings are generally small and limited to family farms - approximately 50 percent of all land holdings are less than 0.5 hectares in size and 50 percent under one hectare. As such, the zamindari system of big landholders is limited to the plains. Both the geography and the Pahari cultural heritage have played roles in maintaining a traditionally more equitable, if impoverished, land distribution in Uttarakhand.

65. **64. Table IV-7. Area under Principal Crops and Productivity in Uttarakhand**

Sl. No.	Items	Year/ Period	Unit	Statistics
A. Area Under Principal Crops (Provisional)				
1.	Cereals	2011-12	Ha	896774
	(i) Rice (*Oryza sativa*)	2011-12	Ha	280108
	(ii) Wheat (*Triticum aestivum*)	2011-12	Ha	369209
	(iii) Barley (*Hordeum vulgare*)	2011-12	Ha	22508
	(iv) Maize (*Zea mays*)	2011-12	Ha	28038
	(v) Finger millet (*Eleusine coracana*)	2011-12	Ha	125163
	(vi) Sanwan	2011-12	Ha	63002
	(vii) Other	2011-12	Ha	8746
2.	Pulses	2011-12	Ha	55690
	(i) Urad (*Phaseolus radiatus*)	2011-12	Ha	12980
	(ii) Lentil (*Lens esculenta*)	2011-12	Ha	12295
	(iii) Pea (*Pisum sativum*)	2011-12	Ha	3451
	(iv) Gahat (*Mycrotoma biflorum*)	2011-12	Ha	12033
	(v) Rajma (*Dolichos lablab*)	2011-12	Ha	4614
	(vi) Gram (*Cicer arietinum*)		Ha	766
	(vii) Bhatt (*Glycine* Sp.)	2011-12	Ha	5734
	(viii) Others	2011-12	Ha	3817
3.	Oil Seeds	2011-12	Ha	29705
	(i) Mustard (*Brassica compestris*)	2011-12	Ha	14294
	(ii) Seasmum (*Sesamun indicum*)	2011-12	Ha	2020
	(iii) Groundnut (*Arechis hypogea*)	2011-12	Ha	1112
	(iv) Soyabean (*Glycin max*)	2011-12	Ha	12279
4.	Other Crops	2011-12		
	(i) Sugarcane (*Saccharum officinarum*)	2011-12	Ha	108255
	(ii) Onion (*Allium cepa*)	2011-12	Ha	2353
B. Agriculture Productivity (Provisional)				
1.	Cereals	2011-12	Qtl./Ha	22.03
	(i) Rice (*Oryza sativa*)	2011-12	Qtl./Ha	21.20
	(ii) Wheat (*Triticum aestivum*)	2011-12	Qtl./Ha	23.80
	(iii) Barley (*Hordeum vulgare*)	2011-12	Qtl./Ha	12.64
	(iv) Maize (*Zea mays*)	2011-12	Qtl./Ha	14.66

	(v) Finger millet (*Eleusine coracana*)	2011-12	Qtl./Ha	13.92
2.	Pulses	2011-12	Qtl./Ha	8.15
	(i) Urad (*Phaseolus radiatus*)	2011-12	Qtl./Ha	8.13
	(ii) Lentil (*Lens esculenta*)	2011-12	Qtl./Ha	8.19
	(iii) Pea (*Pisum sativum*)	2011-12	Qtl./Ha	9.54
	(iv) Gahat (*Mycrotoma biflorum*)	2011-12	Qtl./Ha	8.04
	(v) Rajma (*Dolichos lablab*)	2011-12	Qtl./Ha	10.27
	(vi) Gram (*Cicer arietinum*)		Qtl./Ha	7.85
	(vii) Bhatt (Black Soyabeen)	2011-12	Qtl./Ha	9.83
3.	Oil Seeds	2011-12	Qtl./Ha	8.34
	(i) Mustard (*Brassica compestris*)	2011-12	Qtl./Ha	8.00
	(ii) Seasmum (*Sesamun indicum*)	2011-12	Qtl./Ha	2.26
	(iii) Groundnut (*Arechis hypogea*)	2011-12	Qtl./Ha	12.72
	(iv) Soyabean (*Glycin max*)	2011-12	Qtl./Ha	14.46
4.	Other Crops	2011-12	Qtl./Ha	
	(i) Sugarcane (*Saccharum officinarum*)	2011-12	Qtl./Ha	609.33
	(ii) Onion (*Allium cepa*)	2011-12	Qtl./Ha	55.69

Source: *Uttarakhand at a Glance (2012-13), Directorate of Economics & Statistics, GoU.*

Table IV-8: Ecological Sub-Regions and Altitude-wise Major Agriculture Crops

Sl. No.	Ecological Sub-Region	Altitudinal Gradient (m)	Major Agriculture Crops
1.	Lower Dun, Terai	300-600	Wheat (*Triticum aestivum*), Paddy (*Oryza sativa*) and Sugarcane (*Sachharum officinarum*).
2.	Upper Dun, Bhabar, lower Shivaliks	600-1,200	Wheat (*Triticum aestivum*), Paddy (*Oryza sativa*), Maize (*Zea mays*) Chaulai (*Amaranthus* species) Finger millet (*Eleusine coracana*) Barnyard millet (*Echinochloa frumentesia*)
3.	Middle Garhwal-Kumaon Region	1,200-1,800	Wheat (*Triticum aestivum*), Paddy (*Oryza sativa*), Cheena (*Panicum miliaceum*), Potato (*Solanum tuberosum*), Barley (*Hordeum vulgare*) Finger millet (*Eleusine coracana*) and Barnyard millet (*Echinochloa frumentesia*),
4.	Upper Garhwal-Kumaon Region	1,800-2,400	Wheat (*Triticum aestivum*) Barley (*Hordeum vulgare*) Potato (*Solanum tuberosum*), Chaulai (*Amaranthus* species), Cheena (*Panicum miliaceum*) and Phaphra (*Fagopyum tataricum*)
5.	Cold Zone	2,400-3,600	**Summer Crops:** Wheat (*Triticum aestivum*), Barley (*Hordeum vulgare*) Potato (*Solanum tuberosum*), Phaphra (*Fagopyum tataricum*) Chaulai (*Amaranthus* species), Kauni (*Setaria etalica*) Ogal (*Fagopyrum esculentum*) and Uva Jau (*Hoycleum himalayanse*)

Source: *Uttarakhand at a Glance (2012-13), Directorate of Economics & Statistics, GoU.*

64. The irrigation facility is only available adjoining to rivers in valleys. The cross drainages are very limited within the state. The irrigation and drainage system in Uttarakhand is described in **Table IV-9** given below.

Table IV-9: Mode of Irrigation and Drainage System in Uttarakhand

Sl. No.	Items	Year/Period	Unit	Statistics
A. Net and Gross Irrigated Area				
1.	Canals	2011-12	Ha	83687
2.	Tube Wells	2011-12	Ha	216100
3.	Other Wells	2011-12	Ha	11519
4.	Tanks/ Ponds	2011-12	Ha	83
5.	Other Sources	2011-12	Ha	24747
6.	Net Irrigated Area (NIA)	2011-12	Ha	336136
7.	Gross Irrigated Area (GIA)	2011-12	Ha	561733
B. Irrigational Infrastructure				
1.	Length of Canals	2011-12	Km.	11588
2.	Length of Lift Canals	2011-12	Km.	242
Sl. No.	Items	Year/Period	Unit	Statistics
3.	Tube Wells (State)	2011-12	No.	1110
4.	Pump Sets (Boring/ Free Boaring)	2011-12	No.	54642
5.	Hauj	2011-12	No.	32850
6.	Gool	2011-12	Km.	26365
7.	Hydrum	2011-12	No.	1547
8.	C.C.A. Under State Canal	2011-12	Lakh (Ha)	3.302
9.	Revenue Collection by Irrigation	2011-12	Rs. (Lakh)	252.27

Source: *Uttarakhand at a Glance (2012-13), Directorate of Economics & Statistics, GoU.*

3. Fishery

65. The State has great potential for the development of fisheries. The State abounds in perennial and seasonal water bodies which hold high promise for the growth of fishery. Golden Mahseer (*Tor putitora*), one of the main game and food fish in the central Himalayan region, has decreased significantly. The fish migrate considerable distances upstream in search of suitable spawning grounds. Stocks of the Himalayan mahseer are depleted and it is now considered an endangered species. Catch data from the major rivers are not available while studies are characterized as sporadic and preliminary in nature. According to available statistics, the Himalayan Mahseer contributes significantly only in one river-comprising 32.8% of the catch from the Nayar River, 9.7% from Song River, and 0.8-3.1% from other rivers. The important fishes commonly found in the Himalayan river basins are *Catla catla*, *Labeo rohita*, *Labeo calbase*, *Cirrihinus mirigale*, *Rita rita*, *Heteropneuptus fonilis*, *Notopterus nontopterus*, *Macrobrachum rosenbergii*, *Channa punetatus etc.*

66. No interference with fishery activities is envisaged by execution of the proposed subprojects.

4. Biodiversity and Protected Areas

67. The State of Uttarakhand is endowed with rich bio-diversity as manifested by its approximately 46 percent forest cover. The State has established six national parks and seven 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, Nandhaur Wildlife 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.

Table IV-10: Wildlife in Uttarakhand

Sl. No.	Protected Areas	Year	Unit	Statistics
1.	**Biosphere Reserves**			
	(i) Number	2013-14	No.	1
	(ii) Area	2013-14	km^2	5,860.69
2.	**National Parks**			
	(i) Number	2013-14	No.	6
	(ii) Area	2013-14	km^2	4,915.02
3.	**Wildlife Sanctuaries**			
	(i) Number	2013-14	No.	7
	(ii) Area	2013-14	km^2	2,690.12
Sl. No.	Protected Areas	Year	Unit	Statistics
4.	Important Wild Animals			
	(i) Tiger	2008	No.	178
	(ii) Leopard	2008	No.	2335
	(iii) Elephant	2008	No.	1346
	(iv) Musk Deer	2008	No.	376
	(v) Black Bear	2008	No.	1935
	vi) Sloth Bear	2008	No.	172
	vii) Brown Bear	2008	No.	14

Source: *Wildlife and Protected Areas, ENVIS, 2014*

68. 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.
69. The State of Uttarakhand is represented by Biogeographic Zones 2B Western Himalaya and 7B Siwaliks[1] 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.

Table IV-11: Protected Areas in Uttarakhand

S. No.	Protected Area	District	Establishment	Area (m^2)
National Park				
1	Corbett	Nainital & Pauri Garhwal	1936	520.82
2	Nanda Devi	Chamoli	1982	624.60

3	Valley of Flowers	Chamoli	1982	87.50
4	Rajaji NP	Dehradun, Pauri & Haridwar	1983	820.00
5	Gangotri	Uttarkashi	1989	2390.02
6	Govind	Uttarkashi	1990	472.08
Wildlife Sanctuary				
1	Govind WLS	Uttarkashi	1955	485.89
2	Kedarnath WLS	Chamoli	1972	975.20
3	Askot WLS	Pithoragarh	1986	600.00
4	Sonanadi WLS	Garhwal	1987	301.18
5	Binsar WLS	Almora	1988	47.07
6	Musoorie WLS	Dehradun	1993	10.82
7	Nandhaur WLS	Nainital and Champawat	2012	269.96

Source: *Wildlife and Protected Areas, ENVIS, 2014*

70. 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. Some important information about wildlife of Uttarakhand is given in the Table below.

Table IV-12: List of Major Flora

Sl. No.	Local Name	Scientific Name
A. Trees		
1.	Buransh	*Rhododendron arboretum*
2.	Deodar	*Cedrus deodara*
3.	Chir	*Pinus roxburghii*
4.	Surai	*Cupressus tourulosa*
5.	Padam	*Prunus cornuta*
6.	Mehal	*Pyrus pashia*
7.	Otis	*Alnus nepalensis*
8.	Ayar	*Lyonia ovalifolia*
9.	Kafal	*Myrica sapida*
10.	Akhrot	*Juglans regia*
11.	Bhimal	*Grewia optiva*
12.	Ritha	*Sapijdus mukorossi*
13.	Tun	*Toona ciliate*
14.	Nimla	*Ficus auriculata*
15.	Timur	*Zanthoxylum tamala*
16.	Kharik	*Celtis australis*
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*
B.		

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*
C. Grasses and Herbs		
1.	Dub	*Cynodon dactylon*
2.	Kush	*Sacharum spontaneum*
3.	Gol ringal	*Chimonobambusa falcate*
4.	Jatamasi	*Nardostachys grandiflora*
5	Tachita	*Apluda muticr*

Sl. No.	Local Name	Scientific Name
6.	Dev ringal	*Thamnocalamus faclouerі*
7.	Jhugra ringal	*Arundinaria jaunsarensis*
8.	Thamgil	*Thamnocalamus spathiflorus*

Table IV-13: List of Major Fauna

Sl. No.	Wild Animals	
	Local Name	**Scientific Name**
A. Mammals		
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 pennant*
14.	Bandar	*Macaqua mulatta*
B. Birds		
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 himalayana*

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*

Source: *Negi, A.S., Status, Distribution and Management of Mountain Ungulates in Uttaranchal, Envis Bulletine, 2002.*

5. Biosphere Reserves

72. The Biosphere Reserve is the top category after Wildlife Sanctuary and National Park in the Country. Out of the 14 Biosphere Reserves situated in India, the Nanda Devi Biosphere Reserve (NDBR)—established second among the 14—is situated in the State of Uttarakhand. It extends in the three districts of Chamoli (Garhwal), Pithoragarh, and Bageshwar (Kumaon). The Nanda Devi National Park (NDNP) and the Valley of Flowers are UNESCO World Heritage Site declared in 1988. The NDNP is located in the transition range between the Zanskar range and Himalayan foothills with 97 species of plants including many rare and almost extinct plants like *Saussurea sudhanshui, Nardostachys grandiflora, Picrorhiza kurroa, Cypripedium elegans, C. himalaicum, Dioscorea deltoidea and Allium stracheyi.* There are also 83 animal species including the Bharal (*Pseudois nayaur*), Himalayan Musk Deer (*Moschus chrysogaster*), Mainland Serow (*Capricornis sumatraensis*), Himalayan Tahr (*Hemitragus jemlahicus*), Goral (*Nemorhaedus goral*), Snow Leopard (*Panthera uncia*), Common Leopard (*Panthera pardus*), Himalayan Black Bear (*Selenarctos thibetanus*), Common Langur (*Presbytis entellus*), and Rhesus Macaque (*Macaca mullata*). Also, there are about 114 avian species and 27 species of butterflies in the NDNP.

73. The Rajaji National Park was established in 1983 protecting sections of the tropical deciduous forest area of the Shivalik Hill range on the Himalayan foothills. The Park covers 820.42 square kms, along the Haridwar, Dehradun and Pauri Garhwal. The park has a vast Sal forest, and mixed forest mostly covered with Acacia catechu and Vetiveria zizanioides. It is refuge to approximately 49 species of mammals, 315 species of birds, 49 species of reptiles, 10 species of amphibians and 49 of Piscean species. This park has the largest population of elephants in Uttarakhand and a large population of tigers and leopards. Noteable animals seen in the par are the Wild Cat *(Felis silvestris)*, Goral *(Nemorhaedus goral)*, Rhesus Macaque *Maccaca mulatta)*, Himalayan Yellow Throated Marten *(Martes flavigula)*, Monitor Lizard *(Varanus)*, Indian Hare *(Lepus nigricollis)*, Sloth *(Folivora)*, Himalayan Black Bear *(Ursus thibetanus)*, King Cobra (*Ophiophagus Hannah)*, Jackal *(Canis)*, Barking Deer *(Muntiacus muntjak)*, Sambar *(Rusa unicolor)*, Wild boar *(Sus scrofa)*, Indian Langur *(Semnopithecus entellus)*, Indian Porcupine *(Hystrix indica)* and Pythons *(Pythonidae)*. The population of birds consists of the Great Pied Hornbill *(Buceros bicornis)*, Himalayan Pied Kingfisher *(Ceryle rudis)*, Sparrows *(Passeridae)*, Fire Tailed Sunbird *(Aethopyga ignicauda)* and the Peacock *(Pavo cristatus)* - Indian National Bird.

74. The Jim Corbett National Park covers 520 sq kms of Savannah-type grasslands and Sal forests. Declared as a Tiger Reserve in 1973, the Park has a rich diversity including the White Tiger *(Panthera tigris tigris)*, Throated Martem *(Martes flavigula)*, Himalayan Palm Civet *(Paradoxurus hermaphroditus)*, Indian Grey Mongoose *(Herpestes edwardsii)*, Para, Kakka, Ghoral *(Nemorhaedus goral)*, Bar-headed Goose *(Anser indicus)*, Duck, Grepe, Snipe *(Gallinago gallinago)*, Turtles, Python *(Pythonidae)*, Common Otter *(Lutrinae)*, Porcupine *(Hystrix indica)*, Clack-taped Hare, Chital *(Axis axis)*, Spotted Deer *(Axis axis)*, Viper, Cobra, Krait, King Cobra (*Ophiophagus Hannah)*, Tortoise *(Testudinidae)*, Graylag goose *(Anser anser)*, Sandpiper *(Scolopacidae)*, Gull *(Laridae)*, Cormorants *(Phalacrocoracidae Sp)* and Egrets (*Ardea alba)*.

75. The Govind National Park covers an area of 957 sq. kms in Uttarakashi and a sanctuary for the endangered Snow Leopard and some other 15 species of mammals and 150 species of birds that includes the Himalayan Black bear *(Ursus thibetanus)*, Brown bear *(Ursus arctos)*, Musk deer *(Moschus)*, Bharal *Pseudois nayaur*), Himalayan Tahr *(Hemitragus jemlahicus)*, Serow *(Capricornis)* and Common leopard *(Panthera pardus)*. The endangered birds found in this region are Monal Pheasant *(Lophophorus impejanus)*, Koklas Pheasant, Bearded Vulture Himalayan Snow Cock (*Gypaetus barbatus)*, Golden Eagle *(Aquila chrysaetos)*, Western Tragopan *(Tragopan melanocephalus)*, Steppe Eagle *(Aquila nipalensis)* and Black Eagle *(Ictinaetus malaiensis)*. Other varieties of birds include Owls, Pigeons, Minivets, Thrush, Warblers, Bulbul, Cuckoo and Finches.

75. The Valley of Flowers is a World Heritage Site located in Chamoli. There are hundreds of species mostly being Orchids, Poppies, Primula, Calendulas, Iris, Lily, Roses, Violets, Rhododendron, Angelica, Himalayan Fritillary, Daisies and Anemones and also supports a variety of mammals like the Himalayan Tahr, Snow Leopard, Musk Deer, Red Fox, Common Langur (a type of monkey), Bharal, Serow, Himalayan Black Bear, Himalayan Brown Bear, Pica (Mouse hare). A huge variety of butterflies and birds are also found in the valley including Himalayan Golden Eagle, Griffon Vulture, Snow Partridge, Himalayan Snow Cock, Himalayan Monal, Snow Pigeon, and Sparrow Hawk. All the protected sites listed above are far away from the 5 sub-project locations.

I. Socio-Economic Profile

1. Social and Cultural Development

76. The State of Uttarakhand occupies a total land area of 53,483 Km^2, which is about 1.73% of the total geographical area of the country. The native people of Uttarakhand are generally called either Garhwali or Kumaoni depending on their place of origin in either the Kumaon or Garhwal region.

77. According to the 2011 census of India, Uttarakhand has a population of 10,086,292 people comprising 5,137,773 males and 4,948,519 females. The state is the 20^{th} most populous state of the country having 0.84% of the population on 1.69% of the land. The population density of the state is 189 people/Km^2 having a 2001-2011 decadal growth rate of 18.81%. The gender ratio is

963 females/1000 males. The crude birth rate in the state is 18.6 with the total fertility rate being 2.3. The state has an infant mortality rate of 43, a maternal mortality rate of 188 and a crude death rate of 6.6.

78. Administratively, the State is divided into Garhwal and Kumaon Divisions and 13 Districts, 49 Tehsils and 95 Blocks. The Kumaon and Garhwal Divisions have six and seven Districts respectively. There are 16,177 villages in the State and 7,227 gram panchayats. Of the total number of villages, 5,868 villages are not connected by roads.

2. Land Use Pattern

79. The land use pattern of Uttarakhand is strongly governed by the following geo-climatic factors: altitudinal gradients, climate, mountainous terrain, lithological type, topography, surface hydrology, exposure of sun light in the crop fields, forests & alpine meadows, sparse vegetation (scrub), human settlement areas, grazing and barren land *etc.*

80. Forest is the main land use sector in the State and nearly 45.82% of the geographical area is under forest cover. The timber line vegetation is clearly demarcated above 2900 m (amsl) altitude. 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 12.44% of the total areas 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.

J. Health

81. The state Infant Mortality Rate is 36 and Maternal Mortality Ratio is 359 (SRS 2007 - 2009) which are higher than the National average. The Sex Ratio in the State is 963 (as compared to 940 for the country). The comparative figures of major health and demographic indicators are shown in ***Table IV-14***.

Table IV-14: Demographic, Socio-economic and Health Profile of Uttarakhand as compared to India Figures

S. No.	Indicator	Uttarakhand	India
1.	Total Population (in Crore: Census 2011)	1.01	121.01
2.	Decadal Growth (in %: Census 2011)	19.17	17.64
3.	Crude Birth Rate (SRS 2011)	18.9	21.8
4.	Crude Death Rate (SRS 2011)	6.2	7.1
5.	Natural Growth Rate (SRS 2011)	12.8	14.7
6.	Infant Mortality Rate (SRS 2011)	36	44
7.	Maternal Mortality Rate (SRS 2007-09)	359	212
8.	Total Fertility Rate (SRS 2011)	NA	2.4
9.	Sex Ratio (Census 2011)	963	940
10.	Child Sex Ratio (Census 2011)	886	914
11.	Schedule Caste Population (in Crore: Census 2001)	0.15	16.67
12.	Schedule Tribe population (in crore: Census 2001)	0.02	8.43
13.	Total Literacy Rate (in %: Census 2011)	79.63	74.04

14.	Male Literacy Rate (in %: Census 2011)	88.33	82.14
15.	Female Literacy Rate (in %: Census 2011)	70.70	65.46

Source: *RHS Bulletin, March 2012, M/O Health & F.W., GOI.*

82. The health infrastructure of the State is described in succeeding Table. There are only 14 Obstetricians/Gynaecologists and 20 Pediatricians in the State. Such numbers are way below the estimated State requirement of 59 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. These health infrastructures have been described in ***Table IV-15***.

Table IV-15: Health Infrastructure of Uttarakhand

Indicators	**Required**	**In Position**	**Shortfall**
Sub-centre	2341	1848	493
Primary Health Centre	351	257	94
Indicators	Required	In Position	Shortfall
Community Health Centre	87	59	28
Health worker (Female)/ANM at Sub Centres & PHCs	2105	2016	*
Health Worker (Male) at Sub Centres	1848	184	1664
Health Assistant (Female)/LHV at PHCs	257	88	169
Health Assistant (Male) at PHCs	257	29	228
Doctor at PHCs	257	205	52
Obstetricians & Gynecologists at CHCs	59	14	45
Pediatricians at CHCs	59	20	39
Total specialists at CHCs	236	51	185
Radiographers at CHCs	59	17	42
Pharmacist at PHCs & CHCs	316	292	24
Laboratory Technicians at PHCs & CHCs	316	81	235
Nursing Staff at PHCs & CHCs	670	243	427

Source: *RHS Bulletin, March 2012, M/O Health & F.W., GOI.*

K. Literacy

83. As per census data of 2011, the literacy rate of the Uttarakhand is 79.63% with 88.33% literacy for males and 70.70% literacy for female. In Uttarakhand, there are 15331 primary schools with 1040139 students and 22118 working teachers as per census 2011.

L. Cultural and Archeological Resources

84. 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 Fair, Kunjapuri Fair, Lakhawar Village Fair, and Mata Murti Ka Mela. 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 Fair.

85. In places that are not easily accessible, the people of the district have been able to preserve their culture, folk lore, folk songs and folk dances, the some of the better known cultural art forms are being described below:

- *The Thadiya dance, which is accompanied by song, is performed on Basant Panchami, the festival celebrating the advent of spring. Another dance, is performed inn Deepawali and the Pandava Nritya during the winter particularly after the harvesting of crop and it depicts the principal events of the Mahabharata.*
- *Other folk dances are Jeetu Bhagdawal and Jagar or Ghariyali. These dances enact mythological stories, the participants, both men and women, put on their traditional colorful dress and dance to the tune of drums and Ransinghas.*
- *One of the important dance performed during the fairs and accompanied by song is called Chanchari or Jhoda, in which both men and women participate.*

86. Folk songs are usually traditional and are sung particularly by the woman, who works very hard in the fields from morning till night in all kind of weather. During the month of Chaitra the women of the village gather at a central place and sing traditional song which generally relates deeds of heroism, love and the hard life which they have to lead in the hills. In the district, fairs, festivals, religious and social gatherings are the main occasions for recreation and amusement. On special occasions people arrange swangs (open air dramatic performances) particularly depicting scenes or legends connected with Shiva and Parvati.
87. The houses in the hilly areas of Uttarakhand do not build according to any town planning scheme but have been put up haphazardly in clusters on level grounds at places where water springs are accessible or on the bank of the river in the valleys. The houses are build of stones and are generally double storeyed. Each house has in front courtyard called a Chauk. A mud or stone staircase or a wooden ladder leads to the upper storey, the roof built of wood and stone. The height of the upper storey is generally 2.1 m and the roof is usually a sloping structures of timber covered with Patals (quartzite slabs or states) or the well off use corrugated galvanized iron sheets. Generally the upper storey has a Verandah in front of the upper rooms.
88. The houses in the higher regions are two to three storeyes with balconies all round and paved courtyard in front where people do their threshing, weaving, spinning and other house hold works. At times the cattle sheds are made at some distance from the villages. The houses are built in rows of half a dozen or so and strikingly picturesque in their fort like appearance.
89. The staple food grains consumed by the people are *Triticum aestivum* (wheat), *Oryza sativa* (rice), *Zea mays* (maize), *Eleusine coracana* (Mandua) and *Echinochloa frumentasea* (Jhangora), the last three being coarse grains generally eaten by the poorer sections. The pulses consumed are urad, gahat, bhatt, soontha, tur, lobia and masor. The Hindus of the district are vegetarian by habit and preference. Although the Muslims, Christians and Sikhs are generally non-vegetarian. Those who do not afford eating meat daily opt for vegetarian diet.

L. Economic Development

Transportation and Communication

90. Transportation system is a key factor in the socio-economic development of any area. 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 only airport functional in the State.

91. As per statistical diary of Uttarakhand 2011-2012, the overall road network in the State is 337486.92 km. The road network is administered predominantly by the PWD and comprises of 1375.76 km of national highways (NH) 3788.20 km of State Highways (SH), 3289.74 km of Major District Roads (MDR), 2,945.04 km of Other District Roads (ODR), 14543 km of Village Roads (VR) 858.85 light vehicle road (LVR). Other than PWD, Irrigation department (741 km), Cane development Department (885 km), Forest Department (3257 km), Border Road Task Force (BRTF) 1281.32 Km and others like Mandi Parishad/Market council and PMGSY road (1685 km) a total 7849.32 km road is also managed by their respective department. The Border Roads Organization manages about 1,623 km of NHs, SHs, MDRs, and ODRs (class 9 equivalent and above roads having carriage way width 3.75 meter and above).

92. 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.

93. As per PWD records, the **Table IV-16** give the scenario of roads in Uttarakhand state.

Table IV-16: Transportation in Uttarakhand State

Sl. No.	Items	Year/Period	Unit	Statistics
(A)	**Motor Roads Maintained by PWD**			
	(i) National Highways	2013-14	Km.	1375.76
	(ii) State Highways	2013-14	Km.	3782.24
	(iii) Major District Roads	2013-14	Km.	3289.74
	(iv) Other District Roads	2013-14	Km.	2985.27
	(v) Rural Roads	2013-14	Km.	16177.16
	(vi) L.V. Roads	2013-14	Km.	790.38
(B)	**Motor Roads Maintained by BRTF**			
	(i)Total Length of Roads	2013-14	Km.	1281.32
(C)	**Motor Roads Maintained by Local Bodies**			
	(i) District Panchayats	2013-14	Km.	807.60
	(ii) Urban Local Bodies & Others	2013-14	Km.	2356.13
(D)	**Roads Maintained by Other Departments**			
	(i) Irrigation	2013-14	Km.	741
	(ii) Cane Development	2013-14	Km.	850.12

	(iii) Forest	2013-14	Km.	3270
	(iv) Others	2013-14	Km.	2060.21
(E)	**Postal and Communication Services**			
	(i) Post Offices	2013-14	No.	2719
	(ii)Telephone Exchanges	2013-14	No.	473
	(iii) Telegraph Offices	2013-14	No.	0
	(iv) PCOs	2013-14	No.	5275
	(v) Telephone Connections (Including WLL) by BSNL	2013-14	No.	195855
	(vi) Mobile phone by BSNL	2013-14	No.	902096

Source: *Uttarakhand at a Glance (2014-15), Directorate of Economics and Statistics, GoU.*

2. Industrial Development

94. The State has finite industrial units due to lack of adequate resources. In the hilly terrains, industries included food processing, fruit processing, medicinal and aromatic plants, and floriculture based industries. In the plain Districts like Haridwar, Udham Singh Nagar, and other places, capital intensive and high-value addition industries are being encouraged by the government.
95. In recent years, Uttarakhand has emerged as one of the most 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 for establishment of small and medium sized agro-parks, food-parks, which in turn are expected to provide common infrastructure facilities for storage, processing, grading, and marketing.
96. Main and traditional business of the state is, Handicrafts, Handlooms, Wool Based Industries, Khadi and Village Industries. Hydro Power, Tourism are the backbone of economic development of the state. No recognizable industry is located in close proximity of the sub-project sites.

N. Energy and Electric Power Potential

97. Uttarakhand has an estimated hydro power potential of about 20,200 MW. However, only 1,130 MW has been tapped at present. Mean while, 4,170 MW projects are under implementation and 3,800 MW projects are allotted to Central, State and private sectors. About 39 projects with a potential of 6,374 MW have been identified for PFR under PMs Hydro Initiatives.
98. 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.

O. Aesthetic and Tourism

99. 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 2,05,46, 323 domestic tourists in the year 2008, 2,19,34, 567 in the year 2009 and 3,02,06, 030 in the year 2010. As per Uttarkhand at a Glance 2012-13 a document issued by Directorate of Economic and Statistics GoU state recieved 5,69,250 tourists in the year 2011-2012 registering a considerable yearly growth. Expenditure on schemes for tourism development and promotion in the State has progressively increased over the years. 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.
100. In respect to tourism major tourist destination in Uttarakhand are Devprayag, Khatling Glacier, Narendra Nagar, Sem Mukhem, Chamba, Dhanaulti, Kunjapuri, New Tehri, Surkanda Devi, Chandrabadni, Kempty Fall, Nagtibba etc.

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

101. The sub-project have been screened using the ADB's rapid environmental assessment (REA) checklist.

- The individual environmental screening checklist is provided in Appendix B of this report.
- **Environmental impacts related to siting**. The proposed sub-project is not expected to have any impact on the Forests. The site is not located within or adjacent to the cultural heritage site, protected area (national park / sanctuary /biosphere reserve), 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) available or observed within the subproject corridor of impact.

A. Land Acquisition and Resettlement

102. The proposed sub-project location does not exist within the revenue lands as per Government records. There are no critical impacts on agriculture land and resettlement of people as well as dismantling of any structure during land acquisition or due to the proposed sub-project components.

103. The location as per the land availability with ownership status was finalized after site visit by the Social Experts of PIU & PMU (UEAP: ADB).

104. Due to tough and risky hilly terrain, flat land is the major crisis in Uttarakhand. Most of the land belongs to the State Forest Department or surrounded by restricted areas such as reserve forests, protected areas, ecosensitive zones *etc.*, which is again a major time taking process to get forest clearances. Keeping this fact in mind the land available with Revenue department is selected for this purpose. There is no case of private land acquisition.

B. Environmental Impacts

105. The assessment of environmental impacts due to the implementation of the sub-project has been carried out for potential impacts during the following stages of the project planning and implementation:

1. **Location Impacts:** Impacts associated with site selection, including impacts on environment and resettlement or livelihood related impacts on communities.

   Design Impacts and Pre-Construction Impacts: Impacts arising from the inappropriate designs of proposed activities would in general include the inadequate drainage provisions, contemporary designs for the traditional and cultural environment *etc*. Selection of materials, if not carefully chosen, will adversely impact the aesthetic appeal of the surroundings. The results of interventions are unobtrusive and will be integral part of the overall ambience so as to avoid impacts on the aesthetic beauty of the proposed site. All component designs will be worked out to minimize any impacts on the adjoining properties, and considering the drainage and sewerage connections on the road. Given that there is a need for disposal of

construction wastes. The contractors will be required to consult with the Project Implementation Unit under PMU/UEAP: ADB for safe disposal sites.

3. **Construction Impacts:** The impacts are generic to the construction activities at the sub-project location. All construction activities to be undertaken at the site will be approved by competent authority before start of any such activity in the vicinity of the site so that the history and sanctity as well as the usability of the site are not hampered. Hence, the EMMP emphasizes on the construction impacts and necessary mitigation measures to be strictly followed by the contractor and to be supervised by the Design and Supervision Consultant (DSC). Key impacts during construction are envisaged on the following aspects: (i) Drainage, (ii) Quarry and borrow pit operations, (iii) Slope cutting and their stability (iv) Water bodies and drainage system (v) Dust generation, air and noise from construction activities, (vi) handling of construction materials at site, (vii) Adoption of safety measures during construction; and (viii) Community health and safety measures.

4. **Operation and Maintenance Impacts:** Impacts associated with the operation and maintenance of proposed helipads and buildings built under project. Impacts during operation of the helipads and buildings established in the sub-project will be due to lack of appropriate maintenance facilities created including the sites around the helipads, toilets, parking facilities apart from drainage and solid waste management of the tourist destinations. These impacts are proposed to be addressed through provisions of water and waste management and orientation of the Tourist facility owners in management and operation of such facilities including collection of wastes, operation of toilet facilities, timely clean-up of waste disposed by the tourists and aesthetics through appropriate maintenance of landscaping.

   As per proposal the helipads constructed under the project will be exclusively used during emergency situation. The impact due to movement of helicopters, noise level will be instantaneous and temporary in nature. Normally the noise level generated during landing and takeoff of helicopter produces a noise level in the range of 90 to 102 dB (A). This impact will be purely temporary and reversible in nature and will have non-significant impact on background noise level in the area at any point of time. No impact is also anticipated on the wildlife due to operation of helicopters.

C. Cumulative Environmental Impact Assessment

107. The cumulative environmental impact assessment (CEIA) examined the interaction between the sub-project's residual effects (i.e., those effects that remain after mitigation measures have been applied) and those associated with other past, existing and reasonably foreseable future projects or activities.

108. Since the sub-project will be built in existing government owned land, and areas to be developed as helipad especially for emergency period. Site specific mitigation measures will be implemented during construction to address temporary disruptions to land use, limitations on access to roads,

sidewalk closures, parking modifications, and increased volumes of construction related traffic. During operations of the helipad and allied services, added residential developments, commercial and business facilities increased densities are expected to develop and enhance the sub-project area. This can be considered a long-term cumulative benefit of the sub-project.

Increased tourist influx is expected to impact on environment but at the same time the routes to these destinations are open for a limited time with limited number of tourists. As the locations are mainly en route to pilgrim centres, it is used by trekkers and adventure lovers, who have a different mind set towards outdoors and love for nature. This will be further addressed by the project through regular orientation programs designed both for the tourists and facility providers, and dissemination of awareness material highlighting the environmental importance of the area.

110. Implementation of the project will not have any bearing on ecology and environment of the locality. The subproject will not involve any displacement of people or disruption of any economic activity such as agriculture land *etc*. The design and constructions are consistent with the surrounding landscape. The project will not influence the flora or fauna of the locality in any way.

VI. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

111. The information disclosure, public consultaion at sub-project locations and stakeholder analysis are very significant tasks under any project for proper understanding and transparency in proposed project.

A. Public Participation during Preparation of IEE Report

112. The public consultation and participation includes identification of project affected persons (PAPs) and other interested groups or parties (stakeholders). Informing and providing the stakeholders with sufficient background and technical information regarding the proposed developmental activities; creating opportunities and mechanisms where by they can participate and raise their view points (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.

113. 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 (Safeguard Policy Staement, 2009). The stakeholders of the project include project affected communities and institutional stakeholders such as local bodies, and other line department (Revenue, Forest, Environment etc.). The consultations at micro-level (village level) and macro-level (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.

114. During Project preparation and consultations with the Executing Agency (EA), Implementation Agency (IA), District Administration and other agencies at local levels on selection of sub-project and identification of key issues including addressing the current gaps in provision of basic services like approach road to access the proposed helipad site. The outputs of public consultation during site visits have been summarized below for timely and effective implementation of the project.

Outputs of Public Consultation during Site Visits

	(13th May, 17th May 2016,18 May 1st June 2016, 2nd June 2016,)
Name of the Places	: Sub-Project site at Gauchar
District	Chamoli
Period	**(13th May, 17th May 2016,18 May 2016, 1st June 2016, 2nd June 2016,)**
Participants	Villagers, Shopkeepers and other Line Departments *etc.*

1. Issues discussed:

- Importance of site selection for Hanger and MPH its suitability
- Benefits of Hanger and MPH during natural disaster for evacuation and relief i.e. for emergency purposes.
- Issue of site related NOC and related environmental and social concerns
- General details of specific socio-economic and environmental problems of the region.

- Local issues concerning nearby Panchayats and other development schemes.
- Economic growth through increase in the financial income due to the project.

2. Stakeholder's Response:

- Local people are aware and agree for construction of Hanger and MPH for emergency purposes.
- The approach to the Hanger and MPH site should be constructed in proper way so that
- Permanent caretaker should be provided so that he can take proper care and maintenance of the helipad.
- Local villagers has no objection in construction of helipad
- During construction of the helipad employment should generate from the local people.
- During construction and operation safety issue should be taken proper attention.

2. Recommendation and Suggestions:

- There is a need to pay due attention to conservation of natural resources along with proper disposal of construction wastes generated during construction phase.

- Affected trees (if any) due to the project should be felled minimum by taking proper permission from the concerned department
- Horns should be blown on blind curve only on the approach roads to hanger and MPH construction during passing of heavy machineries and vehicles.
- There is a need to construct the Speed breakers on blind curves of approach roads to the construction site and near settlement areas etc. to avoid incidences of road accidents.
- Approaches to the Hanger and MPH construction should be properly constructed so that during the time of emergency it can be easily accessible.
- Side drains and crossways for escape of rain water are required. Proper drainage is required for water during rainy season.
- Efforts should be taken for generation of employment to local people during construction and development phase.

B. Future Consultations and Disclosure

The public consultation and disclosure program will remain a continuous process throughout the sub-project to resolve the issues which may arise at any stage (pre-construction, construction and operational stages).

C. Consultation during Detailed Design

116. Focus-group discussions (FGD) with affected persons and other stakeholders to register their grievances/views and concerns, so that these can be addressed in sub-project design wherever necessary. Regular updates on the environmental component of the sub-project will be kept available at the PIU established under PMU (UEAP: ADB).
117. Either PIU or PMU (UEAP: ADB) will conduct information dissemination sessions at major intersections and solicit the help of the local community leaders/prominent citizens/local NGOs to encourage the participation of the people to discuss various environmental issues.
118. The PIU or PMU (UEAP: ADB) with assistance of Design Supervision Consultant (DSC) will conduct information dissemination sessions in the sub-project area. During EMP implementation PIU, DSC, and PMU shall organize public meetings and will appraise the communities about the progress on the implementation of EMP in the sub-project works.

D. Consultation during Construction

119. 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.

Small 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 sub-project monitoring and evaluation

E. Project Disclosure

121. After getting all clearance and final designing of the sub-project, all details related to be project will be disclosed on the websites by the Executing Agency (SDMA or PMU) and ADB. The local communities will be continuously consulted regarding location of alternatives, construction camps, access to site and other likely disturbances which may be raised during construction. The attendance sheet and photographs of Public Consultation are given in ***Appendices – E & F*** respectively.

(ii) For the benefits of the community, the IEE 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 and PMU (UEAP: ADB) Office; District Magistrate Office; and, (iii) Design & Supervision Consultant (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 create awareness among general public. Electronic version of the IEE will be placed in the official website of the SDMA or PMU (UEAP: ADB) 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 sub-project. Copies of the IEE will be kept in the PIU and PMU (UEAP: ADB) Office and will be distributed to any person willing to consult the IEE.

VII. ENVIRONMENTAL MANAGEMENT PLAN & GRIEVANCE REDRESS MECHANISM

A. Institutional Arrangement

123. The institutional arrangements specify the arrangements for the implementation of environmental provisions of the proposed sub-project. The Executing Agency (EA) - State Disaster Management Authority (SDMA) will work closely with Project Management Unit (PMU: UEAP-ADB). The PMU (UEAP: ADB) is responsible for effective implementation of environmental safeguards related to the requirements of the civil aviation infrastructure sub-project. The detailed institutional arrangement and other responsibilities have been described below.

- The sub-project will be implemented and monitored by PIU (UEAP: CA), which will be supported by Design and Supervision Consultant (DSC) and overall management support shall be provided by PMU (UEAP: ADB).
- The safeguard specialists of PMU (UEAP: ADB), and PIU (UEAP: ADB) will monitor and support the implementation programme of environmental covenants with assistance of Design and Supervision Consultant (DSC).
- The Executing Agency - PMU (UEAP: ADB) shall be responsible for ensuring compliance to environmental requirements of the ADB as well as central and state Governments and reporting the same to ADB an environmental management and monitoring plan (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 Executing Agency - PMU (UEAP: ADB) 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 Implementation Agency (IA) and the civil works contractors in this regard. All applicable statutory clearances including environmental clearances, forest clearances, consents and permits or No-Objection Certificate (NOC) from National, State and Local levels to be required atleast 2 month before commencement of civil works at sub-project locations by the civil works contractor or project proponent in line with india's National, State and Local laws and regulations and in accordance with ADB's Safeguard Policy Statement 2009 requirements.

1. Executing Agency (EA): State Disaster Management Authority (SDMA) -Project Management Unit (UEAP: ADB)

- The Executing Agency complies with all applicable legislations and its conversant with the requirements of the EMMP.
- To assesses all activities requiring special attention as specified or requested by the Design and Supervision Consultant (DSC) or safeguards specialist of Project Management Unit (UEAP: ADB).

- On the recommendation of the Environmental Expert (EE), Design and Supervision Consultant (DSC) and Safeguards Specialist of Project Management Unit (UEAP: ADB) through the DSC order, the contractor to suspend any or all works on site if the contractor or his sub-contractors or suppliers fail to comply with the said contractual stipulations with respect to environment and EMMP.
- To ensures along with the Design and Supervision Consultant (DSC) that EMMP and all necessary environmental stipulations are carried in bidding documents and contract documents of the contractor.

- Addressing of complaints and redressal of grievances for the project.

2. Implementation Agency (IA): Project Implementation Unit (Civil Aviation)

- Complies with all applicable legislation and is conversant with the requirements of the EMMP.
- To assesses all activities requiring special attention as specified or requested by the Design and Supervision Consultant (DSC) or safeguards specialist of Project Management Unit (UEAP: ADB) for the duration of the contract.
- To 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 engineers of DSC or Safeguards Specialist of PMU (UEAP: ADB).
- Act as supervising & monitoring agency as delegated in EMMP.

3. Design and Supervision Consultant (DSC)

- To guides PMU (UEAP: ADB), PIU (UEAP: ADB) 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 may be forwarded to the project manager of PIU (UEAP: ADB) on weekly basis.
- To enforces and monitors compliance the requirements of the EMMP at project site.
- To assess 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.

4. Environmental Expert of Engineering (DSC)

- Briefs the contractor about the requirements of the environmental specification and EMMP as applicable.
- To facilitate the statutory compliances related to civil works to PIU (UEAP: ADB) and contractors.
- To advise 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 project in terms of environmental compliances with the EMMP to the DSC, PMU and PIU and provides technical advice relating to environmental issues to the engineer.

5. Civil Work Contractor

- To depute a full time suitable, qualified and experienced environmental safeguard Specialist for the effective implementation of EMMP at project site including environment health & safety (EHS) measures, community liasoning, reporting and grievance redressal on day to day basis.

- Complies with all applicable legislation, is conversant with the requirements of the EMMP, and briefs staff about the requirements of same.
- To ensure any sub-contractors or suppliers, who are utilized within the context of the contract comply with the environmental requirements of the EMMP. The contractor will be responsible for non-compliance on their behalf.
- Provides environmental awareness training to staff.
- To bears the costs of any damages or compensation resulting from non-adherence to the EMMP or written site instructions.
- To conducts all activities in a manner that minimizes disturbance to directly affected residents and the public in general, and foreseeable impacts on the environment.
- To ensures that the engineer is timely informed of any foreseeable activities that will require input from the environmental expert of DSC.
- To receive complaints/grievances from public, discuss with DSC and PIU and take necessary steps for implementation of remedial measures in consultation with the engineer of DSC and report to the executive Agency on the status in its each monthly report till satisfactory resolution.
- The proposed sub-project will be implemented by the PIU (UEAP: CA). The PIU (UEAP: CA) will be responsible for supervision and monitoring of day-to-day implementation of sub-project including EMMP.
- 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 package based on the sub-project specific monitoring progrtamme) or by the IA for the monitoring works, if not included in the civil works contracts.

 The flow chart of various sectors under PIUs (ADB) of “Uttararakhand Emergency Assistance Project (Funded by ADB) is given below.

B. Environmental Management Plan (EMP)

124. The “Environmental Management Plan” (EMP) is a key to ensure a safe and clean environment. The desired results of mitigation measures may not be achieved without until unless formulations of a proper management plan and its effective implementation. The EMP envisages a plan for sound environmental management practices and the proposed mitigation measures (*i.e.* generic

and sub-project specific) may reduce the potential impacts due to the project activities. Based on the existing baseline environmental condition of the sub-project locations, through site survey, various project activities during preconstruction, construction and operation phases of the project, environmental checklist as per the ADB's guidelines environmental impacts are anticipated. The mitigation measures are suggested to minimize the impact. The project activities considered during improvement stage are location of construction camp, obtaining appropriate clearances from regulatory bodies' prior executing construction work, and determination of safety measures.

125. The environmental impacts during construction stage are temporary and reversible in nature. Important product activities considered are establishment of labors camps, removal of some herbaceous and bushy vegetation, cutting of hill slopes to some extent may be envisaged, borrow and quarry operation, crushing of stones and transportation of construction material, construction of drainage channels, and operational movements of construction equipments, vehicles and water supply *etc.*

126. The EMP designed for the project will guide the environmentally-sound construction practices under sub-project and ensure efficient lines of communication between the proposed design and supervision consultants (DSC) also an engineer for the project, contractors, and Project Implementation Unit (PIU) and Project Management Unit (PMU). the EMP identifies the three phases of development as: (i) Pre-construction Phase (ii) Construction Phase and (iii) Post-construction or Operational Phase.

127. The purpose of EMP 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 sub-project; (iii) detail specific actions deemed necessary to assist in mitigating the environmental impact of the sub-project; and (iv) ensure that safety recommendations are complied with.

- A copy of the EMP must be kept at each project site during the construction period at all times. the EMP 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 environmental damages.

All works to be 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 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 Govt. of Uttarakhand and Govt. of India, local levels and gram sabha etc. during sub-project implementation. Compliance with all mitigation measures and monitoring requirements set out in the EMMP.*
- *Submission of a method statement detailing how the sub-project 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 of 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.*

128. The detailed provisions for specific environmental issues are outlined in the EMMP table of impacts and mitigation measures. The key clauses are outlined in the following sections.

- **Quarry and Borrowing**

✓ The contractor will identify and seek prior approval of the engineer for quarrying and borrowing operations. The quarry and borrowing will be carried only from locations approved by the Department of Geology & Mining (if required). Any deviation from the provisions will be immediately notified and approval of the engineer is to be sought.

✓ The contractor shall maintain all borrow sites, 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 (top soil, fill material, gravel, aggregates and other construction materials) shall not be allowed during rainy season unless covered by

a suitable material. The storage on private property will be allowed if written permission is obtained from the owner or authorized party.

- ✓ Borrow areas and 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**
  - ✓ The dismantling of existing structures: debris disposal shall be maximum utilized and disposed as per norms after consultation with DSC, PIU and PMU's Safeguard Specialist. Due care shall be taken that any material falling under hazardous waste category is disposed in accordance with the Hazardous Wastes (management, handling and transboundary movement) Rules, 2008 and amendments till date Hazardous Wastes (management, handling and transboundary movement) Rules, 2008 and its amendments till date and applicable norms.

- **Precautions for Protection of Environmental Measures**
  - ✓ 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 and for cleaning activities and operation of equipments, the contractor will utilize such practical methods and devices as are reasonably available to control, prevent and otherwise minimize air and noise pollution effectively.
  - ✓ 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 (DSC).
- **Air, Water, and Noise Pollution, and Soil Contamination**
  - ✓ 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.
  - ✓ The contractor shall monitor the environmental parameters periodically as specified in the monitoring plan and report to the engineer of DSC and PIU/PMU (UEAP: ADB) in the form of

montly progress report and after one year a consolidated report to be submitted by PMU (UEAP: ADB) to the funding agency (ADB).

- ✓ The contractor shall reduce the dust emission due to construction activities by regular water sprinkling nearby project affected areas.
- ✓ All the construction equipments and vehicles shall have Pollution under Control (PUC) certificate to ensure that no air pollution is caused due to operation of their equipments and vehicles.
- ✓ All the construction equipments and vehicles should remain all time in good conditions up to satisfaction of site engineers.
- ✓ 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 and Community Health and Safety during Construction**

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 working areas, through application of preventive and protective measures consistent with international good practices, as reflected in internationally recognized standards. the contractors, engineer (DSC), EA and IA 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 to 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 working sites and workers camps and having qualified first aider to give first aid at the time of any accident. The contractor shall also organize periodic visits by a qualified registered medical practitioner to the site and workers camps, contact information of doctor, availability & location of first aid box shall be displayed in appropriate language both at work site and workers camps.*
    - *The 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 labour law and EMMP. The contractor will ensure proper*

sanitation and would provide soak pits and septic tanks for disposal of waste water and sewage.

- *The 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; and contractor should follow all the applicable rules and regulations for workers related to health and safety.*

  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**

  ✓ 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.

  ✓ The 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 PIU a certificate to this effect from the owner.

C. Environmental Monitoring Programme

129. 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 Table below.

130. 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 Central Pollution Control Board (CPCB) standards for ambient air, water, noise and soil. Indicators and targets for environmental performance are provided in the EMMP.

131. 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

132. Consultant (DSC). The environmental monitoring plan is outlined in the Table given below.

133. **Table VII - 1: Environmental Monitoring Programme**

S. No.	Indicators	Parameters to be Monitored	Frequency	Responsibility
I. Pre- Construction Stage				
1.	Legislation, Permits and Agreements	Permissions,/NOCs/Consents other statutory requirement.	Once in Pre-Construction Stage	Civil Work Contractor, DSC, IA & EA
2.	Environmental Baseline Data Generation	Ambient Air Quality, Noise level, Water Quality & Soil characteristics as per parameters outlined in EMMP.	Once in Pre-Construction Stage	Civil Work Contractor
3.	Debris Disposal	Safe disposal of construction wastes including bituminous wastes.	Random checks	Civil Work Contractor
II. Construction Stage				
1.	Legislation, Permits and Agreements	Permissions, NoCs/Consents / other statutory requirement	Continuous	Civil Work Contractor, DSC, IA & EA
2.	Dust Suppression	No. of tankers for water sprinkling, Timing of sprinkling, Location of sprinkling (log books to be maintained)	Random checks	Civil Work Contractor
3.	Ambient Air Quality (AAQ)	$PM_{2.5}$, PM_{10}, SO_2, NO_x and CO	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	Civil Work Contractor, to be monitored through approved Monitoring Agency.
4.	Ambient Noise Level	Equivalent Day & Night Time Noise Levels	Once in a quarter where work is in	Civil Work Contractor, to

			progress and near sensitive receptors during construction stage	be monitored through approved Monitoring Agency
5.	Water Quality Monitoring	TDS, pH, TSS, , Hardness, BOD and Faecal Coli Form	Once in a quarter where work is in progress and near sensitive receptors during construction stage	Civil Work Contractor, to be monitored through approved Monitoring Agency
6.	Soil Testing	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	Civil Work Contractor, to be monitored through approved Monitoring Agency
7.	Heritage Protection (if needed)	Visual inspection of works, compliance with ASI regulations and norms	Continuous	DSC/ASI/PIU
S. No.	**Indicators**	**Parameters to be Monitored**	**Frequency**	**Responsibility**
8.	Supply of PPE	Usage of PPE on site, adequacy of equipments.	Continuous	Civil Work Contractor
9.	Establishing Medical Facilities	Access to health facilities for the construction workers	Continuous	Civil Work Contractor
10.	Accident Record	No. of fatal accidents at work site, No. of injuries, No. of disabilities.	Continuous	Civil Work Contractor
11.	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	Post-construction	Civil Work Contractor

		are restored to pre-project conditions as per approved closure plan		
III. Operation & Maintenance Stage				
1.	Water Quality Monitoring	All parameters as per CPCB standards.	Once in year during operation stage	PMU, SDMA
2.	Disposal of Solid Waste (if any)	Proper disposal of Solid Waste (domestic) generated shall be ensured in accordance with the prevalent norms.	Continuous	Civil Aviation Department
3.	Ambient Air Quality (AAQ)	$PM_{2.5}$, PM_{10}, SO_2, NO_x and CO	Once in a Quarter at the Helipad	Civil Aviation Department
4.	Ambient Noise Level	Equivalent Day & Night Time Noise Levels	Once in a quarter at the helipad	Civil Aviation Department

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

D. Environmental Budget

132. 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.
133. 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. 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.

134. These are small scale construction projects; therefore, it is not expected to cause much significant impacts on ambient air, water, soil and noise levels. The main EMMP cost will arise from monitoring of environmental parameters (air, water, soil and noise level).
135. 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 of this, 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 study. 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 below.

136. 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 estimated budget for environmental monitoring and management of sub-project as per contract packages are presented below:

Table VII-2: EMMP Cost for Construction of Hanger (04 units) & MPH (04 units)

S.No	Description	Quantity	Unit	Rate (in Rs)	Amount (in Rs)	Responsibility
6.A	Legislation, permits and Agreements (Consents to Establish and Operate for plants and machinery of the contractor)					These consents are to be obtained by contractor on own cost
6.B Environmental Monitoring (Pre-construction Stage)						
1	Air Quality	8	No	20,000	1,60,000	Contractor
2	Noise Levels	8	No	20,000	1,60,000	
3	Water Quality	8	No	20,000	1,60,000	
4	Soil	8	No	20,000	1,60,000	
Total Cost					**6,40,000**	
6.C Environmental Monitoring (Construction Stage)						
1	Air Quality	24	No	20,000	4,80,000	Contractor
2	Noise Levels	24	No	20,000	4,80,000	
3	Water Quality	24	No	20,000	4,80,000	
4	Soil	24	No	20,000	4,80,000	
Total Cost					**19,20,000**	
6.D Environmental Monitoring (Operation Stage)						
1	Air Quality	4	No	20,000	80,000	PIU
2	Noise Levels	4	No	20,000	80,000	
3	Water Quality	4	No	20,000	80,000	
	Soil	4	No	20,000	80,000	
Total Cost					**3,20,000**	
6.E	Water Sprinkling to suppress dust (Lump Sump)	5000		4	**20,000**	Contractor
Total Cost					**20,000**	
Grand Total (A+B+C+D+E)					**29,00,000**	
	Total Budgeted Cost (Total+G)				**29,00,000**	
Grand Total (in Lac)					**29.00**	

E. Environmental Monitoring and Reporting Process

137. The PMU (UEAP: ADB) will monitor and measure the progress of EMMP implementation. PIU (UEAP: ADB) 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 PIU-CA, who will take follow-up actions, if necessary. PIU (UEAP: ADB)/IA will submit quarterly monitoring and implementation reports to PMU. The PMU will submit semi-annual monitoring reports to ADB based on reporting of PIU (UEAP: ADB)/IA and its own site inspections, assessment of the implementation performance. PMU (UEAP: ADB) will also take corrective actions as required.
138. Monitoring reports will be posted in a location accessible to the public.
139. 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. The Standardized EMMP to guide the contractor in mitigating Environmental Impacts is given in ***Table VII -3***.

Table VII-3: Standardized EMMP to guide the Contractor in mitigating environmental impacts

S. No.	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/Consents requirement – IA 2. Permissions / NOCs/Consents requirement for equipment/machineries, Borrow area/ queries etc. – Contractor	PMU, KMVN	IA, Contractor
		Proof of compliance to statutory requirements must be forwarded by the facility owner contractor to PMU/F-PIU in relation to hot mixing, stone crushers, diesel generators etc	ESO-Contractor, Engineer, & Environmental Expert F-PIU.	PMU, F-PIU	
		A copy of the EMP must be kept on site during the construction period	ESO-Contractor, Engineer & EE	F-PIU, IA & PMU	
1.2	Education of site staff on general and Environmental Conduct[1]	Ensure that all site personnel have a basic level of environmental awareness training	ESO-Contractor and EE EE to deliver	IA & PMU	Contractor, IA
		Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with their task	Environment and Safety Officer of Contractor, and EE	F-PIU, IA & PMU	
		No operator shall be permitted to	Contractor and EE	F-PIU, IA & PMU	

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

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		operate critical items of mechanical equipment without having been trained by the Contractor			
		All employees must undergo safety training and wear the necessary protective clothing /equipment	Contractor and EE	IA & PMU,	
		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 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; and • 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.	Contractor and EE	IA & PMU	

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
1.3	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).	Environment and Safety Officer of Contractor with the Engineer, EE & F-PIU	IA & PMU,	Contractor
		A communications strategy is of vital importance in terms of accommodating traffic during road closure. 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 & F-PIU	IA & PMU,	
		Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.	Contractor with the Engineer, EE & F-PIU	IA & PMU	
		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, temporary walls, or other suitable materials prior to the beginning of	Engineer and EE	IA & PMU	

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		construction.			
		Special attention shall be given to the screening of highly reflective materials on site.	EE	IA & PMU	
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 F-PIU	IA & PMU	
2.	**Design Impacts and Pre-construction Impacts**				
2.1	Layout of components to avoid impacts on the aesthetics 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.	Engineer, EE, and F-PIU	IA & PMU	
2.2	Increased storm water runoff from alterations of the site's natural drainage patterns due to landscaping, excavation works, and addition of paved surfaces	Design of proposed components will enable efficient drainage of the sites and maintain natural drainage patterns.	Engineer, EE, and F-PIU	IA & PMU	
2.3	Selection of materials and construction technologies, if not carefully chosen, will adversely impact the aesthetic appeal of the destinations	Selection of materials will be from approved sources and construction technologies proposed will strictly conform to the Uttarakhand architecture. Any new landscaping elements will only utilize native species. Material selection would be done	Engineer, EE, and F-PIU	IA & PMU	

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		keeping in view that no asbestos (except as allowed), and CFC is used.			
2.4	Socio cultural resources- Ground disturbance can uncover and damage archaeological and historical remains	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; and Develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognized and measures are taken to ensure they are protected and conserved.	Engineer, EE, and F-PIU	Contractor, IA & PMU	
2.5	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.	Engineer, EE, and F-PIU	IA & PMU	
2.6	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 safeguard Expert of PIU. All areas used for temporary	Contractor	Engineer, EE, and F-PIU	Contractor

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		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 PIU.			
3	**Construction Impacts**				
3.1	Construction Camps - Location, Selection, Design and Layout	Siting of the construction camps shall be as per the guidelines below and details of layout to be approved by PIU. Construction camps shall not be proposed within 500 m 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 300 m 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.	Contractor with the Engineer and EE	F-PIU, IA & PMU	
3.2	Drinking water availability	Sufficient supply of cold potable water to be provided and maintained. The water quality shall be as per standard norms for drinking water. If the drinking water is obtained from an intermittent public water supply then storage tanks will be provided.	Contractor	Engineer and EE	

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		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 and approved by EE-PIU) 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 Safeguard Expert of PIU. The Environmental Specialist of PIU 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 water course or agricultural land, Orchards and Natural Habitats like Grasslands.	Contractor with the Engineer	F-PIU, IA & PMU	
3.4	Stockpiling of construction materials	Stockpiling of construction materials does not impact obstruct the drainage and Stockpiles will be covered to protect from dust and erosion.	Contractor with the Engineer	F-PIU, IA & PMU	
3.5	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.	Contractor with the Engineer	F-PIU, IA & PMU	

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		Adequate safety precautions will be ensured during transportation of quarry material from quarries to the construction site. Vehicles transporting the material will be covered to prevent spillage.			
3.6	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 PIU & 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 PIU.	Contractor with the Engineer	F-PIU, IA & PMU	
3.7	Soil/Land Erosion	Slope protection measures will be undertaken as per design to control soil erosion.	Contractor with the Engineer	FPIU, IA & PMU	
3.8	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 the Engineer	Engineer, F-PIU & PMU	

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
3.9	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.	Contractor	EE of Engineer, F-PIU & PMU	
3.10	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.	Contractor	Engineer, F-PIU & PMU	
3.11	Generation of dust	The Contractor will take every precaution to reduce the levels of dust at construction	Contractor	Engineer, F-PIU & PMU	

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		site. Regular sprinkling of water and Stockpiles of soil will be kept covered in such a manner to minimize dust generation.			
3.12	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.	Contractor	Engineer, F-PIU & PMU	
3.13	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.	Contractor with the Engineer	EE, F-PIU & PMU	

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		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.			
3.14	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. 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.	Contractor	Engineer, F-PIU & PMU	
3.15	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, F-PIU & PMU	
3.16	Safety Measures During	Personal Protective Equipment for workers	Contractor	Engineer, F-PIU &	

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
	Construction	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.		PMU	

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
3.17	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.	Contractor	Engineer, F-PIU & PMU	
3.19	Risk of archaeological chance finds	Strictly follow the protocol for chance finds in any excavation work; Request FPIU 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, and take any action they require ensuring its removal or protection in-situ.	Contractor	Engineer, FPIU & PMU	
3.20	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, F-PIU & PMU	
3.21	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 implementation of EMMP, community liaising, consultations with	Contractor	Engineer, F-PIU & PMU	

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		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	
4.2	Increased Pollution load on the Ecosystem in peak tourist season	Increased Pollution load will be addressed through better facilities. Wherever, possible Solid waste management shall be through local ULB system or other alternate measures. Trampling impacts on vegetation and soil will be minimized by designating proper walkways in and around proposed facilities. Proper parking facilities and traffic management for catering to increased vehicle movement shall be provided. The project (UEAP) will have positive impacts on the socio economic conditions of people of project area by way of providing better road connectivity, water supply & allied facilities Tourism Infrastructure and emergency rescue, evacuation facilities. As per Loan covenants of UEAP:	IA, EA and Tourism Department	SDMA, PMU & GoUK	

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		a) EA shall prepare guidelines for new infrastructure to be developed under the sector; (b) prepare master plan for redevelopment of Kedarnath Dham; and (c) Undertake the carrying capacity and tourist regulation studies and measures thereof.			
4.3	Unhygienic condition due to poor maintenance of sanitation facilities and irregular solid waste collection	Tourism department 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.	IA, Tourism Department	IA / Dept. Of Tourism, GoUK	

EE= Environmental Expert of Engineer (KMVN), , IA= Implementing Agency, EA= Executing Agency, FPIU= Field Project Implementation Unit (KMVN)

F. Disaster Management Plan

140. During Natural Calamity / Disaster, helicopters are requisitioned to provide aid by the Requisitioning Authority (RA). Helicopters can operate from the Disaster sites and temporary/ unprepared helipads in a hostile environment. It is for this reason that

"Operation Circulars" is specific for Utilization of Helicopters in Disaster Management. The Operation Circular No. 7/2013, Civil Aviation Department, Government of India dated 14th August 2013 is referred.

141. The instruction given in this circular are only a guideline to be followed by RA/ State Government, DGCA, Operators and other stake holder participating in Disaster Management. Each calamity/ disaster will have its own peculiarities and intensity and would require a specific response. The Circular is attached as ***Appendix G***

G. Emergency Management Plan

142. The overall objective of the of helipad emergency planning is to minimize the effects of an emergency, particularly in respect of saving lives and maintaining helicopter operations at critical sites through strengthening of infrastructure by construction of MPH and Hagers .

143. The helipad emergency plan sets forth the procedures for co-coordinating the response of different helipad agencies (or services) and those agencies in the surrounding community that could be of assistance in responding to the emergency. Each helipad emergency plan should be a coordinated programme between the helipad and the surrounding community. This is desirable as the planning and procedures needed to handle major emergency situations on the helipad.

Responsibility: Each helipad operator (UCADA/ District Authority) should be responsible for establishing emergency plans and procedures to deal with all unusual conditions at the Helipad and for co-coordinating the plan with surrounding community authorities. The Helipad operator (UCADA/ District Authority) also have the responsibility for assignment of emergency personnel and equipment provided by all concerned departments and agencies, and for providing maximum helicopter emergency services and mutual aid.

Establishment of Helipad Emergency Plan:

The purpose of an airport/heliport emergency plan is to ensure that there is:

- Orderly and efficient transition from normal to emergency operations;
- Delegation of airport emergency authority;
- Assignment of emergency responsibilities;
- Authorization by key personnel for actions contained in the plan;
- Co-ordination of efforts to cope with the emergency; and

- Safe continuation of aircraft operations or return to normal operations as soon as possible.

It is imperative that the Helipad Authority (UCADA/ District Authority) arrange emergency mutual aid agreements which define responsibilities and/or liabilities of each contributing party with surrounding communities. These agreements should include at least the following:

- Clarification of the political and jurisdictional responsibilities of the several agencies that may be involved in order to avoid problems when an emergency occurs;
- Establishment of the command authority; i.e. a single on-scene commander (with designated alternates if necessary);
- Designation of communication priorities at the accident site;
- Organization of emergency transportation facilities under a pre-designated co-coordinator(s);

G. Performance Indicator

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

- Pre-determination of the legal authorities and liabilities of all co-operating emergency personnel; and
- Pre-arrangements for use of portable and heavy rescue equipment from available sources

H. Performance Indicators

144. The performance indicators of implementation of environmental management and monitoring programme has been given in ***Table VII-4***.

Table VII-4: Performance Indicators of EMMP

Sl. No	Performance Indicators	Target	Achievement in Semi-annually and Annually
1.	Budget	Environmental Budget (EMMP Budget)	Expenditure till date
A. Performance Indicators of Monitoring Plan			
2.	Ambient Air Quality (AAQ)	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	Total Number of samples collected

		per Environmental Monitoring Plan	
5.	Soil	Total Number of samples as per Environmental Monitoring Plan	Total Number of samples collected
6.	Safety of Workers	List of PPE as per the number labours	List of PPEs actually provided in the project
B. Performance Indicators of Environmental Management Plan			
7.	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.
8.	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.
9.	Grievance Redressal	Total number of complaints received, its timeline to response and resolution	Actual number of complaints resolved in percentage, response time.
10.	Issues raised in Public Consultation	Target to attend the issues raised in the Public Consultation	Status of compliance to the issues of Public consultation
11.	Information Disclosure	List of information and locations where information to be disclosed	Actual where information has been disclosed.
12.	Education of site staff on Environmental training	Total Number of staffs to be trained	No of staff actually
13.	Capacity Building	Total number of sessions to be covered of Total Number contractors, PIUs and DSCs to be covered	Number of Sessions completed and Number of contractors, PIUs and DSCs.
14.	Implementation of EMP mitigation Measures	All items of Environmental Management Plan with timeline and its respective	Implementation status of EMP items till date
Sl. No	**Performance Indicators**	**Target**	**Achievement in Semi-annually and Annually**
		regulatory standards like for Ambient air Quality – NAAQS, 2009 standards,	

		Drinking water – IS:10500 etc, Residual Chlorine – UEPPCB standard s and CPHEEO Manual for handling.	
15.	Reporting	List and number of Reports to be submitted	List and number of reports submitted

I. Grievance Redressal Mechanism

145. The EA has established a mechanism to receive and facilitate resolution of affected peoples concerns, complaints, and grievances about the Project‘s environmental performance (Appendix C). The project-specific grievance redress mechanism (GRM) is not intended to bypass the government‘s own redress process; rather it is intended to address affected people's concerns and complaints promptly, making it readily accessible to all segments of the affected people and is scaled to the risks and impacts of the Project.

146. The PMU and PIU (UEAP: ADB) will make the public aware of the GRM through public awareness campaigns. Grievances will be filed in writing using the Complaint Register and Complaint Forms or by phone with any member of the PMU and PIU (UEAP: ADB). The contact phone number of the PIU and the PMU have been publicized through the media and placed on notice boards outside their offices and at construction sites ad will serve as a hotline for complaints. . The safeguard documents made available to the public in an accessible version including information on the GRM and will be widely disseminated throughout the corridor by the safeguards officers in the PMU and PIUs with support from the NGO engaged to implement the Community Awareness Program.

147. The PIU has already convened Grievance Redressal Committees (GRC) of the voiced grievance at the project level consisting of members of local government, NGOs, project staff, and representatives of the affected people. Decisions on the grievance are to be made within 15 days of receipt by the committee formed for the purpose. If the grievance cannot be solved, the PMU is notified to further advice on the situation with higher government and legal bodies.

148. The GRC will ensure rights of vulnerable and poor are included. The grievance mechanism will be scaled to the risks and adverse impacts of the Project. It will address affected people's concerns and complaints promptly, using an understandable and transparent process that is gender responsive, culturally

appropriate, and readily accessible to all segments of the affected people at no costs and without retribution. The mechanism developed will be in a manner that it shall not impede access to the existing judicial or administrative remedies. The affected people will be appropriately informed about the mechanism.

149. The PIU officers will be responsible for processing and placing all papers before the GRC, maintaining database of complaints, recording decisions, issuing minutes of the meetings and monitoring to see that formal orders are issued and the decisions carried out. All costs involved in resolving the complaints (meetings, consultations, communication and reporting/information dissemination) will be borne by the PMU (UEAP: ADB).

150. The safeguard monitoring reports will include the following aspects pertaining to progress on grievances: (i) number of cases registered with the GRC, level of jurisdiction (first, second and third tiers), number of hearings held, decisions made, and the status of pending cases; and (ii) lists of cases in process and already decided upon may be prepared with details such as Name, ID with unique serial number, date of notice, date of application, date of hearing, decisions, remarks, actions taken to resolve issues, and status of grievance (*i.e.,* open, closed, pending).

VIII. CONCLUSION AND RECOMMENDATION

151. The proposed sub-project components do not involve any interventions in surrounding environment, natural as well and cultural heritage destinations and have less significant (direct/indirect) environmental impacts. It is expected that the proposed sub-project will enhanced economic growth and provision of livelihood opportunities for local communities through tourism infrastructure development with a focus on preservation and development of natural and cultural heritage and incidental services. The proposed project under the infrastructure development will provide support facility to the State of Uttarakhand, to enhance and develop the tourism sector as a key driver for economic growth on one hand and useful during emergency period on other.
152. This IEE has identified minor likely impacts on water, air and noise during construction and operation period and has defined mitigation measures. Those mitigation measures will be implemented and monitored during the sub-project execution. Further, the provision of environmental infrastructure, including access to sanitation and waste management facilities within the project sites, will better the environmental conditions and minimize the pollution related and aesthetic quality *etc*.
153. The specific management measures laid down in the IEE will effectively address any adverse environmental impacts due to the sub-project. The effective implementation of the measures proposed will be ensured through the building up of capacity towards environmental management within the PMU/PIU (UEAP: ADB) supplemented with the technical expertise of a Safeguards Specialist as part of the DSC Consultants. Further, the environmental monitoring plans provide adequate opportunities towards course correction to address any residual impacts during construction or operation stages.
154. On the basis of the IEE report, It is expected that the proposed project components have only minor temporary and reversible impacts or simply say very less significant environmental impacts on environment. These impacts can be easily mitigated through adequate mitigation measures and regular monitoring during the Design, Construction and Post-construction Phases of the project. It is recommended that PMU/PIU (UEAP: ADB) should have monitoring responsibility in environmental issues of all program components and to ensure the environmental sustenance.
155. The IEE carried out for the sub-project show that the proposed sub-components will result in net environmental benefits, and that any adverse environmental impact can be addressed through proper location, planning, and design of the proposed sub-project; control of construction activity and mitigation measures. The EMP provides for mitigation of all identified impacts and the contract clauses for the environmental

provisions will be part of the civil works contracts. Further, the proposed sub-project elements have been consulted with the stakeholders and no significant issues requiring redressal in terms of environmental safeguards exist.

156. Based on the findings of the IEE, the classification of the sub-project as Category - B is confirmed, and no further special study or detailed EIA needs to be undertaken to comply the rules and regulations under Government of Uttarakhand, Government of India and ADB's (Safeguard Policy Statement, 2009).

157. The "No-objection Certificates" (NOCs) from the concerned Revenue Department (District Magistrates) and user agencies have been obtained for the commencement of civil work. There is no environmental and social issue at this stage. Thus, the commencement of civil work for 1 helipad location can be started as per target of the Uttarakhand Emergency Assistance Project (Phase – V) on priority basis.

Suresh Chandra Khanduri
Environmental Safeguard Specialist
DSC-CA

Environmental Specialist, PIU (CA)

APPENDICES

Appendix A

Rapid Environmental Assessment (REA) Checklist

Instructions:

- This checklist is to be prepared to support the environmental classification of a project.
- This checklist is to be completed with the assistance of an Environment Specialist in a Regional Department.
- This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement, (ii) indigenous peoples planning, (iii) poverty reduction, (iv) participation, and (v) gender and development.
- Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: **India/Loan 3055 IND, Uttarakhand Emergency Assistance Project (UEAP) Construction of Hanger as associated facilities at Chinyalisaur Airstrip, Uttarkashi District in the state of Uttrakhand**

Sector Division: **Department of Civil Aviation, Government of Uttrakhand**

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
Cultural heritage site		√	
Protected Area		√	
Wetland		√	
Mangrove		√	
Estuarine		√	
Buffer zone of protected area		√	
Special area for protecting biodiversity		√	
B. Potential Environmental Impacts Will the Project cause…			
Encroachment on historical/cultural area, disfiguration of landscape or potential loss/damage to physical cultural resources?		√	No such area is within the proposed project site.
Encroachment on precious ecology (e.g. sensitive or protected areas)?		√	No such impact is anticipated

SCREENING QUESTIONS	Yes	No	REMARKS
Alteration of surface water hydrology of waterways resulting in increased sediment in streams affected by increased soil erosion at construction site?		√	No such impact is anticipated.
Deterioration of surface water quality due to silt runoff and sanitary wastes from worker based camps and chemicals used in construction?		√	The worker-based camp (if established) will be away from the water body and septic tanks and soak pits will be provided in the camp for sewerage disposal facilities.
Increased local air pollution due to various project construction activities?	√		There will be slightly increased in Air Pollution due various project construction activities. This impact shall be temporary, site specific and reversible in nature. This will be mitigated by taking proper mitigation measures.
Risk and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?		√	No such impact will be anticipated
Noise and vibration due to project construction or operation?	√		No blasting activity is proposed for the project. Noise level will slightly be increase due to different construction activities and it will be temporary and site specific. This will be mitigated by using PPEs, noise enclosures, etc.
Dislocation or involuntary resettlement of people?		√	Not involved
Dislocation and compulsory resettlement of people?		√	Not involved
Disproportionate impacts on the poor, women and children, indigenous people or other valuable groups		√	No such impact is anticipated.
Poor sanitation and solid waste disposal in construction camps and work sites and possible transmission of communicable diseases (such as STIs and HIV/AIDS) from workers to local populations?		√	No such impact will be anticipated. Local labour will always give preference so that need of construction camp will not require. Migratory labour will be employed in unavoidable circumstances only.

SCREENING QUESTIONS	Yes	No	REMARKS
			Construction Camps (if established) will be provided with necessary water supply, sanitation, storm water drainage, solid waste management and first aid facilities during the construction period.
Creations of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents?		√	No such impact will be anticipated. Proper disposal of liquid effluent will be provided at camps for avoiding water stagnation and creation of breeding grounds
Social conflicts if workers from other regions or countries are hired?		√	No such impact will be anticipated. Local labour will always give preference so that need of construction camp will not require. Migratory labour will be employed in unavoidable circumstances only.
Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		√	Large population influx during project construction will not be expected as local labour will always get the preferences. Construction camps (if established) will be provided with necessary water supply, sanitation, storm water drainage, solid waste management etc. during the construction period and necessary provision for rehabilitation or restoration after completion of construction.
Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological and radiological hazards during project construction and operation?		√	No such impact shall be anticipated
Risk to community health and safety due to the transport, storage and use and/or disposal of materials such as explosives fuel and other chemicals during construction and operation?		√	No such impact shall be anticipated
Community safety risks due to both accidental and natural causes, especially where structure elements or components of the project are accessible to members of the		√	Community safety risks due to both accidental and natural causes can be anticipated at extreme cases. Safety issues will be taken due care while designing the various components of the

SCREENING QUESTIONS	Yes	No	REMARKS
affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning.			project. The proposed hanger is being constructed to ensure safety and evacuation of the tourist and community at the times of natural calamity or accident and emergency. Standard Operation Procedure / Guidelines for operation phase will be prepared by Project Proponent.
Generation of solid waste and/or hazardous waste?	√		Solid waste will be generated due to project activities. Generated wastes should be disposed off at proper designated disposal sites.
Use of chemicals?		√	
Generation of wastewater during construction or operation?	√		Waste water will be generated during construction of proposed hanger. Provision of proper disposal of waste water shall be ensured.

Dipankar Majumdar

Field Safeguard Officer-Environment
DSC

Rapid Environmental Assessment (REA) Checklist

Instructions:

- This checklist is to be prepared to support the environmental classification of a project.
- This checklist is to be completed with the assistance of an Environment Specialist in a Regional Department.
- This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement, (ii) indigenous peoples planning, (iii) poverty reduction, (iv) participation, and (v) gender and development.
- Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: **India/Loan 3055 IND, Uttarakhand Emergency Assistance Project (UEAP) Construction of Hanger as associated facilities at Gauchar Airstrip, Chamoli District in the state of Uttrakhand**

Sector Division: **Department of Civil Aviation, Government of Uttrakhand**

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
Cultural heritage site		√	
Protected Area		√	
Wetland		√	
Mangrove		√	
Estuarine		√	
Buffer zone of protected area		√	
Special area for protecting biodiversity		√	
B. Potential Environmental Impacts Will the Project cause…			
Encroachment on historical/cultural area, disfiguration of landscape or potential loss/damage to physical cultural resources?		√	No such area is within the proposed project site.
Encroachment on precious ecology (e.g. sensitive or protected areas)?		√	No such impact is anticipated
Alteration of surface water		√	No such impact is anticipated.

SCREENING QUESTIONS	Yes	No	REMARKS
hydrology of waterways resulting in increased sediment in streams affected by increased soil erosion at construction site?			
Deterioration of surface water quality due to silt runoff and sanitary wastes from worker based camps and chemicals used in construction?		√	The worker-based camp (if established) will be away from the water body and septic tanks and soak pits will be provided in the camp for sewerage disposal facilities.
Increased local air pollution due to various project construction activities?	√		There will be slightly increased in Air Pollution due various project construction activities. This impact shall be temporary, site specific and reversible in nature. This will be mitigated by taking proper mitigation measures.
Risk and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?		√	No such impact will be anticipated
Noise and vibration due to project construction or operation?	√		No blasting activity is proposed for the project. Noise level will slightly be increase due to different construction activities and it will be temporary and site specific. This will be mitigated by using PPEs, noise enclosures, etc.
Dislocation or involuntary resettlement of people?		√	Not involved
Dislocation and compulsory resettlement of people?		√	Not involved
Disproportionate impacts on the poor, women and children, indigenous people or other valuable groups		√	No such impact is anticipated.
Poor sanitation and solid waste disposal in construction camps and work sites and possible transmission of communicable diseases (such as STIs and HIV/AIDS) from workers to local populations?		√	No such impact will be anticipated. Local labour will always give preference so that need of construction camp will not require. Migratory labour will be employed in unavoidable circumstances only. Construction Camps (if established) will

SCREENING QUESTIONS	Yes	No	REMARKS
			be provided with necessary water supply, sanitation, storm water drainage, solid waste management and first aid facilities during the construction period.
Creations of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents?		√	No such impact will be anticipated. Proper disposal of liquid effluent will be provided at camps for avoiding water stagnation and creation of breeding grounds
Social conflicts if workers from other regions or countries are hired?		√	No such impact will be anticipated. Local labour will always give preference so that need of construction camp will not require. Migratory labour will be employed in unavoidable circumstances only.
Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		√	Large population influx during project construction will not be expected as local labour will always get the preferences. Construction camps (if established) will be provided with necessary water supply, sanitation, storm water drainage, solid waste management etc. during the construction period and necessary provision for rehabilitation or restoration after completion of construction.
Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological and radiological hazards during project construction and operation?		√	No such impact shall be anticipated
Risk to community health and safety due to the transport, storage and use and/or disposal of materials such as explosives fuel and other chemicals during construction and operation?		√	No such impact shall be anticipated
Community safety risks due to both accidental and natural causes, especially where structure elements or components of the project are accessible to members of the affected community or where their		√	Community safety risks due to both accidental and natural causes can be anticipated at extreme cases. Safety issues will be taken due care while designing the various components of the project.

SCREENING QUESTIONS	Yes	No	REMARKS
failure could result in injury to the community throughout project construction, operation and decommissioning.			The proposed Hanger is being constructed to ensure safety and evacuation of the tourist and community at the times of natural calamity or accident and emergency. Standard Operation Procedure / Guidelines for operation phase will be prepared by Project Proponent.
Generation of solid waste and/or hazardous waste?	√		Solid waste will be generated due to project activities. Generated wastes should be disposed off at proper designated disposal sites.
Use of chemicals?		√	
Generation of wastewater during construction or operation?	√		Waste water will be generated during construction of proposed Hanger. Provision of proper disposal of waste water shall be ensured.

Dipankar Majumdar

Field Safeguard Officer-Environment
DSC

Rapid Environmental Assessment (REA) Checklist

Instructions:

- This checklist is to be prepared to support the environmental classification of a project.
- This checklist is to be completed with the assistance of an Environment Specialist in a Regional Department.
- This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement, (ii) indigenous peoples planning, (iii) poverty reduction, (iv) participation, and (v) gender and development.
- Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: **India/Loan 3055 IND, Uttarakhand Emergency Assistance Project (UEAP) Construction of Hanger as associated facilities at Naini-saini Airstrip, Pithoragarh District in the state of Uttrakhand**

Sector Division: **Department of Civil Aviation, Government of Uttrakhand**

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
Cultural heritage site		√	
Protected Area		√	
Wetland		√	
Mangrove		√	
Estuarine		√	
Buffer zone of protected area		√	
Special area for protecting biodiversity		√	
B. Potential Environmental Impacts Will the Project cause…			
Encroachment on historical/cultural area, disfiguration of landscape or potential loss/damage to physical cultural resources?		√	No such area is within the proposed project site.
Encroachment on precious ecology (e.g. sensitive or protected areas)?		√	No such impact is anticipated
Alteration of surface water		√	No such impact is anticipated.

SCREENING QUESTIONS	Yes	No	REMARKS
hydrology of waterways resulting in increased sediment in streams affected by increased soil erosion at construction site?			
Deterioration of surface water quality due to silt runoff and sanitary wastes from worker based camps and chemicals used in construction?		√	The worker-based camp (if established) will be away from the water body and septic tanks and soak pits will be provided in the camp for sewerage disposal facilities.
Increased local air pollution due to various project construction activities?	√		There will be slightly increased in Air Pollution due various project construction activities. This impact shall be temporary, site specific and reversible in nature. This will be mitigated by taking proper mitigation measures.
Risk and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?		√	No such impact will be anticipated
Noise and vibration due to project construction or operation?	√		No blasting activity is proposed for the project. Noise level will slightly be increase due to different construction activities and it will be temporary and site specific. This will be mitigated by using PPEs, noise enclosures, etc.
Dislocation or involuntary resettlement of people?		√	Not involved
Dislocation and compulsory resettlement of people?		√	Not involved
Disproportionate impacts on the poor, women and children, indigenous people or other valuable groups		√	No such impact is anticipated.
Poor sanitation and solid waste disposal in construction camps and work sites and possible transmission of communicable diseases (such as STIs and HIV/AIDS) from workers to local populations?		√	No such impact will be anticipated. Local labour will always give preference so that need of construction camp will not require. Migratory labour will be employed in unavoidable circumstances only. Construction Camps (if established) will

SCREENING QUESTIONS	Yes	No	REMARKS
			be provided with necessary water supply, sanitation, storm water drainage, solid waste management and first aid facilities during the construction period.
Creations of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents?		√	No such impact will be anticipated. Proper disposal of liquid effluent will be provided at camps for avoiding water stagnation and creation of breeding grounds
Social conflicts if workers from other regions or countries are hired?		√	No such impact will be anticipated. Local labour will always give preference so that need of construction camp will not require. Migratory labour will be employed in unavoidable circumstances only.
Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		√	Large population influx during project construction will not be expected as local labour will always get the preferences. Construction camps (if established) will be provided with necessary water supply, sanitation, storm water drainage, solid waste management etc. during the construction period and necessary provision for rehabilitation or restoration after completion of construction.
Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological and radiological hazards during project construction and operation?		√	No such impact shall be anticipated
Risk to community health and safety due to the transport, storage and use and/or disposal of materials such as explosives fuel and other chemicals during construction and operation?		√	No such impact shall be anticipated
Community safety risks due to both accidental and natural causes, especially where structure elements or components of the project are accessible to members of the affected community or where their		√	Community safety risks due to both accidental and natural causes can be anticipated at extreme cases. Safety issues will be taken due care while designing the various components of the project.

SCREENING QUESTIONS	Yes	No	REMARKS
failure could result in injury to the community throughout project construction, operation and decommissioning.			The proposed Hanger is being constructed to ensure safety and evacuation of the tourist and community at the times of natural calamity or accident and emergency. Standard Operation Procedure / Guidelines for operation phase will be prepared by Project Proponent.
Generation of solid waste and/or hazardous waste?	√		Solid waste will be generated due to project activities. Generated wastes should be disposed off at proper designated disposal sites.
Use of chemicals?		√	
Generation of wastewater during construction or operation?	√		Waste water will be generated during construction of proposed Hanger. Provision of proper disposal of waste water shall be ensured.

Dipankar Majumdar

Field Safeguard Officer-Environment
DSC

Rapid Environmental Assessment (REA) Checklist

Instructions:

- This checklist is to be prepared to support the environmental classification of a project.
- This checklist is to be completed with the assistance of an Environment Specialist in a RegionalDepartment.
- This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement, (ii) indigenous peoples planning, (iii) poverty reduction, (iv) participation, and (v) gender and development.
- Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: **India/Loan 3055 IND, Uttarakhand Emergency Assistance Project (UEAP) Construction of Hanger at Sahastradhara in Dehradun district of the state of Uttarakhand**

Sector Division: **Department of Civil Aviation, Government of Uttrakhand**

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
Cultural heritage site		√	
Protected Area		√	
Wetland		√	
Buffer zone of protected area		√	
Special area for protecting biodiversity			
B. Potential Environmental Impacts Will the Project cause…			
Impairment of historical/cultural area, disfiguration of landscape or potential loss/damage to physical cultural resources?		√	No such area is within the proposed project site.

SCREENING QUESTIONS	Yes	No	REMARKS
Disturbance to precious ecology (e.g. sensitive or protected areas)?		√	No trees are affected or no encroachment of precious ecology is anticipated.
Alteration of surface water hydrology of waterways resulting in increased sediment in streams affected by increased soil erosion at construction site?		√	
Deterioration of surface water quality due to silt runoff and sanitary wastes from worker based camps and chemicals used in construction?		√	The worker-based camp (if established) will be away from the water body and septic tanks and soak pits will be provided in the camp for sewerage disposal facilities.
Increased air pollution due to project construction and operation?	√		There will be slightly increased in Air Pollution due to various project construction activities. This impact shall be temporary, site specific and reversible in nature. This will be mitigated by taking proper mitigation measures.
Noise and vibration due to project construction or operation?		√	No such impact will be anticipated
Disproportionate impacts on the poor, women and children, indigenous people or other valuable groups	√		No blasting activity is proposed for the project. Noise level will slightly be increase due to different construction activities and it will be temporary and site specific. This will be mitigated by using PPEs, noise enclosures, etc.
Poor sanitation and solid waste disposal in construction camps and work sites and possible transmission of communicable diseases (such as STIs and HIV/AIDS) from workers to local populations?		√	Not involved
Creations of temporary breeding habitats for diseases such as those transmitted by mosquitoes and		√	Not involved

SCREENING QUESTIONS	Yes	No	REMARKS
rodents?			
Social conflicts if workers from other regions or countries are hired?	√		The project is proposed in the Sports Stadium. Issue of safety and protective measures.
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 impact will be anticipated. Local labour will always give preference so that need of construction camp will not require. Migratory labour will be employed in unavoidable circumstances only. Construction Camps (if established) will be provided with necessary water supply, sanitation, storm water drainage, solid waste management and first aid facilities during the construction period.
Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological and radiological hazards during project construction and operation?		√	No such impact will be anticipated. Proper disposal of liquid effluent will be provided at camps for avoiding water stagnation and creation of breeding grounds.
Risk to community health and safety due to the transport, storage and use and/or disposal of materials such as explosives fuel and other chemicals during construction and operation?		√	No such impact will be anticipated. Local labour will always give preference so that need of construction camp will not require. Migratory labour will be employed in unavoidable circumstances only.
Community safety risks due to both accidental structure elements or members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning.		√	Large population influx during project construction will not be expected as local labour will always get the preferences. Construction camps (if established) will be provided with necessary water supply, sanitation, storm water drainage, solid waste management etc. during the construction period and necessary provision for rehabilitation or restoration after completion of construction.
Generation of solid waste and/or hazardous waste?		√	No such impact shall be anticipated
Use of chemicals?		√	No such impact shall be anticipated

SCREENING QUESTIONS	Yes	No	REMARKS
Generation of wastewater during construction or operation?		√	Community safety risks due to both accidental and natural causes can be anticipated at extreme cases. Safety issues will be taken due care while designing the various components of the project. Standard Operation Procedure / Guidelines for operation phase will be prepared by Project Proponent.

Dipankar Majumdar
Environmental Safeguards Officer
DSC-CA

Environmental Specialist PIU (CA)

Appendix B

Rapid Environmental Assessment (REA) Checklist

Instructions:

- This checklist is to be prepared to support the environmental classification of a project.
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- This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement, (ii) indigenous peoples planning, (iii) poverty reduction, (iv) participation, and (v) gender and development.--
- Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title:	**India/Loan 3055 IND, Uttarakhand Emergency Assistance Project (UEAP)** Construction of a MPH at **Gauchar in District Chamoli the state of Uttarakhand.**
Sector Division:	**Department of Civil Aviation, Government of Uttarakhand**

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			The site for construction of proposed Hanger is not located within or adjacent to the cultural heritage sites, protected areas, wetlands, mangroves, estuarine; core as well buffer zones of the protected areas or any special area for protecting biodiversity.
Cultural heritage site		√	
Protected Area		√	
Wetland		√	
Mangrove		√	
Estuarine		√	
Buffer zone of protected area		√	
Special area for protecting biodiversity		√	
B. Potential Environmental Impacts Will the Project cause…			
Encroachmen on area,		√	No such area lies within or adjacent

t historical/cultural disfiguration of landscape or potential loss/damage to physical cultural resources?			the proposed project site.
Encroachment on precious ecology (e.g. sensitive or protected areas)?		√	No disturbance to precious ecology is anticipated due to construction activities under the proposed sub-project.
Alteration of surface water hydrology of waterways resulting in increased sediment in streams affected by increased soil		√	No alteration in surface water hydrology of waterways is anticipated by the sub-project activities.

SCREENING QUESTIONS	Yes	No	REMARKS
erosion at construction site?			
Deterioration of surface water quality due to silt runoff and sanitary wastes from worker based camps and chemicals used in construction?		√	The worker-based camp (if established) will be away from the water body and septic tanks and soak pits will be provided in the camp for sewerage disposal facilities.
Increased local air pollution due to various project construction activities?	√		There will be possibility of minor increase in air pollution due to construction activities under the proposed sub project may not be ruled out, which would be temporary, site specific and reversible in nature. This will be mitigated by taking suitable mitigation measures as per EMMP.
Risk and vulnerabilities related to occupational health and safety due to biological physical, chemical, , and radiologic al hazards during project construction and operation?		√	No such impact is anticipated.
Noise and vibration due to project construction or operation?	√		No blasting activity is proposed for the project. However possibilities of minor Increase in noise level during construction activities under the sub project may not be ruled out, which would be site specific, temporary and reversible. This will be mitigated by using PPEs, noise enclosures, etc.
Dislocation or involuntary resettlement of people?		√	Not involved
Dislocation and compulsory resettlement of people?		√	Not involved
Disproportionate impacts on the poor, women and children, indigenous people or other valuable groups		√	No such impact is anticipated.
Poor sanitation and solid waste disposal in		√	No such impact is anticipated. Local

construction camps and work sites and possible transmission of communicable diseases (such as STIs and HIV/AIDS) from workers to local populations?			labour will always give preference so that need of construction camp will not require. Migratory labour will be employed in unavoidable circumstances only. Construction Camps (if established) will be provided with necessary water supply, sanitation, storm water drainage, solid waste management and first aid facilities during the construction period.
Creations of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents?		√	No such impact is anticipated. Proper disposal of liquid effluent will be provided at labour camps (if established) for

SCREENING QUESTIONS	Yes	No	REMARKS
			avoiding water stagnation and creation of breeding grounds.
Social conflicts if workers from other regions or countries are hired?		√	No such possibility is anticipated as the local labour will always be given preference to rule out the need for establishment of labour camp at the construction sites. Migratory labour will Be employed in unavoidable circumstances only.
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 possibility is anticipated as the local labour is getting preference as Labou during r construction activities. Construction established camps (if) will be provided with necessary water supply, sanitation, storm water drainage, solid Waste management etc. during the Construction period and necessary provisio For restoratio n rehabilitationor n After completion of construction.
Risk to community health and safety due to the transport, storage and use and/or disposal of materials such as explosives Fuel and other chemicals during construction and operation?		√	No such possibility is anticipated.
Community safety risks due to both accidental and natural causes, especially where structure 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.		√	Community safety risks due to both accidental and natural causes can be anticipated at extreme cases. Safety issues will be taken due care while designing the various components of the project . The proposed helipad is being constructed to ensure safety and evacuation of the tourist and

			community at the times of natural calamity or accident and emergency. Standar d Operation Procedure / Guidelines for operation phase will be prepared by Project Proponent.
Generation of solid waste and/or hazardous waste?	√		Solid waste is anticipated to be generated due to project activities. Generated wastes would be disposed off at proper designated disposal sites. However, no possibility of generation of hazardous waste is anticipated. The Environmental Management Plan (EMP) provides mitigation measures to reduce the impacts.
Use of chemicals?		√	No chemical is proposed to be used during construction activities.

SCREENING QUESTIONS	Yes	No	REMARKS
Generation of wastewater during construction or operation?	√		Waste water is anticipated to be generated during construction activities. Provision of proper disposal of waste water would be ensured through suitable mitigation measures. The Environmental Management Plan (EMP) provides mitigation measures to reduce the impacts.

Dipankar Majumdar

Environmental Safeguards Officer

DSC-CA

Rapid Environmental Assessment (REA) Checklist

Instructions:

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- This checklist is to be completed with the assistance of an Environmental Specialist in a Regional Department.
- This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement, (ii) indigenous peoples planning, (iii) poverty reduction, (iv) participation, and (v) gender and development.
- Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: **India/Loan 3055 IND, Uttarakhand Emergency Assistance Project (UEAP)** Construction of a MPH at **Nainisaini in District Pithoragarh the state of Uttarakhand.**

Sector Division: **Department of Civil Aviation, Government of Uttarakhand**

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			The site for upgradation of proposed MPH is not located within or adjacent to the cultural heritage sites, protected areas, wetlands, mangroves, estuarine; core as well buffer zones of the protected areas or any special area for protecting biodiversity.
Cultural heritage site		√	
Protected Area		√	
Wetland		√	
Mangrove		√	
Estuarine		√	
Buffer zone of protected area		√	
Special area for protecting biodiversity		√	
B. Potential Environmental Impacts Will the Project cause…			
Encroachmen on t historical/cultural area, disfiguration of landscape or potential		√	No such area lies within or adjacent the proposed project site.

loss/damage to physical cultural resources?			
Encroachment on precious ecology (e.g. sensitive or protected areas)?		√	No disturbance to precious ecology is anticipated due to construction activities under the proposed sub-project.
Alteration of surface water hydrology of waterways resulting in increased sediment by in streams affected increased soil		√	No alteration in surface water hydrology of waterways is anticipated by the sub- project activities.

SCREENING QUESTIONS	Yes	No	REMARKS
erosion at construction site?			
Deterioration of surface water quality due to silt runoff and sanitary wastes from worker based camps and chemicals used in construction?		√	The worker-based camp (if established) will be away from the water body and septic tanks and soak pits will be provided in the camp for sewerage disposal facilities.
Increased local air pollution due to various project construction activities?	√		There will be possibility of minor increase in air pollution due to construction activities under the proposed sub project may not be ruled out,which would be temporary, site specific and reversible in nature. This will be mitigated by taking suitable mitigation measures as per EMMP.
Risk and vulnerabilities related to occupational health and safety due to biological physical, chemical, , and radiologic al hazards during project construction and operation?		√	No such impact is anticipated.
Noise and vibration due to project construction or operation?	√		No blasting activity is proposed for the project. However possibilities of minor Increase in noise level during construction activities under the sub project may not be ruled out, which would be site specific, temporary and reversible. This will be mitigated by using PPEs, noise enclosures, etc.
Dislocation or involuntary resettlement of people?		√	Not involved
Dislocation and compulsory resettlement of people?		√	Not involved
Disproportionate impacts on the poor, women and children, indigenous people or other valuable groups		√	No such impact is anticipated.
Poor sanitation and solid waste disposal in		√	No such impact is anticipated. Local

construction camps and work sites and possible transmission of communicable diseases (such as STIs and HIV/AIDS) from workers to local populations?			labour will always give preference so that need of construction camp will not require. Migratory labour will be employed in unavoidable circumstances only. Construction Camps (if established) will be provided with necessary water supply, sanitation, storm water drainage, solid waste management and first aid facilities during the construction period.
Creations of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents?		√	No such impact is anticipated. Proper disposal of liquid effluent will be provided at labour camps (if established) for

SCREENING QUESTIONS	Yes	No	REMARKS
			avoiding water stagnation and creation of breeding grounds.
Social conflicts if workers from other regions or countries are hired?		√	No such possibility is anticipated as the local labour will always be given preference to rule out the need for establishment of labour camp at the construction sites. Migratory labour will Be employed in unavoidable circumstances only.
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 possibility is anticipated as the local labour is getting preference as during labour construction activities. Construction established camps (if) will be provided with necessary water supply, sanitation, storm water drainage, solid Waste management etc. during the Construction period and necessary provisio For restoratio n rehabilitationor n After completion of construction.
Risk to community health and safety due to the transport, storage and use and/or disposal of materials such as explosives Fuel and other chemicals during construction and operation?		√	No such possibility is anticipated.
Community safety risks due to both accidental and natural causes, especially where structure 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.		√	Community safety risks due to both accidental and natural causes can be anticipated at extreme cases. Safety issues will be taken due care while designing the various components of the project . The proposed MPH is being constructed to ensure safety and evacuation of the tourist and

			community at the times of natural calamity or accident and emergency. Standar d Operation Procedure / Guidelines for operation phase will be prepared by Project Proponent.
Generation of solid waste and/or hazardous waste?	√		Solid waste is anticipated to be generated due to project activities. Generated wastes would be disposed off at proper designated disposal sites. However, no possibility of generation of hazardous waste is anticipated. The Environmental Management Plan (EMP) provides mitigation measures to reduce the impacts.
Use of chemicals?		√	No chemical is proposed to be used during construction activities.

SCREENING QUESTIONS	Yes	No	REMARKS
Generation of wastewater during construction or operation?	√		Waste water is anticipated to be generated during construction activities. Provision of proper disposal of waste water would be ensured through suitable mitigation measures. The Environmental Management Plan (EMP) provides mitigation measures to reduce the impacts.

Dipankar Majumdar

Environmental Safeguards Officer

DSC-CA

Rapid Environmental Assessment (REA) Checklist

Instructions:

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

Country/Project Title: **India/Loan 3055 IND, Uttarakhand Emergency Assistance Project (UEAP)** Construction of a MPH at **Chinyalisaur in District Pithoragarh the state of Uttarakhand.**

Sector Division: **Department of Civil Aviation, Government of Uttarakhand**

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			The site for upgradation of proposed MPH is not located within or adjacent to the cultural heritage sites, protected areas, wetlands, mangroves, estuarine; core as well buffer zones of the protected areas or any special area for protecting biodiversity.
Cultural heritage site		√	
Protected Area		√	
Wetland		√	
Mangrove		√	
Estuarine		√	
Buffer zone of protected area		√	
Special area for protecting biodiversity		√	
B. Potential Environmental Impacts Will the Project cause…			
Encroachmen on t historical/cultural area, disfiguration of landscape or potential		√	No such area lies within or adjacent the proposed project site.

loss/damage to physical cultural resources?			
Encroachment on precious ecology (e.g. sensitive or protected areas)?		√	No disturbance to precious ecology is anticipated due to construction activities under the proposed sub-project.
Alteration of surface water hydrology of waterways resulting in increased sediment by in streams affected increased soil		√	No alteration in surface water hydrology of waterways is anticipated by the sub- project activities.

SCREENING QUESTIONS	Yes	No	REMARKS
erosion at construction site?			
Deterioration of surface water quality due to silt runoff and sanitary wastes from worker based camps and chemicals used in construction?		√	The worker-based camp (if established) will be away from the water body and septic tanks and soak pits will be provided in the camp for sewerage disposal facilities.
Increased local air pollution due to various project construction activities?	√		There will be possibility of minor increase in air pollution due to construction activities under the proposed sub project may not be ruled out,which would be temporary, site specific and reversible in nature. This will be mitigated by taking suitable mitigation measures as per EMMP.
Risk and vulnerabilities related to occupational health and safety due to biological physical, chemical, , and radiologic al hazards during project construction and operation?		√	No such impact is anticipated.
Noise and vibration due to project construction or operation?	√		No blasting activity is proposed for the project. However possibilities of minor Increase in noise level during construction activities under the sub project may not be ruled out, which would be site specific, temporary and reversible. This will be mitigated by using PPEs, noise enclosures, etc.
Dislocation or involuntary resettlement of people?		√	Not involved
Dislocation and compulsory resettlement of people?		√	Not involved
Disproportionate impacts on the poor, women and children, indigenous people or other valuable groups		√	No such impact is anticipated.
Poor sanitation and solid waste disposal in		√	No such impact is anticipated. Local

construction camps and work sites and possible transmission of communicable diseases (such as STIs and HIV/AIDS) from workers to local populations?			labour will always give preference so that need of construction camp will not require. Migratory labour will be employed in unavoidable circumstances only. Construction Camps (if established) will be provided with necessary water supply, sanitation, storm water drainage, solid waste management and first aid facilities during the construction period.
Creations of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents?		√	No such impact is anticipated. Proper disposal of liquid effluent will be provided at labour camps (if established) for

SCREENING QUESTIONS	Yes	No	REMARKS
			avoiding water stagnation and creation of breeding grounds.
Social conflicts if workers from other regions or countries are hired?		√	No such possibility is anticipated as the local labour will always be given preference to rule out the need for establishment of labour camp at the construction sites. Migratory labour will Be employed in unavoidable circumstances only.
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 possibility is anticipated as the local labour is getting preference as during labour construction activities. Construction established camps (if) will be provided with necessary water supply, sanitation, storm water drainage, solid Waste management etc. during the Construction period and necessary provisio For restoratio n rehabilitationor n After completion of construction.
Risk to community health and safety due to the transport, storage and use and/or disposal of materials such as explosives Fuel and other chemicals during construction and operation?		√	No such possibility is anticipated.
Community safety risks due to both accidental and natural causes, especially where structure 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.		√	Community safety risks due to both accidental and natural causes can be anticipated at extreme cases. Safety issues will be taken due care while designing the various components of the project . The proposed MPH is being constructed to ensure safety and evacuation of the tourist and

			community at the times of natural calamity or accident and emergency. Standar d Operation Procedure / Guidelines for operation phase will be prepared by Project Proponent.
Generation of solid waste and/or hazardous waste?	√		Solid waste is anticipated to be generated due to project activities. Generated wastes would be disposed off at proper designated disposal sites. However, no possibility of generation of hazardous waste is anticipated. The Environmental Management Plan (EMP) provides mitigation measures to reduce the impacts.
Use of chemicals?		√	No chemical is proposed to be used during construction activities.

SCREENING QUESTIONS	Yes	No	REMARKS
Generation of wastewater during construction or operation?	√		Waste water is anticipated to be generated during construction activities. Provision of proper disposal of waste water would be ensured through suitable mitigation measures. The Environmental Management Plan (EMP) Provides mitigation measures to reduce the impacts.

Dipankar Majumdar

Environmental Safeguards Officer

DSC-CA

Environmental Specialist PIU (CA)

Rapid Environmental Assessment (REA) Checklist

Instructions:

- This checklist is to be prepared to support the environmental classification of a project.
- This checklist is to be completed with the assistance of an Environment Specialist in a RegionalDepartment.
- This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement, (ii) indigenous peoples planning, (iii) poverty reduction, (iv) participation, and (v) gender and development.
- Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title:	**India/Loan 3055 IND, Uttarakhand Emergency Assistance Project (UEAP) Construction of Multipurpose Hall cue Rescue Centre at Sahastradhara in Dehradun district of the state of Uttarakhand**
Sector Division:	**Department of Civil Aviation, Government of Uttrakhand**

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
Cultural heritage site		√	
Protected Area		√	
Wetland		√	
Buffer zone of protected area		√	
Special area for protecting biodiversity			
B. Potential Environmental Impacts Will the Project cause…			
Impairment of historical/cultural area, disfiguration of landscape or potential loss/damage to physical cultural resources?		√	No such area is within the proposed project site.

SCREENING QUESTIONS	Yes	No	REMARKS
Disturbance to precious ecology (e.g. sensitive or protected areas)?		√	No trees are affected or no encroachment of precious ecology is anticipated.
Alteration of surface water hydrology of waterways resulting in increased sediment in streams affected by increased soil erosion at construction site?		√	
Deterioration of surface water quality due to silt runoff and sanitary wastes from worker based camps and chemicals used in construction?		√	The worker-based camp (if established) will be away from the water body and septic tanks and soak pits will be provided in the camp for sewerage disposal facilities.
Increased air pollution due to project construction and operation?	√		There will be slightly increased in Air Pollution due to various project construction activities. This impact shall be temporary, site specific and reversible in nature. This will be mitigated by taking proper mitigation measures.
Noise and vibration due to project construction or operation?		√	No such impact will be anticipated
Disproportionate impacts on the poor, women and children, indigenous people or other valuable groups	√		No blasting activity is proposed for the project. Noise level will slightly be increase due to different construction activities and it will be temporary and site specific. This will be mitigated by using PPEs, noise enclosures, etc.
Poor sanitation and solid waste disposal in construction camps and work sites and possible transmission of communicable diseases (such as STIs and HIV/AIDS) from workers to local populations?		√	Not involved
Creations of temporary breeding habitats for diseases such as those transmitted by mosquitoes and		√	Not involved

SCREENING QUESTIONS	Yes	No	REMARKS
rodents?			
Social conflicts if workers from other regions or countries are hired?	√		The project is proposed in the Sports Stadium. Issue of safety and protective measures.
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 impact will be anticipated. Local labour will always give preference so that need of construction camp will not require. Migratory labour will be employed in unavoidable circumstances only. Construction Camps (if established) will be provided with necessary water supply, sanitation, storm water drainage, solid waste management and first aid facilities during the construction period.
Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological and radiological hazards during project construction and operation?		√	No such impact will be anticipated. Proper disposal of liquid effluent will be provided at camps for avoiding water stagnation and creation of breeding grounds.
Risk to community health and safety due to the transport, storage and use and/or disposal of materials such as explosives fuel and other chemicals during construction and operation?		√	No such impact will be anticipated. Local labour will always give preference so that need of construction camp will not require. Migratory labour will be employed in unavoidable circumstances only.
Community safety risks due to both accidental structure elements or members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning.		√	Large population influx during project construction will not be expected as local labour will always get the preferences. Construction camps (if established) will be provided with necessary water supply, sanitation, storm water drainage, solid waste management etc. during the construction period and necessary provision for rehabilitation or restoration after completion of construction.
Generation of solid waste and/or hazardous waste?		√	No such impact shall be anticipated

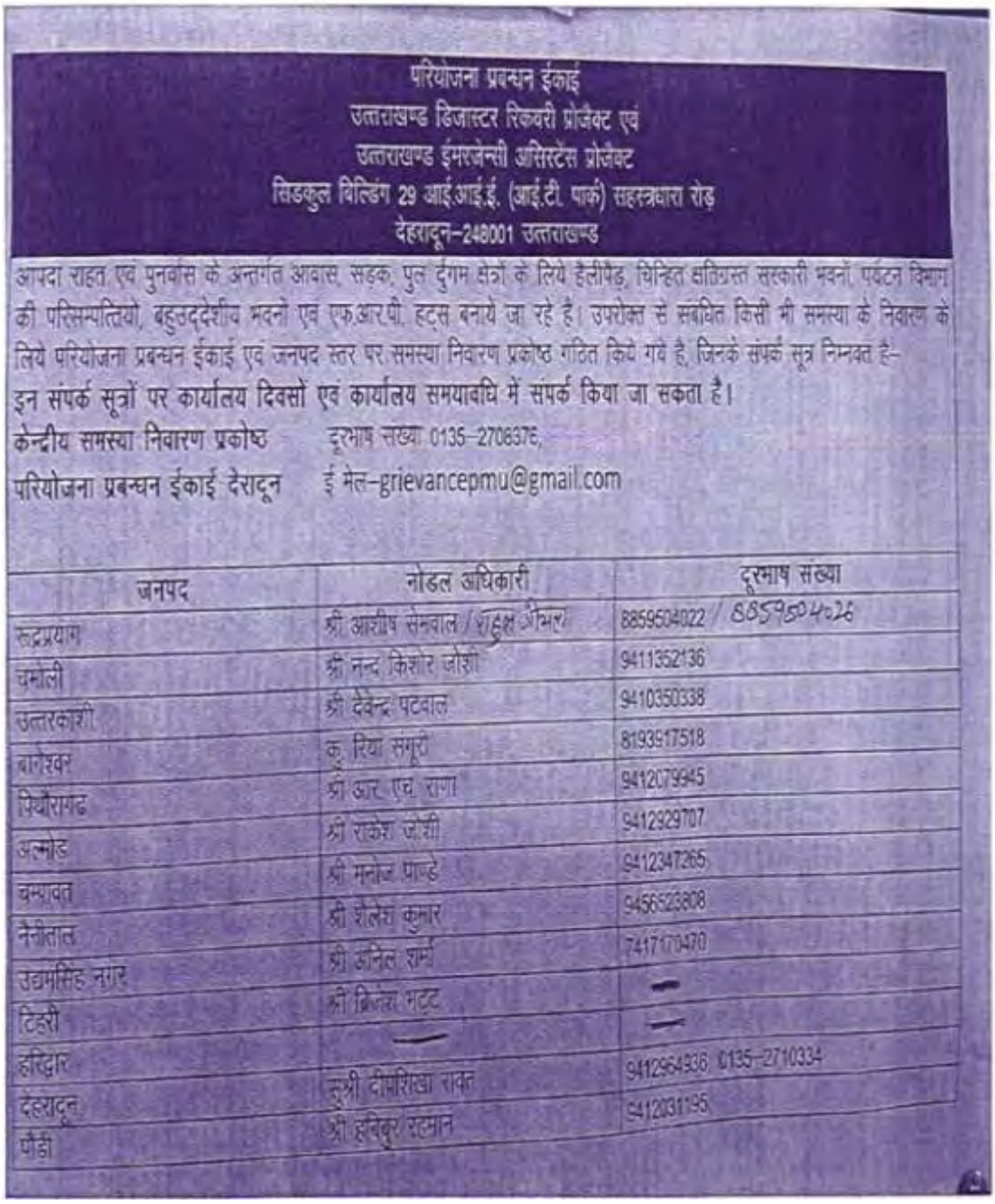
SCREENING QUESTIONS	Yes	No	REMARKS
Use of chemicals?		√	No such impact shall be anticipated
Generation of wastewater during construction or operation?		√	Community safety risks due to both accidental and natural causes can be anticipated at extreme cases. Safety issues will be taken due care while designing the various components of the project. The proposed MPH cum rescue centre is being constructed to ensure safety of the tourist and community at the times of natural calamity or accident and emergency. Standard Operation Procedure / Guidelines for operation phase will be prepared by Project Proponent.

Dipankar Majumdar
Environmental Safeguards Officer
DSC-CA

Environmental Specialist PIU (CA)

Appendix C

UCADA ADVERTISEMENT



परियोजना प्रबन्धन इकाई
उत्तराखण्ड डिजास्टर रिकवरी प्रोजेक्ट एवं
उत्तराखण्ड इमरजेन्सी असिस्टेंस प्रोजेक्ट
सिडकुल बिल्डिंग 29 आई.आई.ई. (आई.टी. पार्क) सहस्त्रधारा रोड़
देहरादून–248001 उत्तराखण्ड

आपदा राहत एवं पुनर्वास के अन्तर्गत आवास, सड़क, पुल दुर्गम क्षेत्रों के लिये हैलीपैड, चिन्हित क्षतिग्रस्त सरकारी भवनों, पर्यटन विभाग की परिसम्पत्तियों, बहुउद्देशीय भवनों एवं एफ.आर.पी. हट्स बनाये जा रहे है। उपरोक्त से संबंधित किसी भी समस्या के निवारण के लिये परियोजना प्रबन्धन इकाई एवं जनपद स्तर पर समस्या निवारण प्रकोष्ठ गठित किये गये है, जिनके संपर्क सूत्र निम्नवत है–

इन संपर्क सूत्रों पर कार्यालय दिवसों एवं कार्यालय समयावधि में संपर्क किया जा सकता है।

केन्द्रीय समस्या निवारण प्रकोष्ठ दूरभाष संख्या 0135–2708376,
परियोजना प्रबन्धन इकाई देहरादून ई मेल–grievancepmu@gmail.com

जनपद	नोडल अधिकारी	दूरभाष संख्या
रुद्रप्रयाग	श्री आशीष सेमवाल / शहुल अमिर	8859504022 / 8859504026
चमोली	श्री नन्द किशोर जोशी	9411352136
उत्तरकाशी	श्री देवेन्द्र पटवाल	9410350338
बागेश्वर	कु. रिया संगूरी	8193917518
पिथौरागढ	श्री आर. एच. राणा	9412079945
अल्मोड	श्री राकेश जोशी	9412929707
चम्पावत	श्री मनोज पाण्डे	9412347265
नैनीताल	श्री शैलेश कुमार	9456523808
उधमसिंह नगर	श्री अनिल शर्मा	7417170470
टिहरी	श्री बिजेन्द्र भट्ट	—
हरिद्वार	—	—
देहरादून	सुश्री दीपशिखा रावत	9412964936 0135–2710334
पौड़ी	श्री हबीबुर रहमान	9412031135

लोक सूचनार्थ हेतु प्रपत्र
(Leaflet for Public Information)

एशियाई विकास बैंक द्वारा सहायतित "उत्तराखण्ड आपातकालीन सहायता परियोजना"

(Uttarakhand Emergency Assistance Project Assisted by ADB)

दूरभाश संख्याः 0135–2608681 E-Mail : piu.ca.uk@gmail.com

पथम चरण

परियोजना कियान्वयन इकाई
उत्तराखण्ड नागरिक उड्डयन विकास प्राधिकरण – देहरादून
(Project Implementation Unit: Uttarakhand Civil Aviation Development Authority)

1.प्रस्तावना (Introduction)

उत्तराखण्ड एक नवसृजित राज्य है, जो 9 नवम्बर 2000 को पूर्ण रूप से पृथक राज्य के रूप में अस्तित्व में आया। जिसका अधिकाँश भाग मध्य हिमालय का पर्वतीय क्षेत्र है। अधिकाँश भू–भाग पर्वतीय आंचल में होने के कारण यहां रेलवे एवं वायुयान जैसी सुविधाओं का प्रायः अभाव रहा है। फलस्वरूप सड़क मार्ग ही एकमात्र आवागमन का सुलभ साधन है। राज्य में आवागमन एवं समस्त विकासात्मक योजनायें सड़कों की उपलब्धता एवं गुणवत्ता पर ही आधारित हैं। राज्य की विषम भौगोलिक परिस्थिति होने के कारण 15–17 जून 2013 को राज्य का अधिकाँश पर्वतीय भू–भाग आपदा से बुरी तरह से प्रभावित हुआ। जिसके परिणामस्वरूप जानमाल की क्षति के साथ कई मोटर मार्ग पूर्ण एवं आंशिक रूप से क्षतिग्रस्त हुये। जो राज्य सरकार के साथ समस्त मानव समुदाय के लिए एक बहुत बड़ी चुनौती साबित हुई। राज्य के पर्वतीय भू–भाग में मौजूदा सड़कों की उचित गुणवत्ता न होने के कारण उक्त नवसृजित राज्य के बहुमुखी विकास हेतु राज्य सरकार द्वारा एशियाई विकास बैंक के वित्तीय सहयोग से उत्तराखण्ड नागरिक उड्डयन विकास प्राधिकरण राज्य में सुलभ आवागमन हेतु विशेषतः आपदाकालीन स्थिति को मद्देनजर रखते हुए पूर्व अनुभवों के आधार पर प्रभावित क्षेत्रों के जनमानस के मध्य उक्त महत्वाकांक्षी परियोजना के अन्तर्गत राज्य के अधीन मौजूदा हैलीपैड्स एवं हैलीपोर्ट्स के सुधारीकरण एवं सुदृढ़ीकरण के साथ–साथ कई नये हैलीपैड्स एवं हैलीपोर्ट्स के निर्माण हेतु वचनबद्ध है। उक्त कार्य हेतु परियोजना से सम्बन्धित सूचना आम जनमानस के सूचनार्थ एवं महत्वपूर्ण सुझाव के लिए इस प्रपत्र के माध्यम से प्रकाशित की जा रही है।

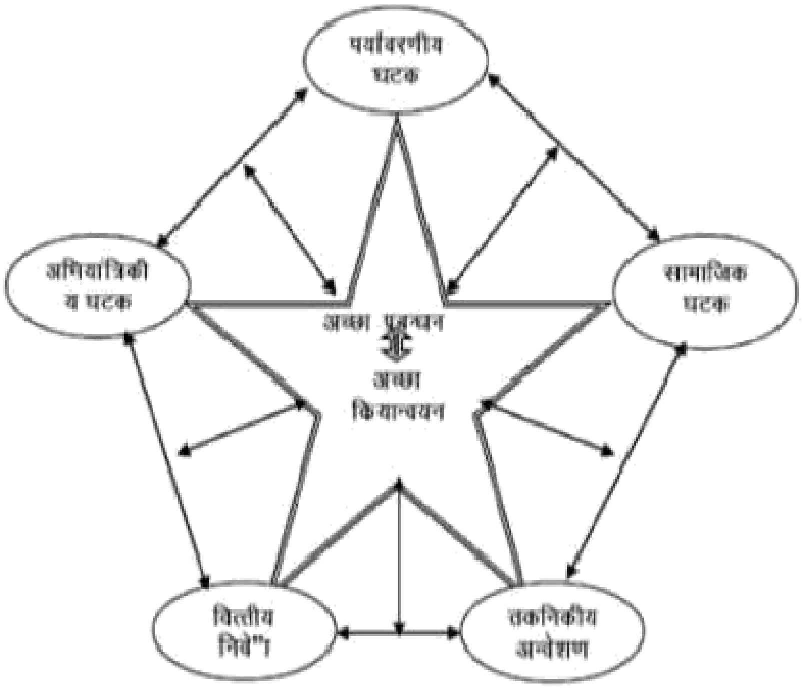
2.उद्देश्य (Objectives)

विकास एवं पर्यावरण एक ही सिक्के के दो पहलू हैं। यदि प्राकृतिक पर्यावरण के संतुलन एवं संवर्द्धन की ओर ध्यान केन्द्रित किया जाए तो निश्चित ही विकास के दुष्प्रभावों को नियंत्रित किया जा सकता है। परन्तु विकास की दौड़ में जहाँ नये मोटर मार्गों का निर्माण कार्य अति आवश्यक है। उसी प्रकार से राज्य के दुर्गम एवं पर्वतीय क्षेत्रों में आपदा जैसी समस्या से निपटने के लिए हैलीपैड्स एवं हैलीपोर्ट्स का निर्माण एवं रखरखाव करना भी उतना ही आवश्यक है। अन्यथा आपदा जैसी दुर्घटनाओं से बच पाना सम्भव नहीं होगा। उक्त समस्या के समाधान हेतु उत्तराखण्ड राज्य सरकार ने एशियाई विकास बैंक के वित्तीय सहयोग से उपरोक्त परियोजनान्तर्गत प्रथम चरण (फेज–1) में 12 एवं द्वितीय चरण (फेज–2,3,4,5,6,7,8) में 48 नय एवं पूर्व निर्मित हैलीपैड्स एवं हैलीपोर्ट्स का कार्य सुधारीकरण एवं सुदृढ़ीकरण हेतु प्रस्तावित किया है। परियोजना के पथम–चरण में से कुल 1 स्थलों में सम्बन्धित विभाग/प्रयोक्ता एजेंसी एवं जिलाधिकारियों से निर्माण कार्य हेतु अनापत्ति प्रमाण–पत्र उपलब्ध हो पाये। जिनका संक्षिप्त उल्लेख **तालिका–1** में किया गया है।

तालिका–1: ''उत्तराखण्ड नागरिक उड्डयन विकास प्राधिकरण'' के अन्तर्गत द्वितीय–चरण पैकेज 1 में नव–निर्माण एवं सुधारीकरण हेतु हैलीपैडस एवं हैलीपोर्ट्स की सूची

क्र0 सं0	प्रस्तावित स्थल	जनपद	श्रेणी (न्यूनतम आकार मी0 में)	पी0एम0सी0	एन0जी0ओ0
गढ़वाल मण्डल				सी0ई0ओ0 डी0सी0 देहरादून (श्री पियूष जैन मो0 [illegible] E-Mail: [illegible]) डा0 सुरजीत सिंह (पर्यावरण विशेषज्ञ [illegible]) डा0 [illegible] (प्रबन्धक विशेषज्ञ [illegible])	श्री एस0 के0 सिंह, प्रबंधक सेंटर फॉर ह्यूमन एण्ड इकोलॉजिकल डेवलपमेंट (चेतना) देहरादून (9219617770/945 2368319)
1	[illegible]	रुद्रप्रयाग	एच–4 ([illegible] मी0)		
महायोग (अ+ब)		1 जनपद	एच–4 = 1		

नोट: हैलीपैडस एवं हैलीपोर्टस के निर्माण हेतु सम्बन्धित विभाग एवं जिलाधिकारियों से प्रस्तावित सरकारी भूमि होने के कारण अनापत्ति प्रमाण–पत्र प्राप्त किया गया है।



प्रवाह मानचित्र – 1: सतत विकास के अन्तर्गत परियोजना के प्रभावपूर्ण क्रियान्वयन हेतु अच्छे प्रबन्धन के लिए विभिन्न घटकों का प्रारूपिक प्रवाह मानचित्र।

➢ **परियोजना के प्रमुख उद्देश्य निम्नवत इस प्रकार हैं।**

- ✓ *राज्य में मौजूदा हैलीपैड्स एवं हैलीपोर्ट्स का पुनरूद्धार एवं सुदृढ़ीकरण के साथ–साथ एवं नये हैलीपैड्स एवं हैलीपोर्ट्स के निर्माण हेतु स्थलों का चयन कर सम्बन्धित विभाग एवं जिलाधिकारियों से निर्माण कार्य हेतु अनापत्ति प्रमाण–पत्र प्राप्त कर परियोजना का प्रभाव पूर्ण क्रियान्वयन करना।*
- ✓ *राज्य के दुर्गम स्थानों में आपदा के दौरान जनता को हैलीकोप्टर/चोपड के माध्यम से प्राथमिक सविधायें एवं आवश्यकीय बचाव कार्य उपलब्ध कराना।*
- ✓ *राज्य के दुर्गम स्थानों के आर्थिक विकास एवं चार धाम यात्रा हेतु पर्यटन को बढ़ावा देना।*
- ✓ *ऐसे क्षेत्र जो उच्च आर्थिक गतिविधियों एवं विकास के अन्तर्गत आते हैं, उनको अन्य क्षेत्रों से जोड़ना ताकि उनसे होने वाले प्राप्त गुनाफों को राज्य के प्रत्येक भाग तक पहुचाया जाना सम्भव हो सके।*
- ✓ *उक्त अध्ययन का मुख्य उद्देश्य प्रस्तावित हैलीपैड्स एवं हैलीपोर्ट्स की अभियांत्रिकी, परिचलन, आर्थिकी, सामाजिक एवं पर्यावरण सम्बन्धित गतिविधियों को प्राथमिकता की सूची में सम्मिलित करना तथा विस्तृत परियोजना आख्या (डीपीआर) निर्धारित करते समय स्थानीय जनता के महत्वपूर्ण सुझावों को मद्देनजर रखना।*
- ✓ *परियोजना से प्रभावित व्यक्ति चाहे प्रत्यक्ष रूप से लाभान्वित न हो, लेकिन परोक्ष रूप को लक्ष्य मानते हुए परियोजना के क्रियान्वयन के तत्पश्चात आम जनमानस के जीवन में सुधार आना सुनिश्चित है।*
- ✓ *मुख्यतया आम जनमानस की आजीविका पर प्रभाव और भूमि अधिग्रहण एवं पर्यावरण अवनयन जैसे नकारात्मक प्रभाव यथासम्भव कम से कम हो जैसे प्रयास करना उक्त अध्ययन का प्रमुख लक्ष्य है।*
- ✓ *एशियाई विकास बैंक के नीति निर्देशों के तहत ग्रामीण आबादी (डीपीपी) के अन्तर्गत महिला सत्तात्मक परिवार, बुजुर्ग वर्ग, गरीबी रेखा से नीचे जीवनयापन (बीपीएल) करने वाले परिवार और सामाजिक रूप से पिछड़े वर्गों (एससी, एसटी) को सम्मिलित किया गया है। उक्त वर्गों के परिवारों पर विशेष ध्यान केन्द्रित है।*
- ✓ *उक्त कार्यक्रम के अन्तर्गत 3 वर्ष की समयावधि में लगभग 60 हैलीपैड्स एवं हैलीपोर्ट्स का निर्माण कार्य प्रस्तावित है।*
- ✓ *उक्त कार्यक्रम के तहत प्रस्तावित क्षेत्र में पड़ने वाले वृक्षों के छतन एवं अतिक्रमण जैसे प्रमुख मुद्दों पर सरकार एवं स्थानीय जनमानस के मध्य विचार विमर्श कर निर्माण कार्य को सुनिश्चित करना।*
- ✓ *उक्त कार्यक्रम के अन्तर्गत समस्त पर्यावरणीय एवं पुनर्वास के संवेदनशील मुद्दों को सिविल कार्यों के क्रियान्वयन होने से दो माह पूर्व निष्पादित किया जाना अति आवश्यक है।*

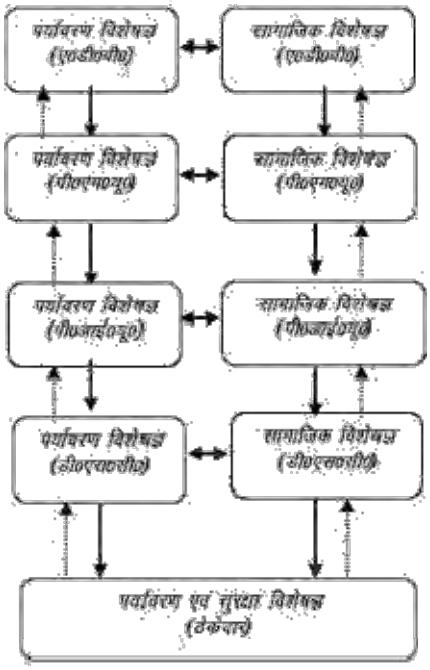
3.पर्यावरण परिदृश्य (Environmental Scenario)

उक्त परियोजना के अन्तर्गत पर्यावरण परिदृश्य का मुख्य उद्देश्य प्राकृतिक पर्यावरण एवं आपदा स्थिति के साथ–साथ सतत विकास को मद्देनजर रखते हुए बेहतर विकल्पों को पर्यावरण संरक्षण हेतु दृष्टिगोचर करना। जिसमें सुनियोजित योजना, आलेखन एवं परियोजना के क्रियान्वयन के समय विभिन्न अवस्थाओं में निम्नलिखित बिन्दुओं को सम्मिलित किया जायेगा।

- ✓ *परियोजना के अन्तर्गत प्रमुख पर्यावरणीय घटकों (जल, जमीन, जंगल, वायु एवं प्राकृतिक संसाधनों का संरक्षण) की पहचान एवं मूल्यांकन करना।*
- ✓ *प्रमुख पर्यावरणीय मुद्दों (जल, जमीन, जंगल, वायु एवं प्राकृतिक संसाधनों का संरक्षण) पर पड़ने वाले नकारात्मक प्रभावों पर नियंत्रण एवं चूनीकरण करना।*
- ✓ *परियोजना के सफल संचालन हेतु प्रारम्भिक पर्यावरण परीक्षण (आईईई), पर्यावरण प्रबंधन योजना (ईएमपी) एवं पर्यावरण प्रभाव विश्लेषण (ईआईए) जैसे महत्वपूर्ण दस्तावेजों को परियोजना की आवश्यकतानुसार एशियाई विकास बैंक एवं भारत सरकार के निती निर्देशों के अनुरूप*

सुनियोजित कर समयबद्ध तरीके से क्रियान्वयित करना।

पर्यावरण एवं सामाजिक सुरक्षा की दृष्टिकोण से विशेषज्ञों का पदानुकम

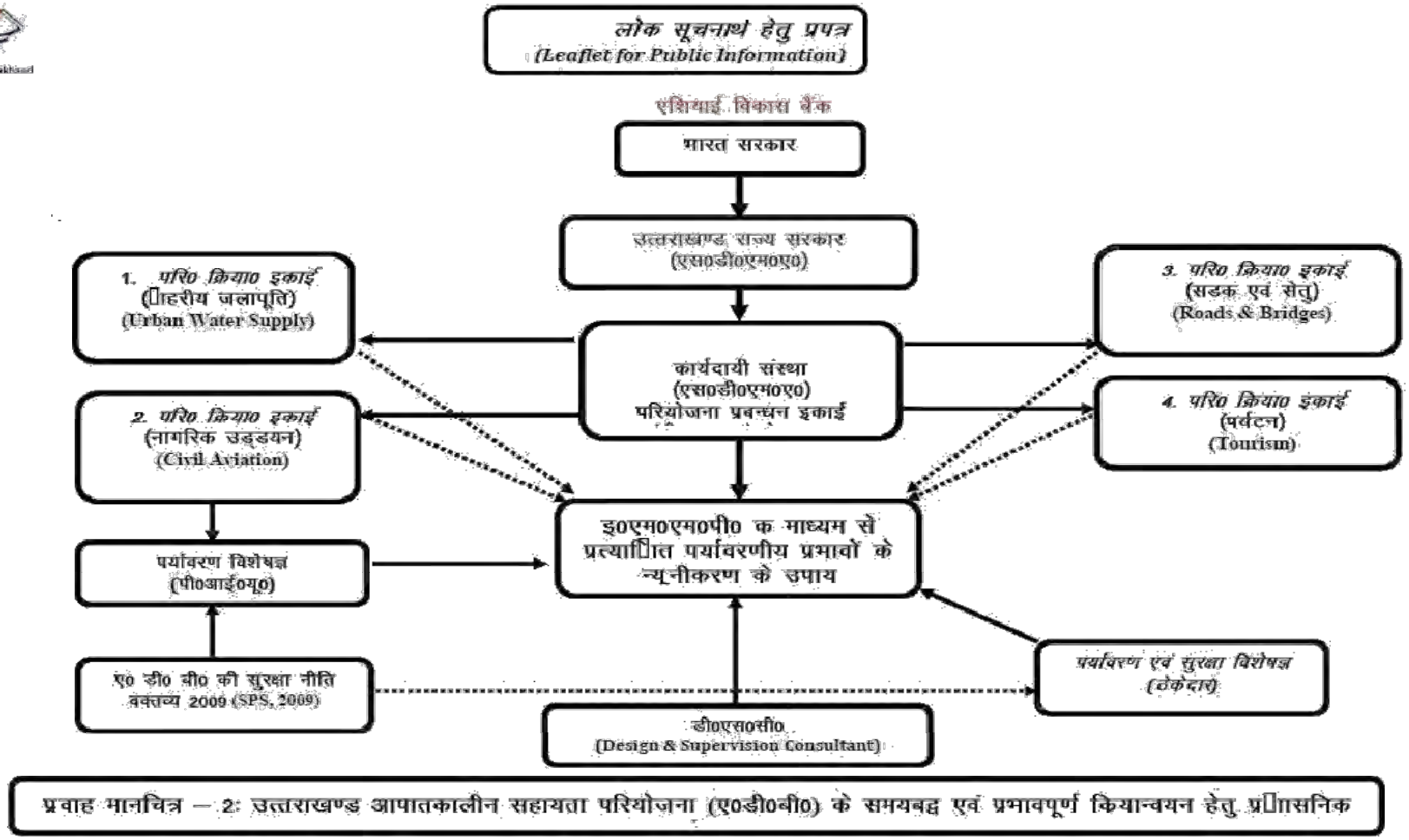


4. प्राकृतिक पर्यावरण के अंग
(Parts of Natural Environment)

(अ) भौतिक पर्यावरण
(Physical Environment)
- जल संसाधन।
- मृदा संरक्षण।
- पर्यावरण प्रदूषण (वायु, जल, ध्वनि इत्यादि)।
- अपशिष्ट पदार्थों का निष्पादन।
- खनिज एवं धातु संसाधन।
- स्थलाकृति इत्यादि।

(ब) जैविक पर्यावरण
(Biological Environment)
- प्रस्तावित भूमि में आच्छादित वृक्ष।
- वन्य जीव एवं उनके प्राकृतिक आवास (वन, जलाशय, घोंसले, छिद्र, गड्ढेदार भूमि आदि)।
- वन, अभ्यारण्य, राष्ट्रीय पार्क, जैव–मण्डल निचय इत्यादि।

(स) सामाजिक एवं सांस्कृतिक पर्यावरण
(Socio-cultural Environment)
- पेयजल के स्रोत।
- विद्यालय, महाविद्यालय, अस्पताल इत्यादि।
- धार्मिक स्थल (मन्दिर, मस्जिद, गुरूद्वारा इत्यादि)।
- सांस्कृतिक एवं पुरातात्विक स्थल (धरोहर)।
- अवशिष्ट पदार्थों के निष्पादन हेतु अन्य स्थल एवं सिविल कार्य हेतु ली गई भूमि।



प्रवाह मानचित्र – 2: उत्तराखण्ड आपातकालीन सहायता परियोजना (ए0डी0बी0) के समयबद्ध एवं प्रभावपूर्ण कियान्वयन हेतु प्र□ासनिक

Appendix E

ATTENDANCE SHEET OF PUBLIC CONSULTATION

Gram Pradhan: Mr. Suresh Tapilyal : 9759461620
Patwari : Mr. Shyamlal : 8445532693
Village :- Ratura

PUBLIC CONSULTATION ATTENDANCE SHEET

ATTENDACE SHEET FOR FOCUS GROUP DISCUSSION

Name of the site: Ratura Block: Agustmuni Districts: Rudraprayag.

S.No.	Name	Phone Number	Subjects Discussed		Remarks	Signature of Participants
1	Umesh Tapaliyal	9568549238	(1) Regarding Project		No objection	[illegible]
2	Vinod Tapliyal	9012675379	site of Helipad		No objection	Tapliyal
3	[illegible]	9759049969	coming in the area		No objection	[illegible]
4	Van Sarpanch Mohan Singh Chauhan	9927038176	which they welcome		No objection	[illegible]
5	Gourav Singh	9171493028	& agreed.		No objection	Gaurav Singh
6	Rakesh Kumar	9639757642	(2) Regarding various		No objection	[illegible]
7	Jaisingh	9557205264	of financial income		No objection	J.S.C.
8	Kshetra Panchayat Sumitra Devi	9759363304	due to the project		No objection	[illegible]
9	Shivlal.				No objection	[illegible]
10	Suresh Thapliyal	9759461620			No objection	[illegible]
11	Durga Prasad	9627497265			No objection	[illegible]
12	Lalita Prasad	9536754341			No objection	[illegible]

(Suresh Thapaliyal)
Gram Pradhan
Ratura village

Signature&Date
(Anand Tripathi)

Appendix F

PHOTOGRAPHS OF PUBLIC CONSULTATION

Appendix G

OPERATION CIRCULAR NO. 7/2013

GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT

OFFICE OF THE
DIRECTOR GENERAL OF CIVIL AVIATION
OPP. SAFDARJUNG AIRPORT, NEW DELHI – 110 003
TELEPHONE: +91-011-24635261
+91-011-24644768

FAX: +91-011-24644764

भारत सरकार
नागर विमानन विभाग
महानिदेशक नागर विमानन का कार्यालय
सफदरजंग एयरपोर्ट के सामने
नई दिल्ली - ११० ००३

Reference: No.: संख्या : AV 22024/12/2013-FSD
Dated: दिनांक : 14th August, 2013

OPERATIONS CIRCULAR NO. 7/2013

Subject:- **UTILISATION OF HELICOPTERS IN DISASTER MANAGEMENT**

1. Introduction

1.1 During natural calamity / disaster, both aeroplanes and helicopters are requisitioned to provide aid by the **Requisitioning Authority (RA).** Aeroplanes generally fly between two airports where all aviation related facilities and security exist. However Helicopters operate from the disaster sites and temporary/ unprepared helipads in a hostile environment. It is for this reason that this **'Operation Circular' is specific to 'Utilisation of Helicopters in Disaster Management (DM)'.**

1.2 Helicopters have proved to be the most effective means of transportation, casualty evacuation, mass evacuation and means to provide 'relief' during a disaster, particularly in an inhospitable terrain and over hostile environment. This aspect was proved beyond doubt during the 2013 flash floods in Uttarakhand where almost eighty five (85) helicopters of Civil and Military registrations participated and were the only life-line in higher reaches of Himalayas. Helicopters with their ability to maneuver in restricted spaces, hover and act as an aerial platform saved almost 50,000 lives in Uttarakhand and were of immense help to the local administration and to the ground rescue parties.

1.3 The instructions given in this Circular are only a guideline to be followed by

1

RA/ State Govts, DGCA, Operators and other stake holders participating in DM. Each calamity/ disaster will have its own peculiarities and intensity and would require a specific response. What was applicable in Uttarakhand mountains during floods may not be applicable while providing aid and relief during an earthquake in the plains or other places.

2. Limitations of Helicopters

2.1 The RA and State Govts need to know the limitations of helicopters to be able to deploy them efficiently for best results for DM. The limitations of helicopters can be enumerated as follows:

a) Weather:
- Rain and Snow
- Visibility
- Turbulence
- Icing
- Strong and gusting winds.
- Thunderstorms.

b) Availability of landing spaces in hostile terrain/ environment.
c) Dusty and unprepared helipads.
d) Degradation of performance in high altitudes and in high temperatures.
e) Operations by 'Day' only.
f) Airspace management.
g) Number of helicopters available for the task as no dedicated helicopters are available for search and rescue, firefighting or winching, etc. under Civil registration.
h) Carrying capacity i.e. number of passengers and cargo, which depletes in high altitudes and in high temperatures conditions.
i) High maintenance vis-à-vis fixed wing aircrafts.
j) Pilot fatigue compounded by single pilot operations.

3. Helicopter Provisioning.

3.1 In addition to Civil registered helicopters, Indian Army, Indian Air Force, Indian Navy and Para-Military forces like BSF and CRPF also contribute their helicopter towards DM. Thus, DM site and area is a congregation of many 'Types' of helicopters, each with different characteristic and capabilities. Also, the rules governing flying operations for defence pilots and civil pilots are different. Therefore there is a need to integrate all operators participating in DM to be on one grid.

4. **Disasters in India**

4.1 India is prone to numerous natural and man-made disasters, which could be :

a) Cloud burst, Floods and Landslides (Uttarakhand 2013, Assam 2012, Ladakh 2010 and Karnataka, Orissa, Kerala and Gujarat in 2009).

b) Earthquakes (Sikkim in 2009, J&K in 2007, Gujarat in 2000, Uttarakhand in 1999, Maharashtra in 1991 and HP in 1975)
c) Tsunami (A & N Islands, TN, AP and Orissa in 2004)
d) Cyclones (Orissa in1999, Gujarat in 2007, 2001 and 1998, Karnataka in 1993, Tamil Nadu in 2011, 2010, 2000, 1996 and 1993 and AP in 2007, 1998 and 1990)
e) Famines
f) Fires, both urban and jungle.
g) Manmade disasters like Bhopal Gas tragedy (1990), Rail accidents, terrorist attacks akin to 9/ 11 in the US, Radiations (Japan 2011), Building collapse and many more.

5. **Affects of Disasters on Flying Operations**

5.1 Each disaster will affect flying activities and operations in a different manner but some common aspects are :

a) Break down of 'surface transport' affects logistic and aviation supply chain. Washing away of roads in Uttarakhand led to obstruction in transportation of fuel and logistics to forward helipads, leading to greater turnaround time and reduction in number of people evacuated.
b) Breakdown in telecommunications. It leads to lack of coordination between helicopter operators, between civil and defence/ para-military helicopters and between operators and State/ local administration.
c) Landslides, water logging, rubble, fire etc. result in non-availability of helipads to operate helicopters.
d) Restricted flying due to inclement weather (clouding and rain) and hostile environment reduces the window of opportunity to fly.
e) Lack of ground support near and over the disaster site.
f) Lack of control (aerial and on ground) in the disaster area.
g) Limited airspace on disaster site/ area and its availability to helicopters, since their number could be very large as in Uttarakhand.

6. Tasking of Civil Helicopters

6.1 As the State Govts realize and recognize the potential of helicopters, it is likely that more and more helicopters will be sought in future for disasters and the main tasks assigned to helicopters would be:

a) Casualty evacuation.
b) Evacuate stranded people, particularly women, children, old and feeble, to safe places.
c) Search and rescue (SAR).
d) Carry rations, supplies and drinking water.
e) Medical aid.
f) Firefighting.
g) Carry large, voluminous and heavy loads like bridges, bulldozers, etc.
h) Aerial reconnaissance by decision makers.
i) In some case, carriage of dead bodies.
j) Relief and rehabilitation after the calamity.

7. Suggested Role and Responsibilities of RA / State Govts.

7.1 Without interfering in the DM scheme or in the functioning of State Govts, following guidelines are recommended for all Stake holders :

a) Include requisition and management of aviation assets as an integral part of DM scheme. State's Aviation department could be a part of DM Authority (DMA).
b) Ministry of Civil Aviation in their document 'Vision 2020' had suggested construction of a helipad in the vicinity of all large and populated habitats. State Govts may like to consider this aspect for implementation and construct helipads as per CAR Sec 4, Series 'B', Part 'V' which can be used by helicopters during normal times for ferrying passengers, tourists, VIPs and Govt. officials. During disaster/ calamity, they would serve as a hub/ launch pad for helicopters aiding DM.
c) Regular maintenance of State Govt. airports and helipads. In Uttarakhand, Gaucher airstrip had to be prepared before IAF aircraft could land on it.
d) Update 'Helipad directory' to include permanent and frequently used helipads, both Govt. and Private. State Govts. May provide such data to DGCA.

e) Encourage/ asse construction of helipads in their States and simplify helicopter movement procedures for their regular use.

f) Consider construction of roof top helipads over high rise buildings, particularly over those buildings frequented by general public in large numbers or with high density dwellings, for evacuation during fire. Some Indian cities have already made it mandatory for buildngs above certain height to have roof top helipads.

g) Ensure all State Govt. aviation assets are serviceable. Helicopters of some State Govts are unserviceable for prolonged periods, some over three years.

h) Maintain a directory of all helicopters and aeroplanes in the State, which could be called upon for immediate relief during a disaster.

i) Update telephone directory of all Govt., Defence, Para-military and private operators in their State along with AAI and helipad operators.

j) Formulate procedures and modalites for requisitioning and chartering civil helicopters and aeroplanes during disaster.

k) During DM, the RA/ State Govt. would be required to ensure the following :

- Provide security to all aviation assets.
- Ensure one point contact with civil and defence operators for tasking aviation resources.
- Draw priorities for tasking the sparse assets.
- Smooth logistics support to keep machines flying.
- Coordinate with DGCA, AAI, BCAS and Defence authorities to ensure coordination at all levels and uninterrupted flying operations.
- Coordination with all stake holders and operators.
- Ensure even handed policies to avoid misuse by unscrupulous elements.
- Compile daily flying effort and results achieved.
- Provide administration back-up to air and ground crew operating for DM.

7.2 State Govts would formulate a detailed working plan based on the above guidelines.

8. Role of DGCA

8.1 Since DGCA is a 'regulatory authority' and not part of NDMA or State DMA, its role is confined to ensuing Safety of aircraft operations and as a facilitator. Notwithstanding that, DGCA would provide all assistance to the RA/ State Govts to ensure quick response alongwith optimum and safe utlization of all aviation assets during DM. Some aspects which DGCA can facilitate are :

a) Smooth and quick mobilization of civil registered aviation resources to the site of disaster.

b) Advice State Aviation Cells to integrate aviation resources in their DM Scheme.

c) Provide Flight Operations Inspectors (FOIs) during the calamity to be collocated with State DMA and at site of disaster, to assist in the following :

- Interaction with State Government.
- Ensure optimum utilization of aviation resources and airspace management.
- Ensure safety of helicopter operations and flying during adverse conditions. Flight safety would be top priority at all times.
- Assist in preparation of landing grounds/ helipads.
- Logistic support to helicopters operating from forward helipads.
- Rest and relief of pilots, in coordination with operators.
- Proper maintenance of helicopters.
- Safety and security of helicopters, landing grounds, etc. so that people do not crowd helicopters leading to inadvertent accident / incident.
- Proper briefing of pilots before take-off.
- Debriefing of pilots after the sortie.
- Priority of work
- Assist operators to get ATS clearances, if required.
- Provide SAR to IAF and Army, if required.
- Disseminating information to all operators and pilots about the following.
  - Weather in different valleys, routes and in different regions.
  - Conditions of existing helipads and landing grounds.
  - Security and aids available at various locations.
  - Movement of IAF and Army resources.
  - Location of ground / rescue parties.
  - Location of persons who need assistance.
  - Site of accident, if any, and relief to be rushed in.
  - VIP movement and restrictions, if any.

8.2 DDG-FSD will be the single point contact in DGCA Headquarters, when civil registered helicopters participate in DM. He/ she will be assisted by Senior most FOI(H) who will ensure mobilization of aviation assets, detailing FOIs to disaster site, mediating between operators and compiling daily reports.

9. Role of Operators

9.1 It is expected that 'Operators' would rise to occasion during a calamity/ disaster and support the RA/ State Govt whole heartedly and scrupulously. Some of the tasks to be performed by Operators would be :

a) On specific instructions from the Ministry of Civil Aviation, 'Aid to State Govt. / RA' would be given 'Priority' over all other commercial activities. On requisition, move the helicopter(s) and ground party to the disaster site at the earliest by shortest route.

b) During DM :
- Undertake all flights within the realms of pilot's and helicopter's abilities, without jeopardizing safety.
- Ensure crew composition as per severity of weather, terrain, task, landing areas, security and safety concerns.
- Proper maintenance in field conditions.
- Rest and relief to air and ground crew.
- Work in coordination with other operators as per instructions of DGCA FOI delegated on site or co-opted with State DMA.
- Ensure FDTL compliance. DGCA may be approached to extend FDTL in exceptional cases.
- Seek DGCA assistance to utilize services of other operator's air and ground crew.
- Strictly follow rules for VFR and IFR flights.
- Provide assistance to other operators, if required.
- Provide assistance to IAF and Army, if required.
- While tasking, give due consideration to pilot's :
  - Capabilities and clearances.
  - Emotional stability for evacuating casualties and dead bodies.
  - Single pilot ops capabilities in difficult terrain, over hostile areas and in inclement weather conditions.
- Ensure ethical conduct by all company personnel. Flying during DM is not an 'Opportunity' but an 'Aid'.
- Demobilize when released by RA/ State Govt.

9.2 As responsible entities, Operators need to further define their roles themselves during DM and ensure compliance.

9.3 Since a majority of pilots flying civil helicopters in India have military background, they would well be advised to draw a judicial and rational

balance between 'Flight safety' and 'Mission accomplishment'. Flight safety would remain of paramount importance and the pilots should:

a) Know capability and limitation of and their machines.
b) Stretch themselves and their machine only up to a certain limit and not beyond. It is always better to live another day to save more lives than take an irrational step in the heat of the moment.
c) Follow local SOPs, routings and other instructions meticulously. The airspace over the disaster area is shared by numerous helicopters and aircraft. Thus it is important to abide by clearances obtained and coordination done on ground before the sortie.

9.4 Lessons from Uttarakhand DM. During the floods in Uttarakhand, four (4) helicopters, three (3) civil and one (1) of IAF, and twenty (20) lives were lost due to avoidable accidents. Proper selection of helipad, adhering to security instructions, not flying in bad weather, not stretching the capabilities of the helicopter and proper hill training of the pilots would have ensured an accident free operation.

10. Helicopter Hubs/ Bases

10.1 Numerous helicopter bases may be required to be established in aid of a DM. FOI co-opted with State DM will ensure:

a) Distribution and movement of resources between different bases as per tasks envisaged.
b) Security of all bases.
c) Establishment of all maintenance and administrative facilities at all the bases.
d) Coordination with military helicopters.
e) Flight planning and its execution in coordination with other bases.
f) Adequate stocking and replenishment of FOL and other supplies in all bases.
g) Provide SAR in case of an air accident.

11. Reports and Returns

11.1 All operators will ensure the following:

a) Proper record of all sorties launched in aid of disaster management is maintained. It will consist of:

- Number of sorties launched
- Number of hours flown.
- Numbers of passengers evacuated/air lifted.

- Load carried.
- Any special task undertaken.

b) Information will be given to FOI in the State DMA every day and to DGCA Hqrs. every 7th day on each Monday.

12. Conclusion

12.1 Above instructions are not exhaustive and would require modification and interpretation by the FOIs co-opted with State Govts and by the State DMA as per ground realities and degree / intensity of disaster.

12.2 All Operators should carry out the assigned tasks to the best of their ability within the realms of "Flight Safety" and also within human, machine and weather limitations.

Sd/-
(Lalit Gupta)
Deputy Director General
for Director General of Civil Aviation

Appendix H

NO-OBJECTION CERTIFICATES (NOCs)

पंजीकृत

प्रेषक,

जिलाधिकारी,
रूद्रप्रयाग।

सेवा में,

कार्यक्रम प्रबन्धक,
परियोजना कियान्वयन इकाई,
यू0ई0ए0पी0 (सिविल एवियेशन),
यूकाडा, दून हैलीड्रोम, सहस्त्रधारा,
ग्राम कुल्हान, देहरादून।

संख्या–2558/पन्द्रह–11 (2010–11) पार्ट – 2 दिनांक रूद्रप्रयाग 09 मार्च 2016

विषयः– स्थान गुलाबराय मैदान हैलीपैड के स्थान पर जनपद रूद्रप्रयाग के ग्राम रतूड़ा सीमान्तर्गत डुडीरू नामे तोक में हैलीपैड निर्माण के सम्बन्ध में।

महोदय,

उपरोक्त विषयक कृपया अपने कार्यालय के पत्र संख्या 254/पी0ई0यू0 (सिविल एवियेशन यू0ई0ए0पी0 (14) 2015–16 दिनांक 11–1–2016 का अवलोकन करने का कष्ट करें, जो कि स्थान गुलाबराय हैलीपैड के निर्माण के सम्बन्ध में स्थानीय जनप्रतिनिधियों के साथ पुनः वार्ता कर मामले का शीघ्र निस्तारण कर यदि उक्त स्थल पर निर्माण कार्य कराया जाना सम्भव न हो तो उनके स्थान पर अन्य किसी स्थल का चयन कर स्थल का पूर्ण विवरण अनापत्ति प्रमाण पत्र सहित उपलब्ध कराये जाने से सम्बन्धित है।

उक्त के क्रम में उप जिलाधिकारी रूद्रप्रयाग ने अपने पत्र संख्या आर0 119/ रीडर – हैलीपैड/2016 दिनांक 26 फरवरी 2016 के द्वारा इस कार्यालय को अवगत कराया है कि स्थान गुलाबराय में आपदा को दृष्टिगत रखते हुये जनहित में हैलीपैड निर्माण प्रस्तावित था किन्तु गुलाबराय में हैलीपैड निर्माण का स्थानीय जनता / जनप्रतिनिधियों द्वारा लगातार विरोध किया जा रहा है। गुलाबराय मैदान से लगी निजी नाप भूमि स्वामियों से पुनः वार्ता की गई, लेकिन उनके द्वारा सहमति नहीं दी गई। तदुपरान्त तहसीलदार रूद्रप्रयाग द्वारा जिला मुख्यालय से 08 कि0मी0 की परिधि में हैलीपैड निर्माण हेतु ग्राम रतूड़ा मध्ये डुडीरू नामे तोक में ज0वि0र0 खतौनी की श्रेणी 10 (04) अन्य कारणों से अकृषिक भूमि के खाता संख्या 48– चट्टान के खसरा नं0 2969 रकबा 6.267 है0 मध्ये 0.401 है0 भूमि का चयन कर प्रस्तावित किया गया है। प्रस्तावित भूमि पर वर्तमान में 27 छोटे–बड़े चीड़ के पेड़ तथा चयनित भूमि के बाहर भी 25–30 चीड़

के पेड़ स्थित हैं। भूमि हल्की ढलानी किस्म की है। प्रस्तावित भूमि के समीप 8.00 मीटर की दूरी पर विद्युतपोल स्थित है जिसे अन्य स्थान पर शिफ्ट किया जा सकता है। चयनित भूमि राष्ट्रीय राजमार्ग रुद्रप्रयाग–कर्णप्रयाग से लगभग 02 कि0मी0 की दूरी पर तथा लिंक रोड ग्राम रतूड़ा के समीप स्थिति है। उक्त भूमि सार्वजनिक उपयोग, गौचर, पनघट, कब्रिस्थान, शमशान घाट, आदि की नहीं है। उक्त भूमि पर हैलीपैड निर्माण हेतु ग्रामवासियों को कोई आपत्ति नहीं है, जिसके सम्बन्ध में प्रधान ग्राम पंचायत रतूड़ा व सरपंच ग्राम पंचायत रतूड़ा द्वारा अनापत्ति दी गई है। चयनित भूमि को नक्शे में लाल स्याही से प्रदर्शित किया गया है।

अतः जनपद रुद्रप्रयाग के गुलाबराय मैदान हैलीपैड के स्थान पर ग्राम रतूड़ा के डुडीरू नामे तोक, राजस्व उप निरीक्षक क्षेत्र रतूड़ा, तहसील एवं जनपद रुद्रप्रयाग की सीमान्तर्गत चयनित भूमि का नक्शा, खसरा, खतौनी, प्रधान/सरपंच ग्राम पंचायत रतूड़ा के अनापत्ति प्रमाण पत्र एवं निर्धारित प्रारूप पर अनापत्ति प्रमाण पत्र सहित संलग्न कर आवश्यक कार्यवाही हेतु प्रेषित किया जा रहा है।

संलग्नः यथोपरि,

(डॉ. राघव लंगर)
आई.ए.एस.
जिलाधिकारी, रुद्रप्रयाग।

प्रतिलिपि आयुक्त, गढ़वाल मण्डल पौड़ी को सूचनार्थ प्रेषित ।

जिलाधिकारी
रुद्रप्रयाग ।