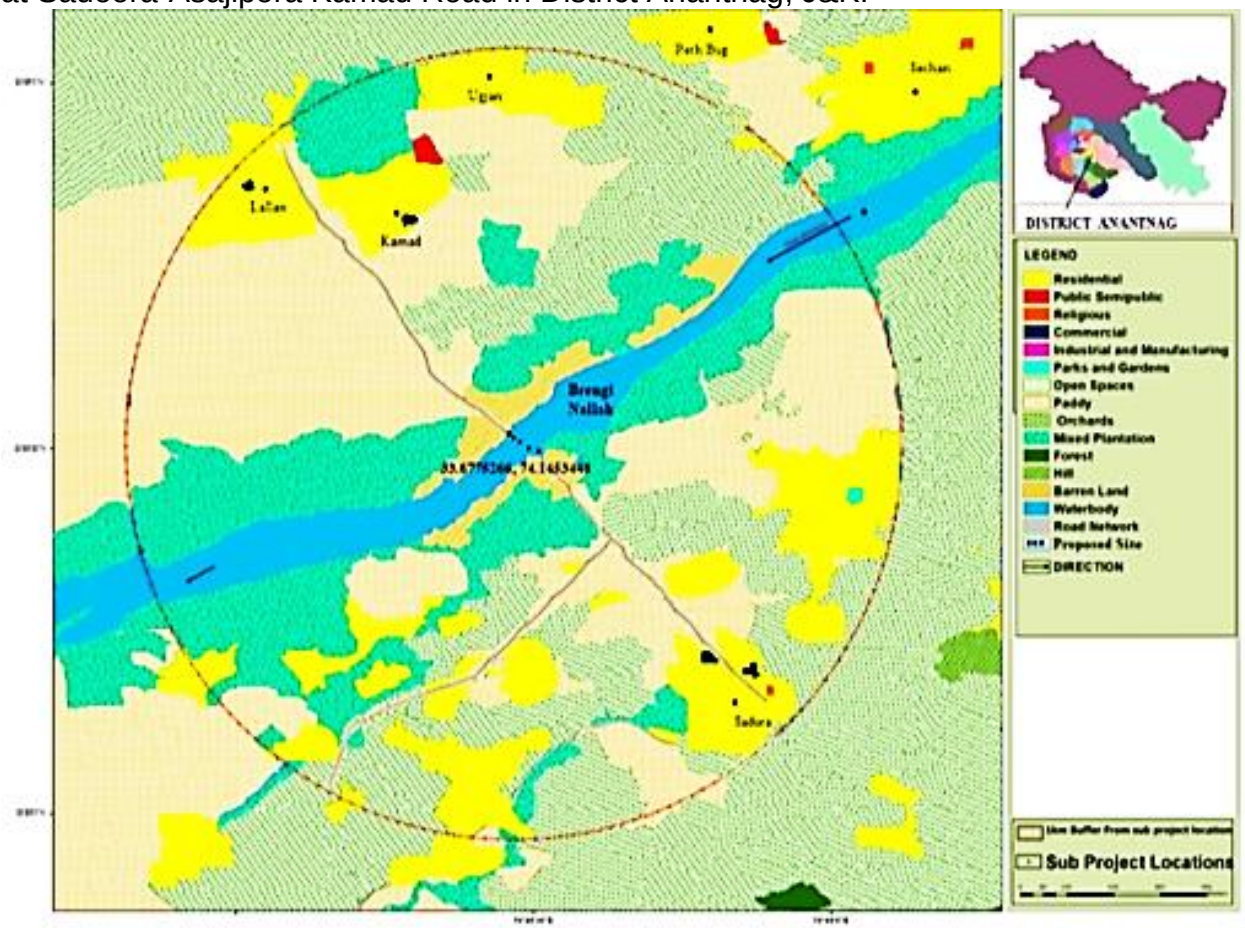
ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT

Design and Construction of 3x30 meter Steel Trussed Girder Bridge on Bringi Nallah at Sadoora-Asajipora Kamad Road in District Anantnag, J&K.



GIS/LULC Map of Project Influene Area (PIA) Sadoora Bridge, Anantnag

Jhelum Tawi Flood Recovery Project- The World Bank Financed Project

Prepared By: Akhter R. Bhat (Senior Environmental Consultant) for M/s Khanday Infrastructure Pvt. Ltd.

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January 2021

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Executive Summary

Annexures

Acronyms & Abbreviations

AAQ	:	Ambient Air Quality
ASI	:	Archaeological Survey of India
BIS	:	Bureau of Indian Standards
CPCB	:	Central Pollution Control Board
CPR	:	Common Property Resources
COVID 19	:	Coronavirus Disease of 2019
DPR	:	Detailed Project Report
DO	:	Dissolved Oxygen
EA	:	Environmental Assessment
EIA	:	Environmental impact Assessment
EMP	:	Environmental Management Plan
EPC	:	Engineering, Procurement and Construction
EMP	:	Environmental Management Plan
ERA	:	Economic Reconstruction Agency
EIA	:	Environmental Impact Assessment
GC	:	General Conditions
GoI	:	Government of India
ILO	:	International Labour Organization
IS	:	Indian Standard
J&K	:	Jammu and Kashmir
JTFRP	:	Jhelum Tawi Flood Recovery Project
MoEF&CC	:	Ministry of Environment, Forest and Climate Change
NAAQS	:	National Ambient Air Quality Standards
NOC	:	No Objection Certificate
OP	:	Operational Policy
PAP	:	Project Affected Persons
PIU	:	Project Implementation unit
PIA	:	Project Influence Area
PMU	:	Project Management Unit
PPE	:	Personal Protective Equipment
PUC	:	Pollution Under Control
PWD	:	Public Works Department
RoW	:	Right of Way
R&B	:	Roads & Building
SPCB	:	State Pollution Control Board
TAQAC	:	Technical Assistance and Quality Audit Consultants
WB	:	World Bank

EXECUTIVE SUMMARY

A catastrophic deluge of September 2014 shows negative impact on economic aspects of the State and massive infrastructure damages in which capital city Srinagar was most affected and a trail of siltation in most of the water bodies as environmental degradation which is always synonymous with major floods. In connection to a devastating flood, a mission of the World Bank visited the State during February 1-6, 2015 on request of Government of India to review and assess the damages to produce a rapid multi-sectoral assessment report of the damages and needs. The Rapid Damage and Needs Analysis (RDNA) estimates the total damages and loss caused by floods at about INR 2 11,975 million (US$ 3,550.45), most of it to housing, livelihoods, and roads and bridges, which combined represent more than 70% of the damages in terms of value. Public service infrastructure and equipment of hospitals and education centres were also severely damaged and are still not fully operational. Based on the RDNA results, restoration works underway, and discussions with the GoJ&K, "Jhelum and Tawi Flood Disaster Recovery Project (JTFRP)" will focus on restoring critical infrastructure using international best practice on resilient infrastructure.

The objective of component 2 “Reconstruction of Roads and Bridges” is to restore and improve the connectivity disrupted due to the disaster through the reconstruction of damaged roads and bridges. The infrastructure will be designed to withstand earthquake and flood forces as per the latest official design guidelines. The affected areas will benefit from the restored access to the markets thereby increasing the economic growth in these areas and timely access to health and education services. Restoration of roads & bridges will also serve as supply/rescue lines in the event of a disaster.

The environmental assessment scope includes screening and scoping, environmental assessment and devising of environmental management plan (EMP) for each bridge subprojects under component-2 of Jhelum Tawi Flood Recovery Project. The objective of Environment screening is to identify the potentially significant environmental issues of the sub-projects at an early stage for an affective Environmental Assessment.

Under this component, one of the identified bride subproject is “Design and Construction of 3x30 meter Steel Trussed Girder Bridge on Bringi Nallah at Sadoora-Asajipora Kamad Road in District Anatnag, J&K.

As per the EIA notification 2006 and subsequent amendments, the construction of the proposed 3x30 meter Steel Trussed Girder Bridge on Bringi Nallah at Anantnag is not required. The subproject shall require to obtain Consent to Establish and Consent to Operate under Water (Prevention and Control of Pollution) Act, 1974, Air (Prevention and Control of Pollution) Act, 1981) and authorization under Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016 from J&K PCB for establishing and operation of Hot Mix Plant, WMM Plant and RMC plant for the subprojects. No Objection Certificate (NOC) is also required from the Irrigation and Flood Control department for the construction of Sadoora Bridge on Bringi Nallah.

World Bank safeguard policies are designed to prevent and mitigate undue harm to people and their environment in the development process. The layout requirements that must be complied with for all Bank-funded projects (refer to World Bank's Website on Safeguard Policies). Environmental Policies – OP/BP 4.01 Environmental Assessment and OP/BP 4.11 Physical Cultural Resources are triggered in the project.

Project Location

The proposed construction of the Sadoora bridge is located in Sadoora village in District Anatnag of Jammu & Kashmir. The bridge will be constructed on Bringi Nallah.

Name of the Project	Project Location with Coordinates
Construction of 3x30 meter Steel Trussed Girder Bridge on Bringi Nallah at Sadoora-Asajipora Kamad Road in District Anantnag, J&K	Sadoora village of Kamad Block in District Anantnag Geo-Coordinates: Lat: 33° 6´ 77.52" Long: 75° 14´ 53.44"

Screening and Environmental Assessment

Sub-projects under "Jhelum and Tawi Flood Recovery Project" commonly known as JTFRP have a prior requirement of screening which is based on three categories; viz., nature of the project, size of the project and location of the project that is sensitive area criteria. The objective of the Environment and Social screening is to identify the potentially significant environmental and social issues of the sub-project at an early stage for detailed environmental mpacts. The Environmental Assessment for the bridge subproject includes establishing an environmental baseline in the study area, identify the range of environmental impacts, specify the measures to avoid, minimize, and mitigate negative impacts and maximize positive impacts and integrate possible environmental enhancement measures. The proposed measures will be formulated in the form of an environmental management plan with the necessary budget and institutional roles for effective implementation. The EMP developed shall form the part of EPC contract for its implementation.

Policy and Legal Regulatory Instruments

National and State Laws

- EIA Notification, 14th Sept 2006 and Subsequent amendments
- Jammu and Kashmir Forest (Conservation) Act, 1997
- Jammu and Kashmir Wildlife (Protection) Act, 1978
- Air (Prevention and Control of Pollution) Act,1981
- Water Prevention and Control of Pollution) Act,1974
- Noise Pollution (Regulation and Control Act),2000
- Construction & Demolition Waste Management Rules, 2016
- e-waste (Management) Rules, 2015
- Public Liability and Insurance Act of 1991

- Central Motor Vehicle Act 1988 and the Central Motor Vehicle Rules 2019
- Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996/ Jammu and Kashmir Building and Other Construction Workers (Regulation of Employment and Condition of Services) Rules, 2006
- Jammu and Kashmir Electricity Act, 2010 and amendments thereof and BIS 1255;1983 and amendments thereof
- Hazardous Waste (Management, Handling and Trans-boundary Movement) Rules,2008 and amendments thereof
- Solid Waste Management Rules, 2016
- The Jammu and Kashmir Preservation of Specified Trees Act, 1969
- Wetland (Conservation and Management) Rules, 2017

World Bank Operational Policies

- OP/BP 4.01 Environmental Assessment
- OP/BP 4.36 Forests
- OP/BP 4.11 Physical Cultural Resources
- OP/BP 4.12 Involuntary Resettlement

Project Description

The proposed subproject is Engineering, Procurement and Construction (EPC) mode contract for "Design and Construction of 3x30 meter Steel Trussed Girder Bridge on Bringi Nallah at Sadoora-Asajipora Kamad Road in District Anatnag, J&K and environmental enhancement measures etc as per the best engineering practices, in compliance to the World Bank policies and in synchronization with project environmental management strategies.

Scope of the Work

The scope of works for the proposed bridge project will include design and construction of Sadoora bridge having a total span of 3x30 meter Steel Trussed Girder type Bridge.

Public Consultation

One of the important components of this study is the dissemination of project information by way of "Consultation with stakeholders and the general public", which was conducted successfully with residents/ stakeholders in the project area of Sadoora and Asajipora during reconnaissance and EIA survey of the project as part of the study. During the consultation process of the proposed sub-project, people have expressed keen interest in the consultation process and were aware of the proposed bridge project in Sadoora village. People, in general, were very enthusiastic about the benefits of the Sadoora bridge and the perceived benefits are direct connectivity of Sadoora village with rest of the adjoining areas like Vessu, Kamad, Fatehpore, Forah, Sechan, Lallan, Ganoora, Ugjan, Asajipora etc.

Some of the responses with suggestions received from the residents and stakeholders during the consultation are abridged as i). timely completion of the Sadoora bridge so that the people of the aea will be benefited with the better access to the amenities and safe access at the Bringi nallah, ii) development of proper nallah protection measures

as scouring happens during high discharge of Bringi nallah as witnessed during 2014 floods and during the rainy season, iii) landscaping & beautification process/ programme by way of Pine plantation in order to increase aesthetic value as well. Further the locals ensured full cooperation and support for the successful execution of the project; iv) residents who are related to the construction industry may be engaged with the proposed bridge works; v) landscaping of existing open spaces with Pine plantation.

Assessment of Impacts

The environmental assessment study carried out at the proposed site for Sadoora Bridge and its approaches including nallah training works in terms of the potential environmental impacts that may occur as a result of the implementation of the project. The anticipated environment impacts identified during the construction phase which comprise of transitory/ insignificant increase in air and noise pollution, soil erosion, change in water quality or contamination and these impacts are temporary and site and time-specific in nature. The major impacts of the project are expected to be during the construction phase leading to air and noise quality deterioration, occupational, health and safety impacts to the works and local communities, utility shifting, generation of construction debris and disposal of waste material respectively. The proposed construction of Sadoora bridge project will have significant positive impacts and to address the problem of connectivity and high-quality motorable access to the adjoining areas through improved design and environmental enhancement measures.

The project mitigation measures have been developed for evading, reducing and regulating the adverse impacts on the environment impacts induced by the project proposed. The policy, legal and institutional framework under the ambit of which the EIA was undertaken, is also detailed out in the environmental impact assessment report. The comprehensive Environmental Management Plan (EMP) for the proposed Sadoora Bridge has been developed, which elaborates on the mitigation measures, means of implementation for the proposed measures, monitoring strategy and the budgets for its implementation.

1. INTRODUCTION

1.1. Project Background

In September 2014, Jammu & Kashmir experienced torrential monsoon rains in the region causing major flooding and landslides. The continuous spell of rains from September 2 to 6, 2014, caused Jhelum and Chenab Rivers as well as many other streams/tributaries to flow above the danger mark. The Jhelum River also breached its banks flooding many low-lying areas in Kashmir, including the capital. In many districts, the rainfall exceeded the normal by over 600%. The Indian Meteorological Department (IMD) records precipitation above 244.4 mm as extremely heavy rainfall, and J&K received 558mm of rain in the June-September period, as against the normal 477.4 mm. The district of Qazigund recorded over 550 mm of rainfall in 6 days as against a historic normal of 6.2 mm over the same period.

Due to the unprecedented heavy rainfall, the catchment areas particularly the low lying areas were flooded for more than two weeks. Some areas in urban Srinagar stayed flooded for 28 days. Water levels were as high as 27 feet in many parts of Srinagar city. The areas from the main tributaries of river Jhelum vis-à-vis Bringi nallah, Vishav nallah, Lider nallah and Sandran nallah started overflowing due to the heavy rainfall causing water levels in Jhelum river to rise.

Based on the **Rapid Damage Needs Assessment (RDNA)** results, restoration works underway, and discussions with the GoJ&K, the project will focus on restoring critical infrastructure using international best practices on resilient infrastructure. Given the state's vulnerability to both floods and earthquakes, the infrastructure will be designed with upgraded resilient features and will include contingency planning for future disaster events. Therefore, the project aims at both restoring essential services disrupted by the floods and improving the design standard and practices in the state to increase resilience.

The Project Development Objective (PDO) is to support the recovery and increase disaster resilience in targeted areas of the State and increase the capacity of the State entities to respond promptly and effectively to an eligible crisis or emergency.

The project comprises of the following seven components:

1. Reconstruction and strengthening of critical infrastructure (US$60 million)
2. **Reconstruction of roads and bridges (US$80 million)**
3. *Restoration of urban flood management infrastructure (US$50 million)*
4. Strengthening and restoration of livelihoods (US$15 million)
5. Strengthening disaster risk management capacity (US$25 million)
6. Contingent Emergency Response (US$0 million)
7. Implementation Support (US$20 million)

Under Jhelum Tawi Flood Recovery Project (JTFRP), the component-2 aims at Construction of 5 bridges in Kashmir Region under Engineering, Procurement and Construction (EPC) mode contract as listed in Table 1.1 below. These bridge subprojects were selected based on the flood damages incurred during September 2014 floods and history of submergence and findings of environment and social screening exercise.

One of the bridge subproject, "Design and Construction of 3x30 meter Steel Trussed Girder Bridge on Bringi Nallah at Sadoora-Asajipora Kamad Road in District Anantnag, J&K is awarded to M/s Khanday Infrastructures Pvt. Ltd. One of the key requirement of the bridge project is to conduct Environmental Impact Assessment (EIA) study and preparation of the report as per the World Bank guidelines. The M/s Khanday Infrastructures Pvt. Ltd. has entered into a contract agreement on 25th June 2020 with Mr Akhter R. Bhat as an Independent Environmental Consultant for conducting of EIA study and preparation of its report.

Table 1.1: List of the Bridge Projects (EPC Mode) under Component-2 of JTFRP in Jammu & Kashmir

S. No.	Project Type	Subprojects	Span/ Length (in meters)	District
Design and Construction of:				
Kashmir Region				
1.	EPC Mode	1x110m span 2 lane through type steel arch bridge on Sindh nallah at Wayil in District Ganderbal, J&K	1X110= **110**	Ganderbal, J&K
2.	EPC Mode	1x25 meter span plate girder bridge on Raine nallah at Kaliban in District Baramulla	1x25=**25**	Baramulla, J&K
3.	EPC Mode	1x45 meter span trussed Girder Bridge on Rambiara Nallah at Village Wachi in District Shopian	1x45= **45**	Shopian, J&K
4.	EPC Mode	3x30 m. steel trussed girder bridge on Bringi Nallah at Sadora-Asajipora Kamad Road in District Anantnag.	3x30=90	Anantnag, J&K
5.	EPC Mode	2 Lane bridge on Vishav Nallah at Chamgund in District Kulgam	**400**	Kulgam, J&K

1.2. Description of the Project

Anantnag district is southernmost district of Kashmir valley separated from the Jammu Province by the mighty Pir- Panjal Range & connects both the regions by the famous Jawahar Tunnel. The district with its headquarters at Anantnag forms the southern part of Kashmir valley and is located between 33°17'20'' and 34°15'30'' North latitude and between 74°30'15'' and 74°35'00'' East longitude. It is bounded by two districts of Kashmir division, one district of Leh (Ladakh Division) and three districts of Jammu division. The district is bounded by Poonch district in the west, Srinagar district in the North & Kargil district in the North East and Doda district in the East, by Pulwama district in the North West and Rajouri & Udhampur districts in the

South & South East. The District Anantnag is situated at a distance of 55 km of the south-east of Srinagar. Its entire southern sector and major parts of the eastern region is strewn with thick forests and mountains. The district has the largest number of health resorts in the whole state. Of them particular mention may be made of Verinag, Kukernag, Achabal and Pahalgam. Anantnag being the district headquarters comprises of 12 tehsils. This district has been divided in 16 Community Development Blocks.

Sadoora Village is Dooru Sub District's 6th most populous village, located in Kamad Block across Bringi Nallah of Anantnag District, Jammu & Kashmir. It is located 6.7 km towards North from District head quarters Anantnag and 66.3 km from the capital city of Srinagar. Total geographical area of Sadoora village is 3.37 km^2 and it is the 8th biggest village by area in the sub district. Population of the village is 5482 and Population density is 1627 persons per km^2. Sadoora is surrounded by Sechan village towards East, Forah village towards North, Napoora Village towards west, Fatehpora village towards South, kamad village towards NE, and Vessu towards SW. Kulgam and Shopian are the nearby districts to Sadoora village. Most of the people of Sadoora are Associated with Walnut Business, Agriculture production is very low. Sadoora has one Railway Station which connects Sadoora with Srinagar, Anantnag, and Banihal. The village was connected with main district with a 6x20 ft span submersible causeway, which was washed away due to devastating flood of September 2014. During episodes of torrential rains, the villages get disconnected with other habitations and people of the area especially students, patients face a lot of difficulties in absence of connectivity over said Nallah during the rainy season. Now, to redress the demand of the public, it was proposed to construct 3x30 meter Truss Girder Bridge on Bringi Nallah.

The poposed bridge at Sadoora is a major/vital connecting link between Sadoora, Kamand, Vessu, Lallan, Ganoora, Ugjan, and Asajipora besides connecting district headquarter Anantnag. The proposed bridge is to be constructed on Sadoora-Asajipora Kamad Road connecting vast area to NH 44. The bridge will also serve indirectly to thousands of other souls of the other adjoining areas as it links these areas with National Highway and district head-quarter.

1.3. Scope for Conducting the EIA study

Environmental impact assessment study of the bridge project to identify and evaluate impacts on the environment due to the various stage of project implementation and provide inputs to project road design team to incorporate necessary measures in design to minimise such impacts through suitable engineering interventions. The approach road Hence, an Environmental Management Framework has been designed for baseline environmental study, identifying impacts, mitigation measures to avoid, minimize and mitigate anticipated negative impacts within the project impact zone and project influence area. Accordingly, to minimize negative impacts during the entire project cycle environmental management plan has been developed with roles and responsibility for sound construction management during the project implementation. Furthermore, the report covers major finding of existing environmental, legal and administrative framework, monitoring programme, the cost

for environmental management and evaluation of potential environmental impacts due to the proposed construction of 3x30 meter span bridge on Bringi Nallah in Kashmir region of J&K.

In general, the broad scope of the Environmental Assessment study includes following but not limited to:

- collect any additional data relevant to the study area;
- undertake environmental monitoring to establish the baseline environmental status of the study area;
- assess the impacts on environmental attributes due to the construction and operation on of the proposed bridge work at Sadoora;
- prepare an Environmental Management Plan (EMP) outlining the measures for improving the environmental quality and budgetary cost estimation for implementation;
- identify critical environmental attributes required to be monitored after the implementation of the proposed subproject

1.4. Need and Benefits of The Proposed Bridge

The Sadoora bridge project is located in Kamad block of district Anantnag. The Sadoora village and Asajipora/ Kamad villages alongwith the adjoining habitations were connected with the main district with a causeway which was disloaged and washed awayd during 2014 floods. A temporary bailey type bridge (single lane) was constructed after 2014 floods which was also damaged during the the subsequent flash floods and was repaired in 2018.

"[1]The road to several villages in south Kashmir remained cut off for the number of times after a vital temporay Sadoora bridge over Nallah Bringi suffered extensive damage. Despite spending lakhs on its restoration and construction of diversion after the main bridge was washed away during 2014 floods, thousands of inhabitants living on the either side are forced to take a longer route as the authorities have failed to reconstruct this bridge. The bridge provided connectivity to dozens of villages in the main town Anantnag. The main concrete bridge (causeway type) was washed away during 2014 floods. Afterwards, it was the locals who out of their own money constructed the diversion. The route passing over this bridge through Sadoora, Fatehpora and Larkipora is considered the second highway as commuters coming from Qazigund, Vessu and several other adjacent villages intending to enter the main town Anantnag use it as a bypass to avoid traffic through Khanabal route. In 2014, the high discharge waters of Bringi nallah washed away the many temporary makeshift bridges and diversions. The worst affected are the employees, students and businessmen of these areas," a local said. "At times, we remove our clothes and cross the river to save time. The route is vital for locals living in Sadoora and Kamad, the villages on both sides of Bringi, as a railway station is located in Sadoora and people from dozens of villages in the region prefer this route to reach Anantnag main town. In April 2017, the authorities constructed a small iron bailey type bridge in the middle of the river while the rest of the approach road from either side of the

[1] Article on "Sadoora Bridge washed away" published in Daily Rising Kashmir Newspaper dated October 04 2018 and 29 Dec 2017

bank was filled with boulders. The intense rainfall during June 2018 that wreaked the havoc across several areas of south Kashmir region washed away the approach roads of this temporary bridge, leaving it useless again. "Why do authorities need to spend money on this bridge every year rather than making a proper bridge once and for all".

During rainy season, the village gets disconnected with other habitations and people of the area especially elderly, students, patients face lot of difficulties due to the lack of proper connectivity over Bringi Nallah during episodes of precipitation. To redress the demand of the public, it was proposed to construct 3x30 meter span Steel Trussed Girder Bridge with deck over Bringi Nallah including the construction of Approaches and Nallah training works.

1.5. The need for the Environmental Assessment

The EIA for the subproject includes establishing the environmental baseline conditions in the study area, identify the range of anticipated environmental impacts during design, pre-construction, operation and maintenance phases of the project, specifying the measures to avoid, minimize, and mitigate negative impacts and maximize positive impacts and integrate possible mitigation measures, environmental management plan (EMP) and environmental enhancement measures.

The proposed mitigation measures will be formulated in the form of an environmental management plan with necessary budget and institutional roles for effective implementation of EMP for the "Construction of 3x30 meter bridge on Bringi Nallah at Sadoora-Asajipora Kamad Road (Kashmir Region) under Jhelum and Tawi Flood Recovery Project (JTFRP) and integration of the same into project implementation agreements, including construction contract documents.

1.6. Environmental Screening and Scoping

Environmental screening exercise of the proposed subproject projects was undertaken to facilitate inputs on environmental, social and economic considerations for current and prospects. Further, this report also provides scoping inputs in determining the major environmental issues and defines the scope of work for conducting an environmental assessment. As per the findings and recommendations of the Environmental Screening report, Environmental Assessment has been carried out for the subproject. The scoping exercise defines geographical boundaries for the subproject for impact assessment as well as defining the project influence area to assess the impacts due to project activities.

1.7. Environmental Impact Assessment (EIA)

The EIA for this bridge project includes establishing an environmental baseline in the study area, identify the anticipated environmental impacts, specify the measures to avoid, minimize, and mitigate negative impacts and maximize positive impacts and integrate necessary mitigation measures, environmental management plan and environmental enhancement measures as required. The proposed measures will be formulated in the form of an Environmental Management Plan with necessary budget provisions and

institutional roles for effective implementation during various stages of the project. The EMP developed shall form the part of the construction contract document.

1.8. Environmental Management Plan (EMP)

An Environmental Management Plan designed for the implementation of the subproject shall consist of an overall framework which will be a guiding document providing environmental planning and design criteria for the current subprojects, generic environmental management measures, institutional mechanism for implementation, capacity building and training process, and resource materials to function adequately to mainstream the environmental management and implementation of environmental management and monitoring plan.

1.9. Study Approach

To accomplish the above objectives, an assessment study was made in line with the guidelines stipulated by the World Bank and ESMF of JTFRP for environmental assessment.

a) Field Reconnaissance Survey

The approach to the entire study was formulated based on a detailed field reconnaissance survey and a thorough understanding of the proposed project. The reconnaissance survey was carried out for the project road to understand the salient environmental features of the project area, sensitive areas with regards to the proposed project activities, and a general understanding of the proposed subproject.

Based on the above an environmental profile of the project area, primary and secondary data requirements for carrying out further activities of the study, environmental surveys necessary for assessing the project impacts, and the project influence area were identified.

b) Review and Assessment of Applicable Environmental Regulations

Discussions with different stakeholders and review of the various regulations and guidelines for EIA were conducted to assess the sampling and analysis requirements for the project and the procedural requirements for conducting an Environment Assessment. This primarily comprised of reviewing all relevant documents available for the project area.

c) Delineation of Study Area for Assessment

The above tasks identified the survey and analysis requirements for baseline data collection required for assessing the anticipated impacts of the proposed subproject activities. Based on which, the study area that is critical for assessing the project impacts was identified and delineated. The project influence area also considered those areas that are directly or indirectly influenced by the project activities during pre-construction, construction or operation of the proposed bridge works.

d) Baseline Environmental Conditions

This activity comprised of field surveys for assessing the baseline environmental conditions and collecting primary and secondary information regarding physical, biological and socio-economic conditions of the study area. Besides, existing environmental quality of the study area was assessed based on the field of environmental monitoring. For monitoring the air, noise, and water quality, monitoring was carried and samples were collected and analyzed for relevant parameters.

e) Prediction/Assessment of Potential Impacts

The activity identified the likely impacts through changes in the physical, biological or socio-economic environment based on the analysis of the baseline environmental data collected. The assessment considered both positive and negative impacts due to the subproject activities and also due to the construction, and operation of the project corridor.

f) Environment Management Plan

The major components of the environment management plan comprised preparation of mitigation plans for all the negative impacts identified during study and to avoid, minimize or compensate the impacts, and the post-project monitoring plan for the measures suggested in the management plan to ensure that the impacts of the project are within the regulatory standards

1.9. Structure of Environmental Assessment (EIA) Report

The structure of the EIA report has been categorized in the following Chapters:

Executive Summary

1. Introduction
2. Approach & Methodology.
3. Project Description
4. Policy, Legal and Administrative Framework
5. Environmental Baseline Data
6. Potential Environmental Impacts
7. Analysis of Alternatives
8. Public Consultation and Disclosure
9. Environmental Management Plan (EMP)

Annexures

2. APPROACH & METHODOLOGY

2.1. Reconnaissance Survey

The reconnaissance survey was conducted on 12 September 2018, March 2019 and principal investigation/ assessment was conducted in 26 June 2020 in the project domain area of Sadoora village of District Anantnag. The site visits and the initial assessment have become the key elements of the schedule of preparation as a part of the screening report. In addition to field investigations and observations, consultations/ field visits were held jointly with the stakeholders and project proponents and available environmental documentation was assembled for review.

2.2. Project Impact and Project Influence Area

To conduct an environmental assessment study of the proposed "Construction of 3x30 meter span bridge at Sadoora in Anantnag district in J&K, it is imperative to define the area for environm ental impacts/ project influence area are being considered. The project will support infrastructure and the proposed construction of the Sadoora Bridge which is confined within the existing alignment of the approach roads which connects with the existing roads.

The project impact area has been considered as Right of Way (ROW) of the project corridor and project influence area has been measured as 500 meters from the centre line of the bridge on both sides.

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2.3. Screening Methodology

The screening exercise was done through reconnaissance survey. Public consultation meetings were arranged with the local community and conducted in Sadoora area near the proposed bridge site with locals, officials and community. Field survey and data collection were carried out as per the screening checklist provided in ESMF of the project. The information has been gathered through primary as well as secondary sources, with the support of Contractor/PMU/PIU team members. The objective behind the environmental screening was to delineate affected environmental features and issue like soil erosion, slope stability/ embankment measures, scheduled trees protection, sensitive receptors- schools/ religious places and residential area, human settlements, water, natural resources etc. in the project area, to define impacts and to minimize the adverse environmental impacts by suggesting best engineering solutions/options at optimal costs.

The positive actions not only to avoid adverse impacts but to capitalize on opportunities to correct environmental degradation or improve environmental conditions were determined.

2.4. Detailed Baseline Environmental Surveys

A comprehensive survey was conducted for environmental impact and screening studies. For this purpose, a data-sheet was devised to collect quantitative and

qualitative environmental data together with local subproject specific consultations. This will be the basis for further investigations for future studies. Information collection, literature survey and analysis of data published and other recorded data *e.g.* on flora and fauna, climate, pollution along with socio-economic, demographic, land-use pattern, land ownership details etc. of the subprojects were also studied and reviewed. National and state environmental guidelines were also reviewed before carrying out baseline studies. A detailed survey has been carried out by the Environmental Specialist who is responsible for the documentation of the environmental investigations and issues, to evaluate the existing environmental setting and conditions of the proposed project area. Potential significant impacts were identified based on an analytical review of project activities, baseline data, land use, environmental factors, socioeconomic conditions and review of the assessment of potential impacts identified in previous similar kind of projects. A participatory process was adopted while performing environmental screening of the sub-project. The information has been gathered through primary as well as secondary sources of information, with the support of PMU and PIU team members.

2.5. Collection of Data

For the construction of Sadoora Bridge, many activities have been undertaken like specific literature reviews and surveys were carried out referring publication & using the internet and useful information about the project impact and influence area was collected. This includes both published and unpublished environmental data. Literature searches were undertaken and relevant agencies were contacted and apprised of the proposed subproject. The following data were collected for the bridge project during environmental screening/ assessment study: `

- Geo reference maps.
- Socio-economic data from the Planning Department and Census records.
- Geological data from the Geological Survey of India.
- Meteorological data from India Meteorology Department, Govt. of India.
- District Profile from District Statistics Department.
- Forestry and Wildlife Data from the Forest Department.
- Flora and fauna from various sources, including the State Forests Department and Wildlife Department.

Readily available data were reviewed with the initial reconnaissance investigations, and the need for primary data collection in some instances was determined.

2.6. Environmental Monitoring Data

Environmental monitoring (Air, Noise and Water quality) of the proposed “Construction of 3x30 meter span bridge on Bringi Nallah at Sadoora-Asajipora Kamad Road in district Anantnag will be carried during pre-construction stage (that is before the execution of works) to generate the latest baseline data so that it can be correlated for the comparative analysis with the monitoring data during the construction/ operation stages of the project.

2.7. Assessment of Alternatives

Analysis of alternatives is an analytical comparison of the operational effectiveness, costs and environmental risks of proposed development options. This helps to analyze the options critically with its impacts on all physical, social and biological environments. The 'no action option' is to be considered among various options available. The process will ultimately help to determine which option is comparatively better than the other various options. For this project, alternative analysis has been made for three considerations, *i.e.* strategic, planning and technology consideration. The sadoora village was connected with main district with 6x20 ft span submersible cause way, which was washed away due to devastating flood of September 2014. A single lane temporary bailey bridge was constructed for the traffic/ construction vehicles movement. To redress the demand of the public it was proposed to construct a double lane 3x30 mts span steel girder bridge over nallah. The proposed bridge is a major/vital connecting link between Sadoora, Kamand , Vessu, Lallan, Ganoora, Ugjan and Asajipora besides connecting district headquarter Anantnag. The proposed bridge is to be constructed on Sadoora, Kamand Road connecting vast area to NH 44.The bridge will also serve indirectly to thousands of other souls of the other adjoining areas as it links these areas with National Highway and district head-quarter.

Since the village was disconnected with other habitations and people of the area especially students, patients, woman and elderly face lot of difficulties during rainy season as Bringi Nallah/ stream have high discharge with turbulent flow. Based on this assessment the present option of construction of new bridge having a span of 3x30 meter on Bringi Nallah at Sadoora-Asajipora Kamad Road is the best applicable solution and socio-economically viable option. Moreover, the proposed construction of a bridge does not involve any land acquisition/ displacement/ rehabilitation.

2.8. Stakeholder consultation and participation

Stakeholder's view and perception were assessed through informal and formal public consultation meetings. The different stakeholder's *viz.* government officials, local people (both male & female) were contacted and consulted during the study. Stakeholders were informed about the subproject components and likely environmental impacts before seeking their views. Consultation has been carried out for the project in two stages. First stage consultation was undertaken during the impact assessment process to identify the concerns of people, which were duly addressed through appropriate mitigation measures. Second stage consultation was undertaken as part of the preparation of the EIA report to assess the adequacy and acceptability of the proposed mitigation measures and management plan. Public consultations ensured the involvement of the public, experts in the project's pre-planning stage itself and redressal of their concerns and expectations from the subproject. The community members, government officials members opined that the proposed subproject would contribute to the social and economic development of the area. The proposed project would contribute to increased employment opportunities for the local people during and after subproject implementation. The communities welcomed the subproject and all were in favour of the project. Issues raised by stakeholders were analysed for practical and scientific basis, and for developing an

appropriate mitigation, management and monitoring plan, depending on its importance and practicality.

EIA Report for the construction of 3x30 meter Steel Trussed Girder Bridge on Bringi Nallah Sadoora-Asajipora Kamad Road in District Anantnag and its executive summary shall be disclosed at JTFRP/PIU website as per provisions of World Bank disclosure policies.

3. PROJECT DESCRIPTION

3.1. Project Area

District Anantnag is situated in the southern region of the Jammu and Kashmir. Anantnag city is the administrative headquarters of the district. . The district lies in the geographical coordinates of 74^{o}-30' to 75^{o}- 35' East longitude and 33^{o}-20' to 34^{o}-15' North latitude, at an altitude of 5,300 feet (16,00mts) above mean sea level, at a distance of 33 miles (53kms) from main city Srinagar. It comprises an area of 2917 km^{2} which includes 1882 km^{2} of forest area. According to 2011 census it is the third most populous district of state with population of 1,078,692. The district has a population density of 375 inhabitants per sq km. It comprises of 394 villages (Revenue Villages). The district has a feature of possessing the largest number of health resorts in the whole UT, of them particular mention may be made of Verinag, Kokernag, Achabal, Daksum and world famous health resort of Pahalgam. Anantnag being the district headquarters comprises of 12 tehsils (2011 census). This district has been divided into 16 Community Development Blocks.

The project area is located in Sadoora village in Kamad Block in Anantnag District of Jammu & Kashmir It is located 6.7 km towards North from District head quarters Anantnag and 66.3 km from the capital city of Srinagar. Sadoora is surrounded by Sechan village towards East, Forah village towards North, Napoora Village towards west, Fatehpora village towards South, kamad village towards NE, and Vessu towards SW. Kulgam and Shopian are the nearby districts to Sadoora village. Most of the people of Sadoora are Associated with Walnut Business, Agriculture production is very low. Sadoora has one Railway Station which connects Sadoora with Srinagar, Anantnag, and Banihal. The village was connected with the main district with a temporary bridge, which got washed away with flash floods in 2014. During high precipitation in the rainy season, the village gets disconnected with other habitations and people of the area especially students, patients face a lot of difficulties in absence of connectivity over said Nallah. To address the demand of the public, it was proposed to construct 3x30 meter span Steel Trussed Girder Bridge with deck over Bringi Nallah including the construction of approaches and nallah training works.

Keeping in view the importance of road connecting with district headquarter, it is proposed to construct Double Lane bridge in open trench foundation with RCC wall type abutments, Truss girder with RCC deck and Wire Gabion type protection works.

The bridge is a major/vital connecting link between various villages and District headquarter Anantnag. The proposed bridge is to be constructed at Sadoora-Asajipora Kamad Road, connecting villages to district headquarter. The bridge will also serve indirectly to thousands of other people of the adjoining areas as it links these areas with their orchid gardens and fields etc.

3.2. Project Location and Outline

The project is located in Sadoora village across Bringi Nallah of District Anantnag. The project lies between the Latitudes of 33°6´77.52"N and Longitude of

75°14´53.44"E. The total length of the Steel Trussed Girder bridge is 93.60 meter. The width of the Sadoora bridge is 7.5 meter, comprising of 7.50 meter carriageway width and 1.50 meter footpath (both sides). The total length of approach road from Sadoora side is 65 meter and towards Kamad side is 50 meter with a formation width of 7.225 meter.

The proposed bridge having a total length 93.60 meter on Bringi nallah in District Anantnag of J&K. The bridge has the span configuration of 3x30 meters with open web girder superstructure laden with RCC composite deck slab. The bridge has a clear carriageway of 7.50 meters and a provision of 1.50 meters wide footpath on both side of the bridge along with the provision to accommodate utilities especially PHE Pipes. The bridge has all the three spans of the same configuration having of 30 meters c/c Span. The end spans are resting on one side on RCC wall type abutment and on other side on RCC Wall type piers. The inner span is resting on both ends on RCC wall type piers having circular ends. The lattice girder has the arrangement of warren with verticals having 6 meters height from centre of top chord to centre of bottom chord. Both RCC Wall type Abutment as well Wall type Piers are resting on open foundations. The load transfer from superstructure to substructure has been ensured through Pot/PTFE of designed load capacity.

Following components of Substructure and foundation are designed

a) Design of Foundation for Abutment and Pier
b) Design of Abutment & Pier Shaft
c) Design of Abutment Cap & Pier Cap
d) Design of Dirt Wall
e) Design of Return Wall
f) Design of Bearing Pedestal
g) Design of Seismic Stopper

Codes and Specifications

a) IRC: 5-2015: Standard Specifications and Code of Practice for Road Bridges, Section I – General Features of Design (Eighth Revision)
b) IRC: SP: 13-2004: Guidelines for the Design of Small Bridges and Culverts (First Revision)
c) MORT&H: Pocketbook for Bridge Engineers
d) IRC: 6-2017: Standard Specifications and Code of Practice for Road Bridges, Section-II Loads and Load Combinations (Seventh Revision)
e) IRC: 22-2015: Standard Specifications and Code of Practice for Road Bridges, Section VI – Composite Construction (Limit States Design) (Third Revision)
f) IRC: SP:120-2018: Explanatory Handbook to IRC: 22-2015 Standard Specifications and Code of Practice for Road Bridges, Section VI-Composite Construction
g) IRC: 24-2010: Standard Specifications and Code of Practice for Road Bridges, Steel Road Bridges (Limit State Method) Third Revision)
h) IRC: 78-2014: Standard Specifications and Code of Practice for Road Bridges, Section VII- Foundations and Substructures (Revised Edition)
i) IRC: 112-2019: Code of Practice for Concrete Road Bridges
j) IRC: SP-105-2015: Explanatory Handbook to IRC:112-2011: Code Practice for Concrete Roads Bridges

k) IRC: SP: 114-2018: Guidelines for Seismic Design
l) Snow Load (221 of IRC-66 2017)

3.3. Salient Features of the Sadoora Bridge, Anantnag

Table 3.1: Tehnial summary/details of the bridge project

S. No.	Item	Description
01.	Span arrangement	3x30 meter c/c of bearings with an overall length of 93.60 meters end to end.
02.	No. of Spans	Three Spans
03.	Type of Bridge	High-Level Motorable Minor Bridge
04.	Substructure	RCC Wall Abutments with open foundations RCC Wall type Piers with open foundations
05.	Superstructure	Steel Trussed Girder with RCC Deck Slab compositely constructed
06.	Carriageway	Double lane CW of 7.50 mts width
07.	Footpaths	1.50-meter Footpath on either side of CW.
08.	Bearings	POT/PTFE Bearings as per Design Load capacity
9.	Nallah	Bringi nallah/ stream (tributary of the River Jhelum)
10.	Flood Discharge	Max. discharge Calculated from A-V Method = 517.04 Cumecs
11.	Silt Factor	Adopted value of 2.00 from geotech report
12.	Scour Depth	- 4.83 mts from HFL for Abutments -- - 7.61 mts from HFL for piers
13.	Founding Level	- 5.40 mts below bed level for Abutments - 7.00 mts below bed level for piers
14.	Bearing Capacity for Foundation Design	Gross SBC of 40.0 T/ Sqm as per geotech report
15.	Approaches	- A total of 120 meter approaches on both to be constructed with RCC approach wall in the grade of around 5%. - Pavement works in approaches as per NIT
16.	Nallah training Works	Wire Gabion nallah protection works in several tiers both on U/S for 150 mts & D/S for 60 mts of the bridge as per NIT.

Annotations:- U/S: Upstream; DS: Downstream

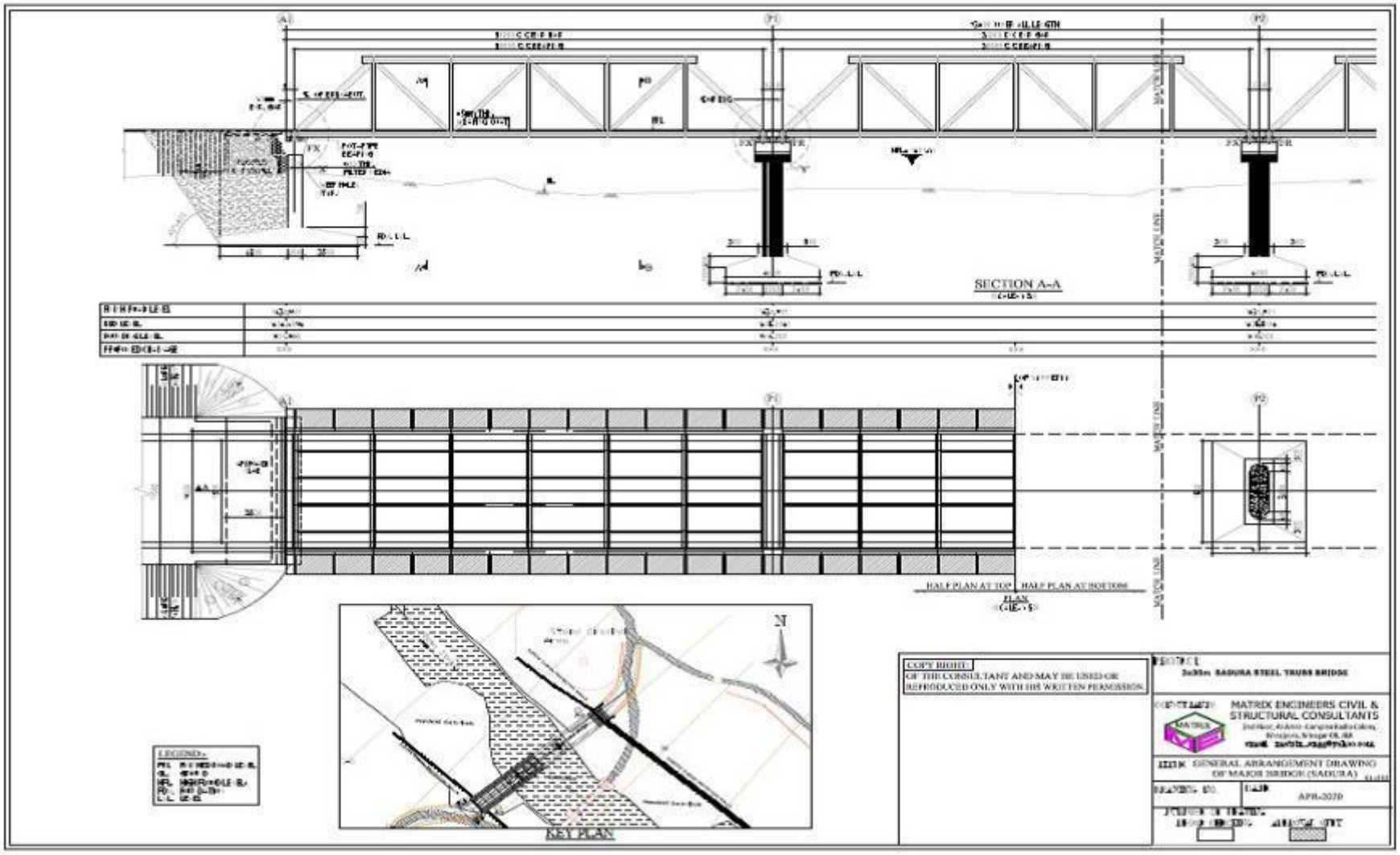


Figure 3.1: General Arrangement Drawing (GAD) of the Proposed Construction 3x30 meter Steel Trussed Girder Bridge over Bringi Nallah at Sadoora in District Anantnag

3.4. Technical Description of the Sadoora Bridge, Anantnag

3.4.1. Table 3.2: Basic Design Data of the Proposed Bridge

S No.	Levels		
1	Formation Level	FRL	1689.500 m
2	Bearing Level	BRL	1687.600 m
3	Abutment Cap Top Level	CTL	1687.300 m
4	Foundation Top Level	FTL	1680.000 m
5	Foundation Bottom Level	FBL	1678.500 m
6	Ground Level	BL	1684.250 m
7	HFL	HFL	1686.310 m
8	Scour Level	SCL	1681.380 m
	Lengths		
1	Length (c/c of exp gap)		25.600 m
2	Distance between exp. gap and c/l of bearing on abut side		0.600 m
3	Span (c/c of bearings		25.000 m
4	Overall width of deck end to end		7.250 m
5	Carriageway width		4.250 m
	Soil Parameters		
1	Grade of concrete		25 Mpa
2	Unit weight of concrete	γ_{con}	2.5 t/m^3
3	Unit weight of dry soil	$\gamma_{dry\ soil}$	1.8 t/m^3
4	Unit weight of submerged soil	$\gamma_{wet\ soil}$	1.0 t/m^3
5	Allowable base pressure (Gross), Normal		26.00 t/m^3
6	Allowable base pressure (Gross), Seismic		32.50 t/m^3
	Backfill Materials		
1	Coulombs (“c”)?		C
2	The angle of Repose of Soil, ϕ (in degrees)	ϕ	35.0
3	Cohesion, C (in t/m2)	C	0.0
4	The angle of Wall friction (2/3ϕ)	δ	22.5
5	Bulk Density of Soil (dry), γb (in t/m3)	γ_b	1.5
6	Bulk Density of Soil (Submerged), γub (int/m3)	γ_{sub}	1.0
7	The batter of a wall with vertical, α (in degrees)	α	90
8	Inclination of Backfill with horizontal, (in degrees) ,	ι	0
9	Equiv. Ht. of backfill earth for live load surcharge (m)	h_{eb}	1.2
10	Coefficient of Friction at the base between rock & concrete	μ	0.50

3.4.2. Hydrological Data of Bringi Nallah at Sadoora

Table 3.3: [2]Flood Discharge from X-sectional Area and observed Velocity for Sadoora Bridge

Chainage	Distance	HFL	BedLevel	(HFL-BL)	Area	Diff. in BL	Wetted Perimeter
m	X (m)		(BL)	m	m^2	Y(m)	√X^2+Y^2
51.41	0	1627.81	1626.41	1.4	0.00	0	0.00
59.43	8.02	1627.81	1625.47	2.34	15.00	0.94	8.07
63.03	3.6	1627.81	1626.03	1.78	7.42	-0.56	3.64
65.19	2.16	1627.81	1625.12	2.69	4.83	-0.91	2.34
68.68	3.49	1627.81	1624.76	3.05	10.02	-0.36	3.51
82.92	14.24	1627.81	1625.23	2.58	40.09	0.47	14.25
90.91	7.99	1627.81	1625.23	2.58	20.61	0	7.99
103.93	13.02	1627.81	1624.68	3.13	37.17	-0.55	13.03
105.40	1.47	1627.81	1625.17	2.64	4.24	0.49	1.55
110.90	5.5	1627.81	1625.51	2.3	13.58	0.34	5.51
125.33	14.43	1627.81	1626.20	1.61	28.21	0.69	14.45
134.47	9.14	1627.81	1626.38	1.43	13.89	0.18	9.14
142.78	8.31	1627.81	1626.41	1.4	11.76	0.03	8.31
				A=	***206.82***	***P=***	***91.80***
	Mean Velocity =			***2.50***	***m/s***		
Discharge of the nallah			***517.04***	***Cumecs***	***OR***	***18259.21***	***Cusecs***

[2] Note: Levels are as per actual X-section for nallah along proposed Bridge site

3.4.3. Scour Depth Calculations for Sadoora Bridge Abutment

Table 3.4: Scour depth details of the Sadoora Bridge

1	Maximum Discharge (cumec)	517.043
	Increase by 30% as per IRC 78-2000	672.16
2	Maximum Velocity (m/sec)	2.50
3	HFL (m)	1627.810
4	[3]Average size of pebbles = db (mm)	2.00
5	[4]Silt Factor = Ksf = 1.76 x (db)^0.5	2.49
6	Clear waterway - Clear distance between piers/abuts (m)	89.100
7	Assuming the flow is concentrated in active channels only Discharge per unit width = Db (cumec/m)	7.544
8	Scour Depth = 1.34 x { (Db ^ 2) ^(1/3) } / { (Ksf) ^ (1/3) } (m) (Para 9.3.2 of IRC:SP:13-2004	3.803
9	According to IRC: 78-2000, CL:703.3 and IRC: SP: 13-2004, CL: 10.1 the maximum depth of scouring Dsm below HFL for the design of abutment having individual foundation without any floor protection may be considered for: 1. Flood without seismic combination :(Dsm= 1.27 dsm) 2. Flood with the seismic combination: for considering load combination of flood and seismic loads, Dsm= 0.9 times Dsm calculated at above at 1.	
10	Maximum Scour Depth for Case 1 (Flood without seismic combination) (m)	4.830
	Maximum Scour Depth for Case 2 (Flood with seismic combination) (m)	4.347
11	Maximum Scour Level (m)	1622.98
12	Maximum Founding Level (m) (Min. 2 meters below Max. Scour as per IRC-78-2000)	1620.98

[3] As per soil report
[4] As per soil report (Restricted)

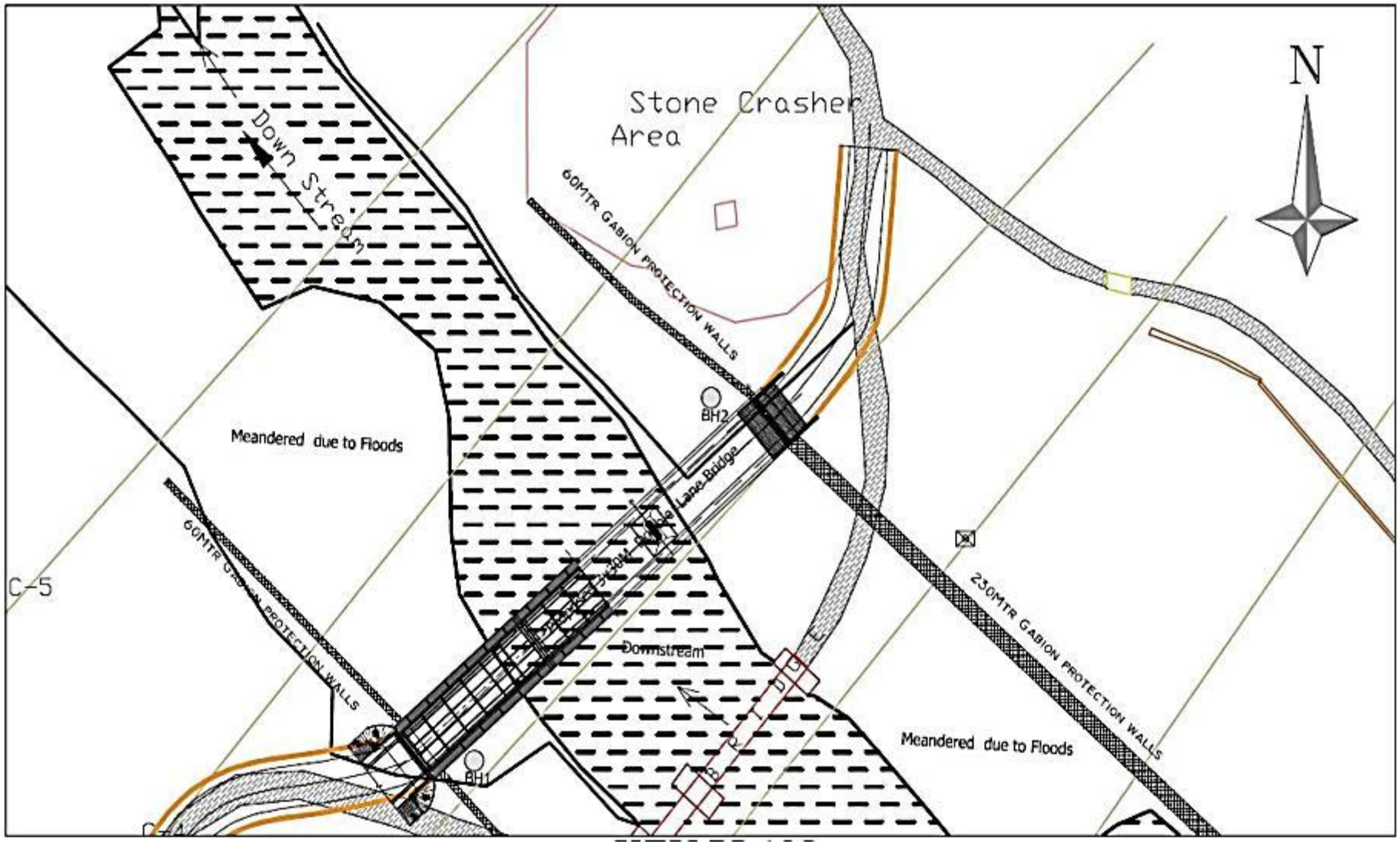
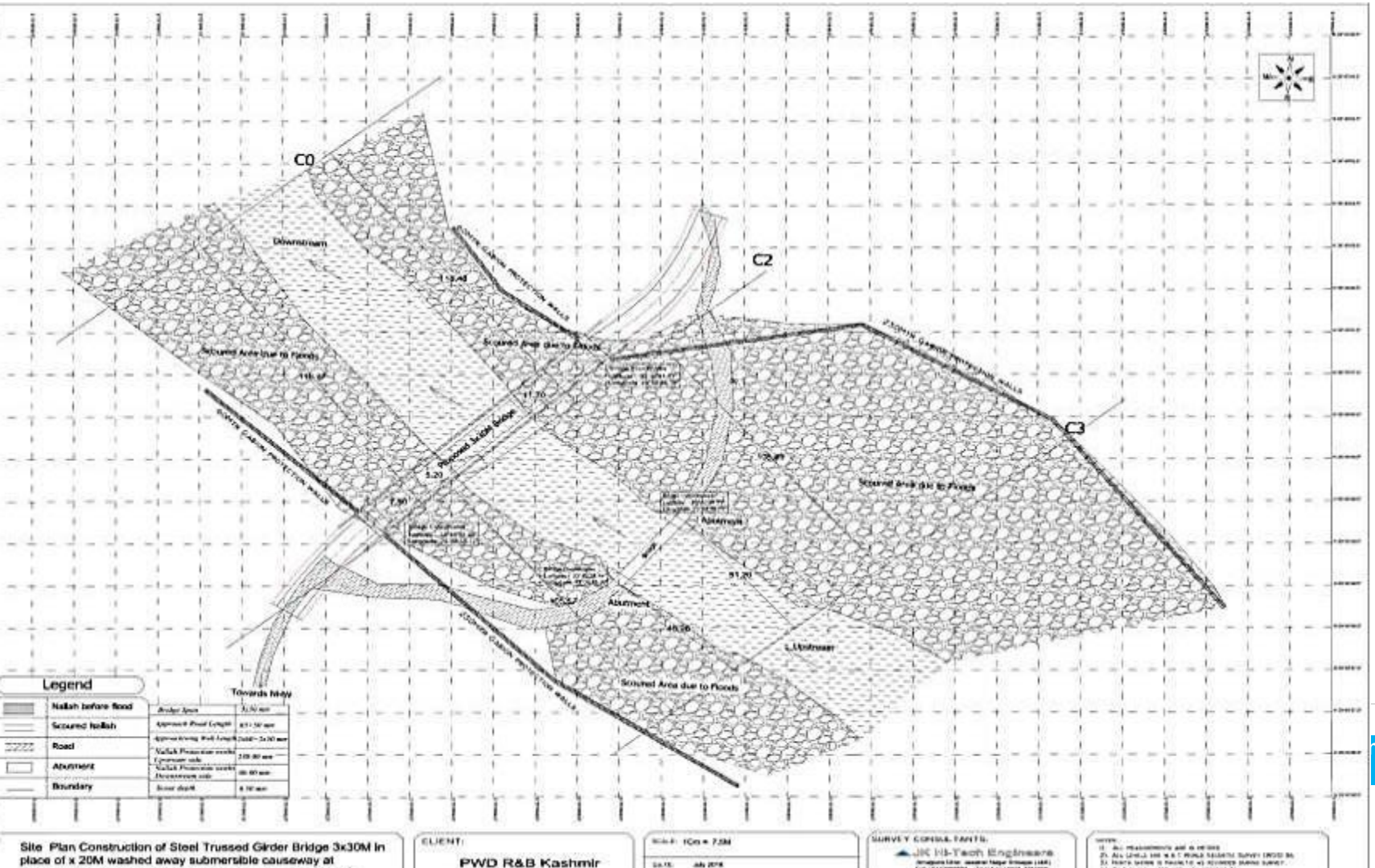


Figure 3.2: Dawing showing Approaches and Nallah Protection Works.


C0
C2
C3
Downstream
Towards Map
Legend
Nallah before flood
Scoured Nallah
Road
Abutment
Boundary
Site Plan Construction of Steel Trussed Girder Bridge 3x30M in place of x 20M washed away submersible causeway at
CLIENT:
PWD R&B Kashmir
SURVEY CONSULTANTS:

Works on both sides (Upstream- 230m and Downstream- 60m)

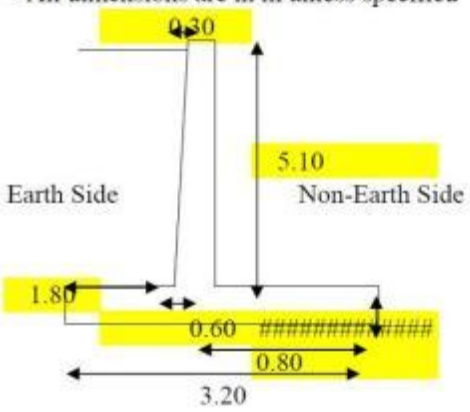
Average max. height of approach filling to be retained = (4.40 +4.0)/2 = 4.2 mts

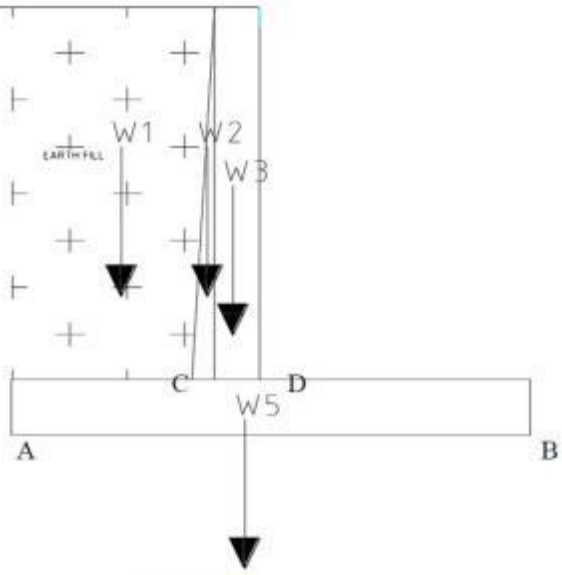
Depth below GL = 1.5 mts

Total ht. of wall for design = 4.2+1.5 = 5.70 mts

Design Of Retaining Wall

* All dimensions are in m unless specified





Properties

Unit wt. of soil(γe), considering it to be saturated	=	18.00 KN/m^3
Angle of internal friction of soil(Φ)	=	35.00 degree
Unit wt. of concrete	=	25.00 KN/m^3
Safe Bearing Capacity of soil(SBC)	=	180.00 KN/m^2
Unit wt. of water,γw	=	10.00 KN/m^3
Coefficient of friction,m	=	0.70
Factor of safety against overturning	=	2.00
Factor of safety against Sliding(For earthquake case)	=	1.25
Factor of safety against Sliding(For non earthquake case)	=	1.50

Loads

Weights

Load	Value(KN)
W1	165.24
W2	19.13
W3	38.25
W5	48.00
TOTAL	270.62

Earth pressure(Static & Dynamic)

(Ref. Clause 8.1 of IS:1893-Part 3 2016)

α_h	=	Horizontal Seimic Coefficient.
α_v	=	Vertical seismic coefficient equal to $\alpha_h/2$
Φ	=	Angle of internal friction of soil
λ	=	$\tan^{-1}[(\alpha_h)/(1\pm\alpha_v)]$
α	=	Angle which earth face of the wall makes with the vertical

Figure 3.4: Design details of the Retaining Walls

3.4.4. Geo-technical Assessment of design parameters

Subsurface Conditions

Based on the boring information, the generalized subsurface conditions at the site are as follows:

Stratum 1: Alluvium – River Blown Deposits (Gravels, Pebbles, Cobbles and boulders): This stratum is of grey, generally rounded to sub-rounded, gravels, pebbles, cobbles and occasional boulders (size varying 80mm to 150mm and occasionally more than that) mixed with gravel and sand. This layer is encountered in both boreholes and extending down to a significant depth of exploration from existing grade level. The standard penetration Resistance (N) values of this layer are always greater than 50, indicating coarse and dense nature of stratum.

Stratum 2: Silty sand/ sandy Silt/ Silty clay/clayey silt/ SM/ML/CI/CL: This stratum is of grey color. These layers are encountered in all boreholes with with N value greater than 50 showing Dense nature of stratum.

Table 3.5: Borehole details of the Sadoora bridge site.

BH No.	Thickness (m)	Strata Description	Core Recovery (%)	RQD (%)
BH-1	0.00-16.50	Alluvium (Gravels, Pebbles, Cobbles or Boulders) in the matrix of sand and silt	9.3-34.0	0.0-10
	16.50-20.00	Stratification of mixed Gravels,Sand, Silt and clay	-	-
BH-2	0.00-18.00	Alluvium (Gravels, Pebbles, Cobbles or Boulders) in the matrix of sand and silt	10.6-36.0	-
	18.00-20.0	Strata of Hard silty clay Stratification of mixed Sand, Silt and clay with few gravels	-	-

3.4.4.1. Proposed Design Soil / Rock Parameters

Based upon the investigations carried out including field tests and our engineering judgments, following proposed design parameters may be used for foundation design of Bridge founded.

Design Soil / Rock Parameters For Construction Of Bridge

Based on field bore log data, it reveals that the project site is completely Bouldery deposits (Residual soils), This is a mixture of rounded to sub-rounded gravels, pebbles, cobbles and boulders, followed by dense/ very hard alternating stratum of sand silt and clay. For analysis, it is treated as Residual Soil.

Silt Factors / Scour Levels

We presume that the scour is likely to occur for given site locations. Silt factor have been calculated and mentioned in Annexure-I. Silt factor of 3-4 is recommended to be used for design analysis. We have considered the maximum scour depth of 5m (given by client) for proposed structures for determination of SBC for open Foundation.

3.4.5. Foundation Support

Considering the nature of the soil, scour depth, type of proposed structures, expected loads Open foundation is recommended. Since the sub-soils are likely to experience Score, Hence open foundation should be taken deep enough beyond the zone of scouring level (as per codal provisions). If however Scour level is expected to be more than considered level or Expected loads are heavy than Foundation should be selected accordingly either in the form of Well or Pile Foundation.

3.4.5.1. Open Foundations (Bearing Capacity for open Foundations)

Bearing capacity for shallow foundations in soil has been analyzed in accordance with IS: 6403-1981, which is based on, modified Terzaghi's classical approach. The weighted average of shear parameters for various strata up to a significant influence zone of 1.5 B (B = width of the foundation) below the foundation level is used in the analysis. Strata of Influence zone below unexplored depth has been considered the same as obtained at termination. Considering the fluctuation of ground water, it is assumed that water table will be at existing ground level and accordingly the water table correction is applied. A factor of safety of 2.5 is selected based on clause of IRC 78-2000 to estimate the net safe bearing capacity from ultimate net bearing capacity. The Bearing capacity has been calculated neglecting the effect of overburden upto maximum scour level (given by client) and zone of liquefaction.

3.4.5.2. Settlement for Open Foundations

The magnitude of settlement, when foundation loads are applied, depends upon the compressibility of the underlying strata and rigidity of the substructure. In a cohesive deposition, the post-construction settlement is caused by dissipation of pore pressures and hence is time-dependent so that consolidation settlement is computed for such soils as per IS: 8009 (Part-1 and II), the depth correction factor is applied as per IS: 8009 (Part-I). The immediate settlements are estimated using the elastic theory considering the effect of a rigid stratum underlying the foundation soils (Reference: "Foundation Analysis and Design" by J. E. Bowles). Depth of Influence zone below unexplored depth have been considered following the same as encountered at termination

3.4.5.3. Design of Abutment /Pier Shaft

Abutment shaft is designed as rectangular column subjected to axial load and biaxial bending. ULS and SLS strengths of abutment section is checked also . Basic combination is used for checking ULS strength. Rare combination is used for checking stress. Quasi-permanent combination is used for checking crack width.

3.4.5.4. Design of Abutment/Pier Cap

The Abutment cap is reinforced with a total minimum of 1% steel distributed equally at both faces and in both directions. Cantilever/corbel action has been considered for design of pier cap.

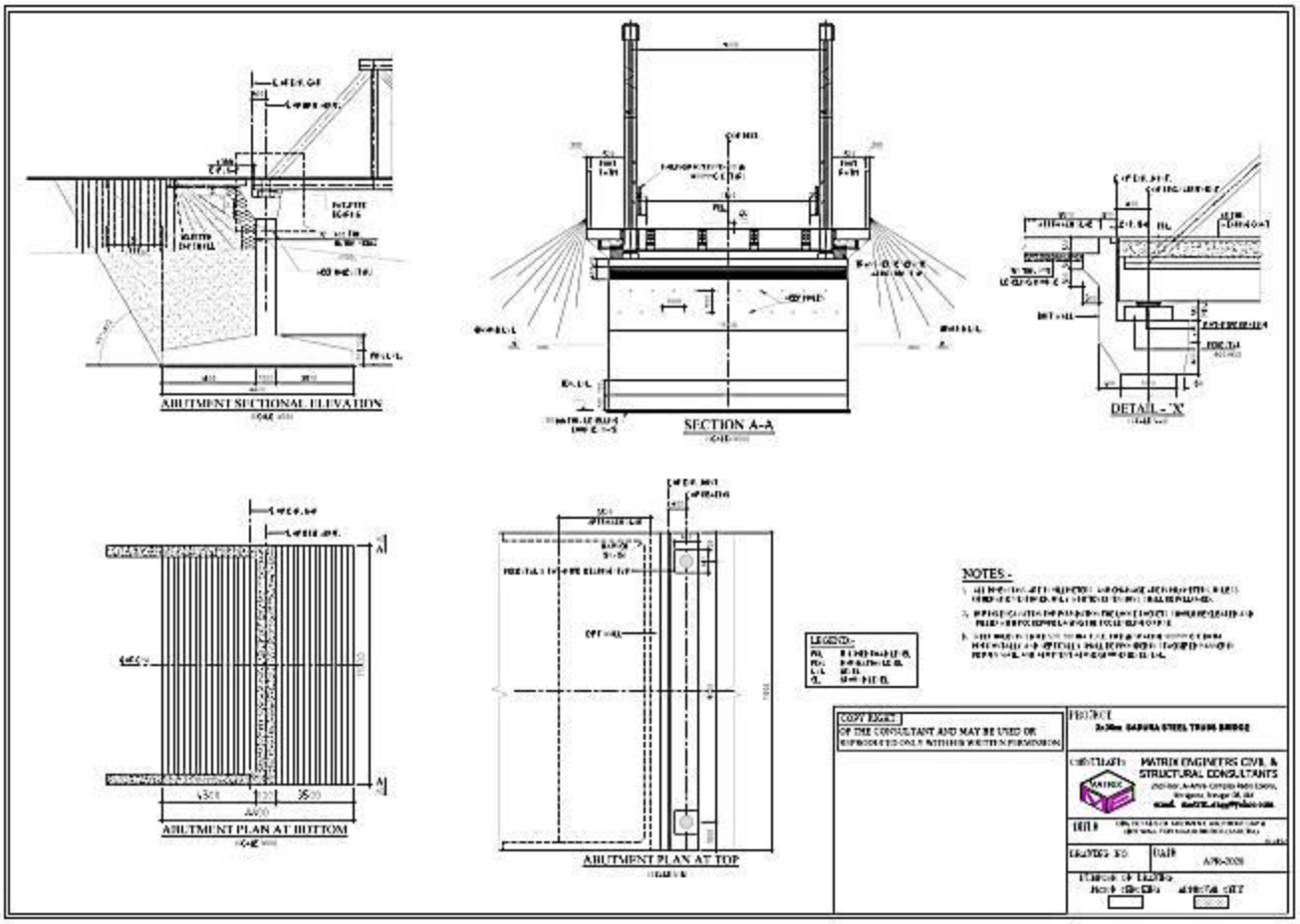


Figure 3.4: Description of Abutment

Table 3.6: Details of the Bearing Capacity at Sadoora Bridge site.

Borehole No	Depth of foundation below Ground level (M)	Depth of foundation below scour level (M)	Size of Foundation (m)	Diameter of well (m)	Net safe bearing pressure in shear (t/m^2)	Net Pressure intensity at foundation level as per settlement criterion (50mm Settlement) (t/m^2)	Recommended Net Allowable Bearing capacity (t/m^2)
A1	15	10	85	6	101.17	75	70
A2	15	10	85	6	116.98	80	75

3.4.6. Geotechnical Assessment-Recommendations

a. The site shows strata of Gravels, Pebbles, cobbles and boulders with sand followed by Stratification of Individual layers of sand, silt or clay or embedded into each other.
b. It is seen that the sub-soils are very dense in condition with very high SPT 'N' values below ground level. The sub-soils are also likely to experience Scour. Hence open foundation should be taken deep enough beyond the scour level as per codal provisions.
c. Scour of 5m has been considered into design analysis as given by client. Since the strata shows very dense nature so the Liquefaction will generally not take place in such conditions.
d. If the Scour level considered for design analysis varies from actual one than Deep foundation is preferential and recommended in such case.
e. The Foundation shall be located on horizontal base and for the foundation adjacent to each other, the pressure coming from the foundation laid on the higher level should be duly considered for the foundation laid on lower level due to dispersion of the pressure from the foundation at higher level. Plate load test can be done for such strata to confirm the maximum allowable bearing capacity for open foundation..
f. In such soils IS 10042-1981 is followed for determining the More reliable results as the samples obtained are generally disturbed, so this code emphasizes on the field test to be conducted for determining actual reliable results.

4. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

This chapter presents the national and local environmental legislation and regulations; and the World Bank policies, which applies to the proposed project entitled as "Construction of 3x30 meter Steel Trussed Girder Bridge on Bringi Nallah at Sadoora-Asajipora Kamad Road in District Anantnag". The various principles are applicable and regulatory clearances required for the bridge project are also been incorporated in this section.

4.1. Legal Framework

The Government of India has laid out various policy guidelines, acts and regulations of the environment. The Environment (Protection) Act, 1986 provides umbrella legislation for the protection of the environment. As per this Act, the responsibility to administer, the legislation has been jointly entrusted to the Ministry of Environment, Forests and Climate Change (MoEF & CC) at National level, whereas Jammu & Kashmir Pollution Control Board (J&KPCB) at the local level in the present context to the proposed bridge project at Sadoora in District Anantnag.

4.2. Applicable National and Local Regulations

The key environmental and other regulations relevant to the proposed "Construction of 3x30 meter Steel Trussed Girder Bridge on Bringi Nallah at Sadoora in District Anantnag in Kashmir region is presented in Table 4.1

Table 4.1: Environmental Regulations Relevant to Construction of 3x30 meter Steel Trussed Girder Bridge at Sadoora, Anantnag is presented under;

S. No.	Environmental and Other Regulations	Relevance to the Proposed Bridge Project	Regulatory Clearances Required, if any	Authority
1.	EIA Notification, 14th Sept 2006 and subsequent amendments	The proposed Sadoora bridge is not covered in the ambit of the EIA Notification 2006 as this is not covered under Category of the notification. As a result, the categorization, and the subsequent environmental assessment and clearance requirements, either from the state or the Government is not triggered.	The Sadoora bridge is not covered under the preview of EIA Notification 2006 and subsequent amendments. However, for the opening of new borrow areas and stone quarry, prior environmental clearance will be required from SEIAA/DEIAA, which is to be obtained by the contractor.	MoEF & CC, GoI and SEIAA/DEIAA, GoJ&K

2.	Jammu and Kashmir Forest (Conservation) Act, 1997	This Act is NOT applicable as the proposed construction of the proposed bridge at Sadoora Anantnag does not require diversion of forest land.	NONE	Principal Chief Conservator of Forests, J&K Forest Department, Government of J&K
3.	Jammu and Kashmir Wildlife (Protection) Act, 1978 as amended, J&K Wildlife (Protection) Act 1978, as amended provide for protection & management of Protected Areas	This act is NOT applicable as the proposed construction of the bridge at Sadoora Anantnag is not passing through any National Parks and Wild Sanctuary.	NONE	Chief Wildlife Warden, Government of J&K
4.	Air (Prevention and Control of Pollution) Act, 1981	This act is applicable for the construction phase to manage ambient air quality at the project site and ancillary sites like camp, crusher plant, hot mix plant, concrete batch mix plant, DG Set etc, for the construction of the bridge at Sadoora Anantnag The NAAQ standards (CPCB) for Ambient Air Quality have been promulgated by the MoEF&CC for various land uses.	YES Consent to Establish (CTE) and Consent to Operation (CTO) from the JKSPCB for setting up of hot mix plant, wet mix plant, stone crusher and diesel generators. To be obtained by the Contractor, before construction works.	J&KSPCB, Government of J&K
5.	Water Prevention and Control of Pollution) Act,1974	This act is applicable for the construction of bridge at Sadoora Anantnag to manage liquid waste discharges from a work camp, concrete batch mix plant, etc. This act will be applicable for control of water pollution from project activity. during the construction phase	YES Consent to Establish (CTE) and Consent to Operation (CTO) from the JKSPCB for setting up of hot mix plant, wet mix plant and stone crusher. To be obtained by the Contractor, before construction works.	J&KSPCB, Government of J&K
6.	Noise Pollution (Regulation and Control Act),2000	This act will be applicable for all construction equipment/ plant and machinery including vehicles deployed for implementation of the proposed construction of the bridge at Sadoora Anantnag regulate	Noise levels are to be controlled during construction works for the proposed construction of the bridge at Sadoora Anantnag in	J&KSPCB, Government of J&K

		ambient noise levels The standards for noise for day & night have been promulgated by the MoEF&CC for various land uses. This act will be applicable to regulate noise nuisance during the construction phase	conformity with permissible standards	
7.	Construction & Demolition Waste Management Rules, 2016	This rule shall apply to the generation of wastes resulting from the demolition of bridge and culvert structures and scarifying of the surface of the existing road and from road construction activities. This will be mitigated within the ambit of this rule.	Construction and Demolition Waste Management Plan shall be prepared and implemented by the contractor, before the commencement of works	Municipal Corporation
8.	Wetland (Conservation and Management) Rules, 2017	This rule prohibits a range of activities in wetlands like settling up and expansion of industries, waste dumping, effluent discharge.	No wetland is located near or within the project influence area. Not Applicable	State Wetland Authority
8.	Public Liability and Insurance Act of 1991	To protect damage to the public life and/or property as a result of negligence/accidents during the construction of the proposed bridge at Sadoora.	Project operations are to be insured by the contractor to cover damage to the public life and/or property due to accidents/ negligence during the construction of the proposed bridge at Sadoora.	State Labour Department
10.	Central Motor Vehicle Act 1988 and Central Motor Vehicle Rules 2019	This act will be applicable for all construction equipment/plant and machinery including vehicles deployed during construction of the proposed bridge at Sadoora.	Vehicular emissions are to be regulated by project proponent in conformity with permissible levels/ emissions PUC to be obtained by the contractor.	J&K Motor Vehicles Department
11.	Building and Other Construction Workers (Regulation of Employment and	To ensure safety and welfare measures for workers employed at construction sites. Compliance to provisions of health and safety measures	Safety and welfare measures for workforce employed at construction sites are to be regulated	Labour and Employment Department, Govt. of J&K

	Conditions of Service) Act, 1996/ Jammu and Kashmir Building and Other Construction Workers (Regulation of Employment and Condition of Services) Rules, 2006	for the construction workers in conformity with BOCW rule concerning safety and health in construction. These regulations to be complied with during the construction of proposed bridge works.	by the contractor in conformity with the Jammu and Kashmir Building and Other Construction Workers (Regulation of Employment and Condition of Services) Rules, 2006	
12.	Hazardous and Other Waste (Management, and Transboundary Movement) Rules,2016	The rules will apply to used oil generated from construction equipment/ machinery during construction works. The rule includes storage, handling, transportation procedures and requirements for safe disposal of hazardous wastes.	Hazardous Waste Authorisation with CTE and CTO by the contractor.	J&KSPCB
13.	Solid Waste Management Rules, 2016	This rule applies to all forms/types of solid waste generated at construction activities, campsite, plant sites, etc..	Solid Waste Management Plan shall be prepared and implemented by the contractor, before the commencement of works	Municipal Corporation
14	The Jammu and Kashmir Preservation of Specified Trees Act, 1969	The act preserves specified trees and for cutting of such trees, permission will be required from Forest Department.	No scheduled tree is located at the bridge site or its approaches.	J&K Forest Department
15	The Ancient Monuments and Archaeological Sites and Remains Act, 1958, and the rules, 1959 guide for carrying out activities, including conservation, construction and reuse in and around the protected monuments.	Applicable only for chance finds.	For chance finds the provisions laid out in the act will be applicable. .	ASI Archaeological Survey of India

4.3. World Bank Safeguard Policies

World Bank safeguard policies are designed to prevent and mitigate undue harm to people and their environment in the development process. The layout requirements that must be complied with for all Bank-funded projects (refer to World Bank's Website on Safeguard Policies). The safeguard policies of the World Bank relevant to the Construction of 3x30m span Bridge on Bringi Nallah at Sadoora in District Anantnag are given in **Table 4.2**.

Table 4.2: Relevant and Applicability of WB Safeguard Policies for Construction of 3x30 meter Single Span Bridge at Sadoora in District Anantnag.

S. No.	World Bank Safeguard Policy	Key Features	Policy Applicability to Sub Project	Policy Triggered Or Not
1.	OP/BP 4.01 Environmental Assessment	An overallall governing policy intended to ensure Bank-financed projects are Environmentaly sound and sustainable	All potential impacts due to the construction of 3x30m bridge at Sadoora Anantnag to be assessed and necessary mitigation measures are to be incorporated accordingly.	Triggered
2.	OP/BP 4.04 Natural Habitats	The policy is intended to prohibit Bank financing of projects that degrade or convert critical habitats and supports projects that affect non-critical habitats only if no alternatives are available and if acceptable mitigation measures are in place.	The site for construction of 3x30m bridge at Sadoora Anantnag is not located in any forest area/ national park or wild sanctuary.	Not Triggered
3.	OP/BP 4.36 Forests	The policy is intended to support sustainable and conservation-oriented forest management, harness potential of forests to reduce poverty sustainably, integrate forests into sustainable economic development and protect vital local and global environmental services and values of forests.	The project site for construction of 3x30m bridge at Sadoora Anantnag is not located in any forest area.	Not Triggered
5.	OP/BP 4.11 Physical Cultural Resources	The policy is intended to ensure that projects identify and inventory cultural resources that are potentially affected by the project. Projects should include mitigation measures when there are adverse impacts on physical cultural resources.	The proposed bridge site along with the approaches at Sadoora does not have any cultural property resources (CPR) and therefore does NOT warrant shifting or affect CPRs. However, there may be a direct or indirect impact on nearby cultural properties	Triggered

4.4. MoRTH & IRC Specifications

Section 111	Precautions for safeguarding the environment
Clause 201.2	Preservation of Property/Amenities during clearing and grubbing
Clause 301.3.2	Stripping and storing of topsoil for reuse during excavation for roadway and drains
Clause 304.3.6	Public safety near towns/villages where excavation is carried out
Clause 305.2.2.2	Locations of borrowing and relevant regulations
Clause 305.3.3	Stripping and storing of topsoil at borrow locations
Section 306	Soil erosion and sedimentation control
Clause 407.4.2	Provisions for turfing on median and islands

4.5. Applicability of International Conventions

‘

Ramsar Convention on Wetlands of International Importance, 1971 (Not Applicable for the proposed Bridge project)

The Ramsar Convention is an international treaty for the conservation and sustainable utilization of wetlands i.e. to stem the progressive encroachment on and loss of wetlands now and in the future, recognizing the fundamental ecological functions of wetlands and their economic, cultural, scientific and recreational value.

According to the Ramsar List of Wetlands of International Importance, there are 25 designated wetlands in the country which are required to be protected. Activities undertaken in the proximity of these wetlands should follow the guidelines of the convention.

International Union for Conservation of Nature (IUCN) (Not Applicable for the proposed Bridge Project)

The International Union for Conservation of Nature (IUCN) is a membership Union uniquely composed of both government and civil society organizations. IUCN has evolved into the world’s largest and most diverse environmental network. IUCN is the global authority on the status of the natural world and the measures needed to safeguard it.

IUCN produces the IUCN Red List of Threatened Species and the IUCN Red List of Ecosystems. The IUCN Red List of Ecosystems is applicable at local, national, regional and global levels. IUCN' stated goal is to expand the global network of national parks and other protected areas and promote good management of such areas. In particular, it focuses on greater protection of the oceans and marine habitats.

4.6. Indian Road Congress (IRC) Code of Practices

Key Indian Road Congress (IRC) Code of Practices applicable for the project concerning the environment are given in Table 4.3 below:

Table 4.3: Indian Road Congress Code of Practices

S. No.	IRC Code Theme	Year	Purpose	Applicability
1.	Recommendations for Road Construction in Areas Affected by Water Logging, Flooding and/or Salts Infestation	IRC:34-2011	Construction in waterlogged areas	Yes
2.	Recommended Practice for Construction of Earth Embankments and Sub-Grade for Road Works	IRC:36-2010	Issues relating to Borrow pits	Yes
3.	Guidelines for Pedestrian Facilities	IRC: 103 -1988	Safety of pedestrians	Yes
4.	Guidelines for Use of Construction and Demolition Waste in Road Sector	IRC:121-2017	Use of Construction and Demolition Waste in Road Sector	Yes
5.	Guidelines on Landscaping and Tree Plantation	IRC:SP:21-2009	Landscaping and Tree Plantation along of the road	Yes
9.	Guidelines for Soil and Granular Material Stabilization Using Cement Lime and Fly Ash	IRC:SP-89-2010	Soil and Granular Material Stabilization Using Cement Lime and Fly Ash	Yes
10.	Guidelines on Requirements for Environmental Clearance for Road Projects	IRC:SP-93-2017	Requirements for Environmental Clearance for Road Projects	Yes
12.	Guidelines on Preparation and Implementation of Environment Management Plan	IRC:SP-108-2015	Preparation and Implementation of Environment Management Plan	Yes

4.7. Environmental Standards

Various environmental standards like National Ambient Air Quality Standards, Ambient Noise Standards, Drinking Water Standards applicable to the construction of 3x30m span Steel Trussed Girder Bridge on Bringi Nallah at Sadoora in District Anantnag are reflected in Environmental Monitoring section of this report.

Environmental standards applicable to this subproject are given below:

- National Ambient Air Quality Standards, 2009
- Ambient Noise Standards
- Drinking-Water Quality Standards-IS:10500:2012
- CPCB Standards for Surface Water Use
- Stack Gas Discharge Standards for Hot Mix Plant

Table 4.4: National Ambient Air Quality Standards

Pollutant	Time Weighted Average	Concentration in Ambient Air	
		Industrial, Residential, Rural and Other Areas	Ecologically Sensitive Area (notified by Central Government)
Sulphur Dioxide (SO_2), $\mu g/m^3$	Annual*	50	20
	24 hours**	80	80
Nitrogen Dioxide (NO_2), $\mu g/m^3$	Annual*	40	30
	24 hours**	80	80
Particulate Matter (size less than 10 µm) or PM_{10} $\mu g/m^3$	Annual*	60	60
	24 hours**	100	100
Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$ $\mu g/m^3$	Annual*	40	40
	24 hours**	60	60
Ozone (O_3) $\mu g/m^3$	8 hours*	100	100
	1 hour**	180	180
Lead (Pb) $\mu g/m^3$	Annual*	0.50	0.50
	24 hours**	1.0	1.0
Carbon Monoxide (CO) mg/m^3	8 hours*	02	02
	1 hour**	04	04
Ammonia (NH_3) $\mu g/m^3$	Annual*	100	100
	24 hours**	400	400
Benzene (C_6H_6) $\mu g/m^3$	Annual*	5	5
Benzo(a)Pyrene (BaP)-particulate phase only, ng/m^3	Annual*	1	1
Arsenic(As), ng/m^3	Annual*	6	60
Nickel (Ni), ng/m^3	Annual*	20	20
* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.			
** 24 hourly or 8 hourly or 1 hourly monitored values, as applicable, shall be complied with 98% of the time; they may exceed the limits but not on two consecutive days of monitoring.			
Source: National Ambient Air Quality Standards, Central Pollution Control Board Notification in the Gazette of India, Extraordinary, New Delhi, 18th November 2009			

Table 4.5: National Ambient N oise Level Standards

Area Code	Category of Area	Limits in dB (A) Leq.	
		Daytime	Night time
A	Industrial	75	70
B	Commercial	65	55
C	Residential	55	45
D	Silence	50	40

Source: *Central Pollution Control Board, New Delhi.*
Note-1 Day time is reckoned in between 6 AM to 10 PM
Note-2 Night time is reckoned in between 10 PM to 6 AM
Note-3 Silence zone is defined as areas up to 100 meters around such as premises as hospitals, educational institutions and courts. The silence zones are to be declared by the Competent Authority
Note-4 Mixed categories of areas should be declared as one of the four above mentioned categories, by the Competent Authority and the corresponding standard shall apply.

Table 4.6: Surface Water Quality

S. No	Parameters	IS:2296 (Class C)	Method Adopted
1	pH	6.5-8.5	pH meter
2	BOD (3 day, 27^0C)	3.0	DO-Azide modification of Wrinkler's method
3	Temperature (^{0}C)	NS	Thermometer
4	Dissolved oxygen	≥4	Azide modification of Wrinkler's method
5	Color (Hazen)	300	Visual Comparison method
7	Chloride (Cl)	600	Argentometric Titration
8	Total Dissolved Solids	1500	Gravimetric Analysis
9	Sulphates (SO_4)	400	Barium Chloride method
10	Oil and Grease	0.1	Partition -Gravimetric method
11	Nitrates	50	Chromotropic acid
12	Total Coliform (MPN/100 ml)	5000	Multiple Tube Fermentation Technique

NS: Not specified. All the values in mg/l if otherwise mentioned

5. BASELINE ENVIRONMENTAL CONDITIONS

5.1. General

Anantnag district is known for the land of countless springs and is about 53 km towards the south of Srinagar (the summer capital of the state of Jammu and Kashmir). This District is in southern sector of Jhelum Valley. It is because of its rejuvenating climate, the inspiring majesty, its lofty mountains, the melodious flow of sweet waters of its springs and streams, fertile soil, fragrant flowers and delicious fruits that the district has come to be synonymous with greatness. It is one of the major districts of the Kashmir Valley, situated to its south and south-western direction. Geographically the district lies between 33° 20' to 34° 13' N Latitude and 74° 30' to 75° 35' E Longitude. The area of the district is 2917 square kilometres, which constitutes about 1.31% of the total area of Jammu & Kashmir state. It is the only district among all the 22 districts of the J&K that shares its boundaries with as many as 8 districts. It has Ganderbal to its north, Doda to its south, Kishtawar to its east whereas Kulgam lies to the west of the district. Furthermore, it also has Kargil to its north-east and Ramban to its south-west, while Srinagar and Pulwama lie in its north-eastern region. The administrative centre of the District is situated at Anantnag, which is 50 Km from Srinagar. The Anantnag District as per census 2011 consists of 387 inhabited villages. The villages have been grouped into 12 Tehsils. District Headquarters of Anantnag is well connected by road. 73.77% of the population lives in rural areas and 26.23 % in urban areas. As per Census 2011, the literacy rate of the District is 64.32 % with male and female literacy rate of 72.66 % and 52.19 % respectively.

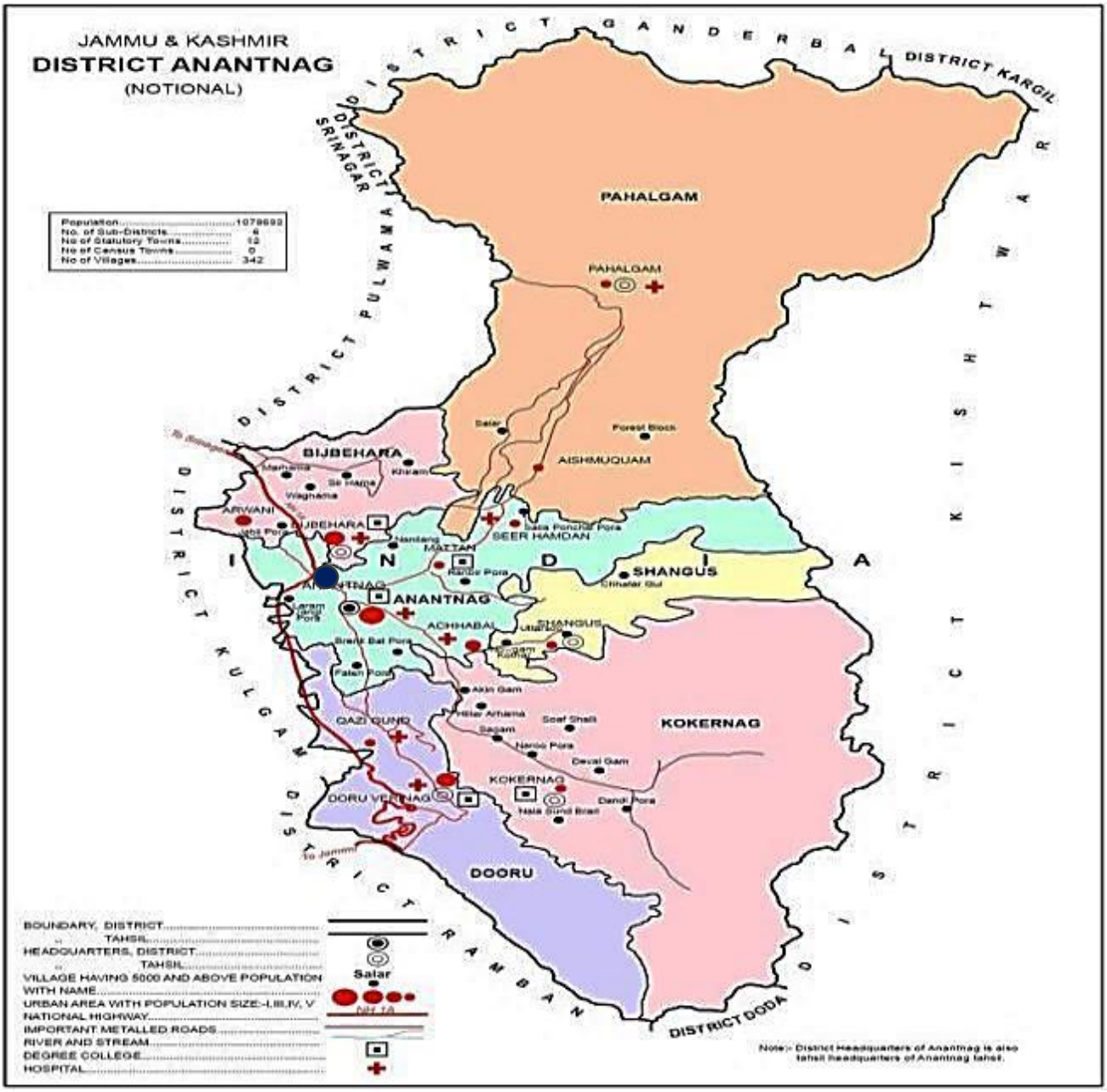


Figure 5.1: Map of District Anantnag (Blue dot howing th poject location)

Agriculture is the main activity which comprises of the major field crops in the Anantnag are Paddy, Maize, Millets, Pulses, Mustard, oilseeds, oats, and Wheat. Within a short span of time rice and maize the major crops were replaced by fruit and willow plantation at a larger scale. Some of minerals located in the Anantnag district are Copper (main copper ore found at Shamuhal near Aishmuqam), Limestone (found in Verinag, Mattan, Sheripora, Brakpora, Donipawa and Achabal), Galena (deposits mainly occur in Shumahal near Aishmuqam), Muth Quartzite (found at Haptnar,

Gugaldar in Lidder Valley of Pahalgam), Glass Sand (present in Lidder and Naubug Valley of Pahalgam), and sand and Bajri.

The district has a feature of possessing the largest number of health resorts in the whole UT, of them particular mention may be made of Verinag, Kokernag, Achabal, Daksum and world famous health resort of Pahalgam.

5.2. Study Area (Project Location and Outline)

Fig: 5.2: Project location of the Sadoora Project showing Projet Influene Area (PIA). (Source: Google Earth)

The project is located in Sadoora village across Bringi Nallah in District Anantnag. It is located 6.7 km towards North from District head quarters Anantnag and 66.3 km from the capital city of Srinagar. Total geographical area of Sadoora village is 3.37 km^2 and it is the 8th biggest village by area in the sub district of Dooru. The project lies between the latitudes of 33°6´77.52"N and Longitude of 75°14´53.44"E. Sadoora is surrounded by Sechan village towards East, Forah village towards North, Napoora Village towards west, Fatehpora village towards South, kamad village towards NE, and Vessu towards SW. Kulgam and Shopian are the nearby districts to Sadoora village. The total length of the steel trussed girder bridge is 93.60 meter. The proposed Sadoora Bridge project will directly connect Sadoora village with rest of the adjoining areas like Kamand, Vessu, Lallan, Ganoora, Ugjan, and Asajipora etc.

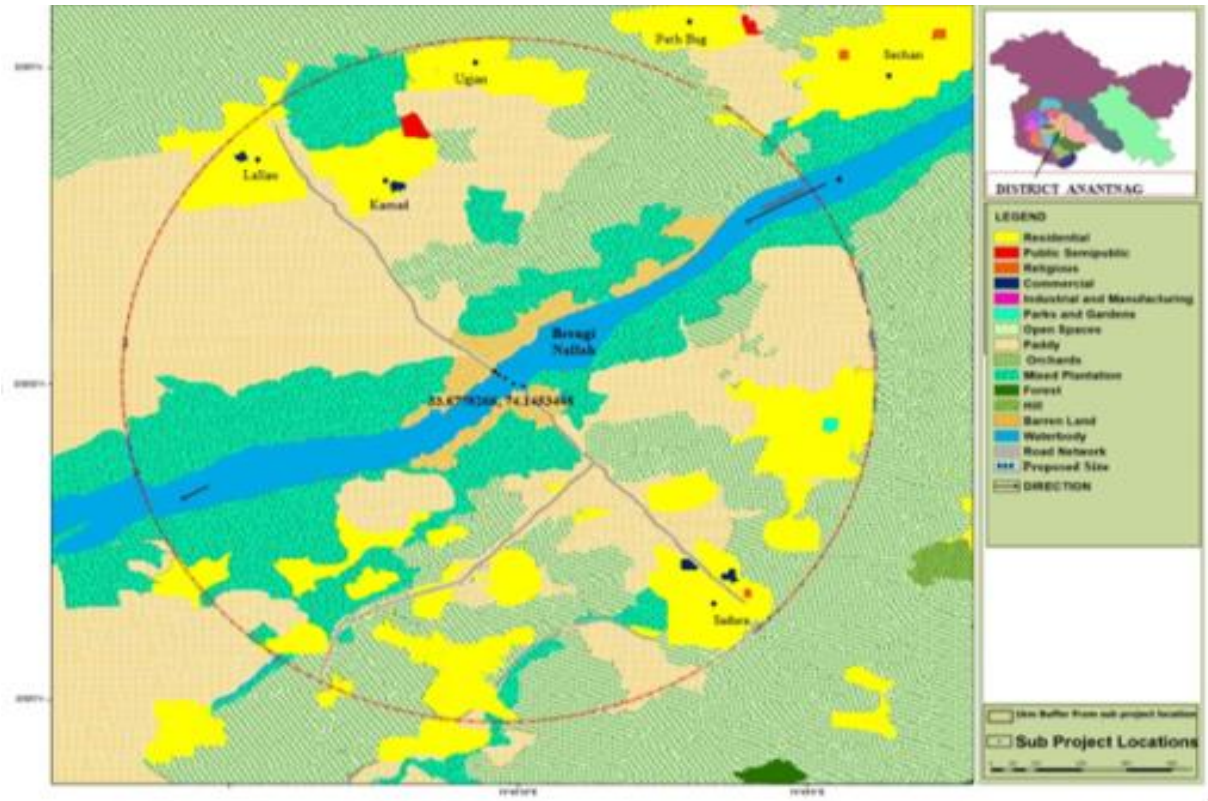


Figure 5.3: GIS/ LULC Map of Proposed Sadoora Bridge- Project Influence Area (PIA)

Research done on Land Use and Land Cover and Socio Economic Changes in District Anantnag Jammu and Kashmir Using Remote Sensing and GIS revealed that agriculture is decreased simultaneously there is increase in horticulture and built-up. Satellite data of 1979, 2005 and 2013 shows land cover classification including Agriculture, Horticulture and Built up.

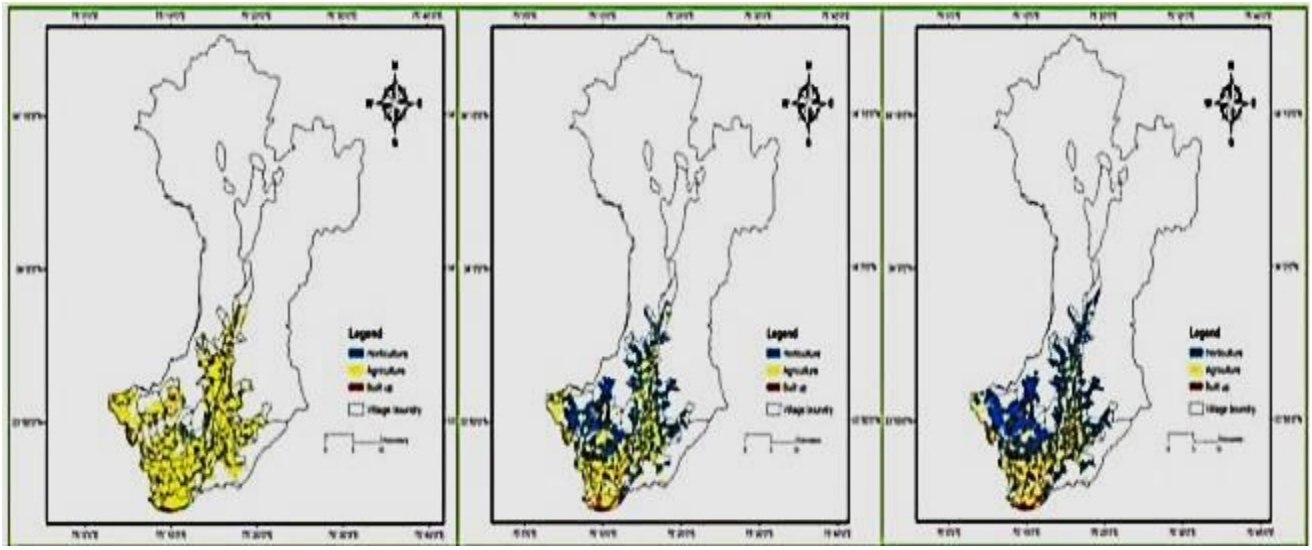


Fig 5.4: Agriculture,Hortculture & Built-up map of District Anantnag

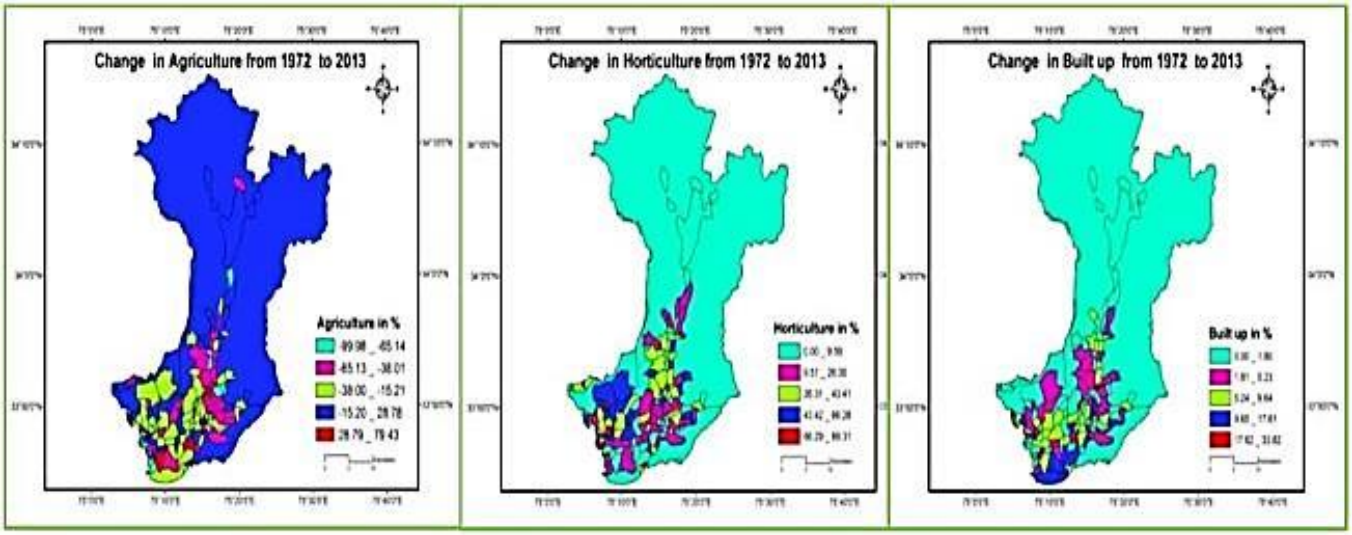


Fig 5.5: Village wise percentage change in Agriculture, Horticulture, Built-up of district Anantnag

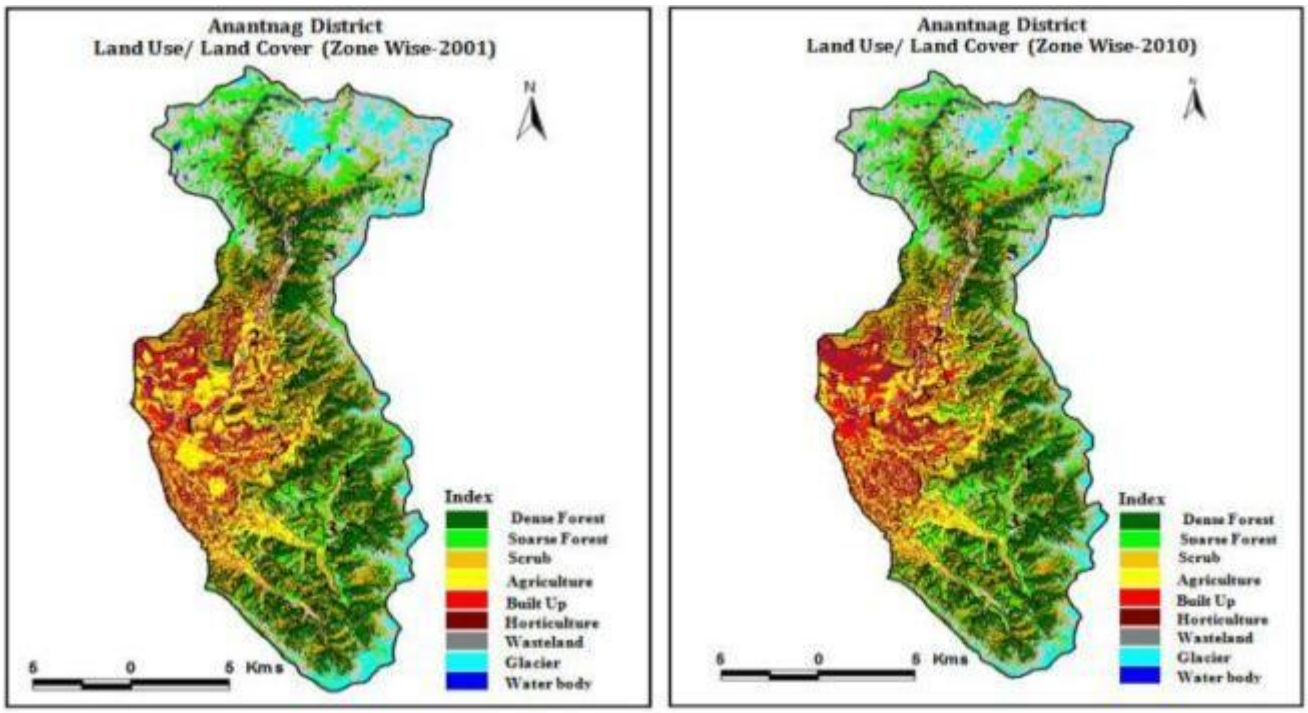


Fig 5.6: Altitudinal Zone Wise Land use/Land cover Change of Anantnag District [2001-2010]

5.3. Topography and Physiography

District Headquarter Anantnag is located about 55 kms from Srinagar and about 254 Kms from Jammu. A National Highway is connecting the district to the rest of the country. The general approach to the whole of the District is through road transport i.e. Taxi and Buses. Taxi and buses

are available from Srinagar and Jammu. Anantnag District is situated in south and south western direction of the state. The district has a total geographical area of 2,917 sq km, comprising of 394 Revenue villages (387 inhabited and 07 un-inhabited villages). Administratively, the district is divided into 12 tehsils (viz, Anantnag, Anantnag-East, Bijbehara, Dooru, Kokernag, Larnoo, Pahalgam, Qazigund, Sallar, Shahabad Bala, Shangus and Srigufwara) and 16 CD blocks. Its entire southern sector and major part of the eastern region is strewn with thick forests and mountains. The height of these mountains in the East, South, and West of the district ranges between 2438 meters to 3048 meters and in some areas, the peaks even to a height of 4572 meters. On the west the district is bounded by mighty Pir Panchal range mountains, through which passes the world famous Jawahar Tunnel. The Anantnag district is not only the rice bowl of the Valley, it is equally rich in landscape of lush green meadows. The district has a feature of possessing the largest number of health resorts in the whole State, of them particular mention may be made of Verinag, Kokernag, Achabal, Daksum and world famous health resort of Pahalgam. Anantnag district is a hilly area encircled by dense forests. The district has at present 2002 Sq Km area under forest. District Anantnag has some important streams (Nallahs) like Sandran, Bringi, Arapath and Lidder. The most important among these Nallahs is the Lidder Nallah which takes off from Sheshnag & Tarsar lakes and irrigates not only the maximum area of the district but is also one of the main tributaries of the River Jehlum. The district has also some important springs like Verinag, Sheshnagh (Lake), Tarsar, Nagabal Anantnag, Kokernag, Achabal and is a true representative of its name Anantnag (land of many springs). Average minimum and maximum temperature in District Anantnag varies from –11°C to 33°C and Average annual rainfall has been recorded as 1103 mm. The major agriculture & horticulture crops are Rice, maize, millets, oil seed, vegetables, fodder crop, pulses, apple, pear, apricot, peach, cherry, mustard, willow, walnuts, etc.

The proposed bridge is constructed on Bringi Nallah at sadoora-Asajipora Kamad Road which is a typical hill stream with a characteristic natural boulder arrangement by the action of flow regime. The surrounding expanse in project influence area is Sadoora village which connects rest of the adjoining areas like Kamand, Vessu, Lallan, Ganoora, Ugjan, and Asajipora etc and are located in a rolling/hilly terrain in a small valley formation. The land-use/ land-cover are mainly agricultural/ horticultural activity, residential set-up in pockets, fruit orchards- Apples, Pears, Apricot, Cherry etc.

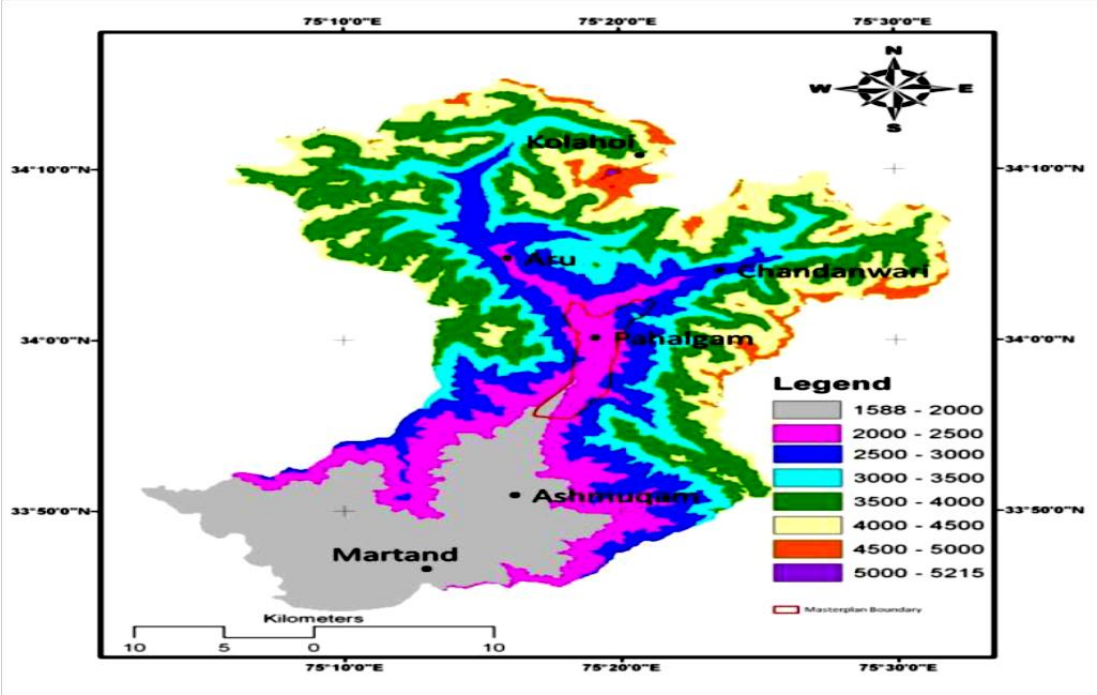


Fig 5.7: Topographical Map of District Anantnag

5.4 . Geology & Soil Type

Geo-morphologically the Kashmir valley holds a unique position in the Himalayas. The valley has undergone many changes in the geological times, the mountain-wall abruptly rising on sides presents a varied geological scenery in its massive quartzite and Silurian to the west of the Wular Lake. Anantnag district is hilly and mountainous towards the northeast and southwest with broad intermountain valley. The altitude of the hill ranges up to 3000 m above msl. The valley area in the central part of the district has flat to mildly undulating topography with its elevation about 1700 m above msl and has an area about 900 sq. km. The master slope in the area is towards north west. The district forms part of the Jhelum sub basin of Indus basin. River Jhelum is the major river, originating at the place Verinag, with its tributaries viz., Lidder, Vishav, Sandarn rivers drains the area. Soil is poor in hilly areas and fertile in plain areas. Productivity in higher ranges is poor while in central regions is fertile. The rock formations underlying the district ranges in age from Cambrian to Quaternary. The brief generalized geological succession in the district is given in Table 5.1

Table 5.1: Geological Succession in the Anantnag District

Stratigraphic unit	*Lithology*	*Thickness (m)*	*App. Age*
Alluvium	Clay, silt, and sand	15	Recent
Upper Karewa	Alternate greenish sandy and grey clay bed layers with Calcareous Laminae	750	Plio-pliestocene
	Second fluvio-glacial Boulder bed	130	
Lower karewa	Clay (Bluish grey) & Conglomerates with coarse to fine sand (greenish in colour)	2000	Plio-pliestocene

	alternate with grey sandy clays. *Lignite and peat material*		
	First fluvio-glacial Boulder bed	200	
Panjal trap	Agglomeratic slates, grits and effusive rocks		Permo-Carboniferous

Panjal traps forming hilly and mountainous terrain of the district with hard formations of igneous and metamorphic rocks. The Karewas and alluvium of Quaternary and Tertiary age (Plio-Pleistocene) underlie the valley area and consists of alternate bands of sand, silt, gravel & clay, interspersed at two to three levels locally by glacial boulder beds. This formation is important from ground water point of view and sustains the water supply system in the area. This formation of Plio-Pleistocene age lies dis-conformably over the older rocks ranging in age from Cambrian to Triassic.

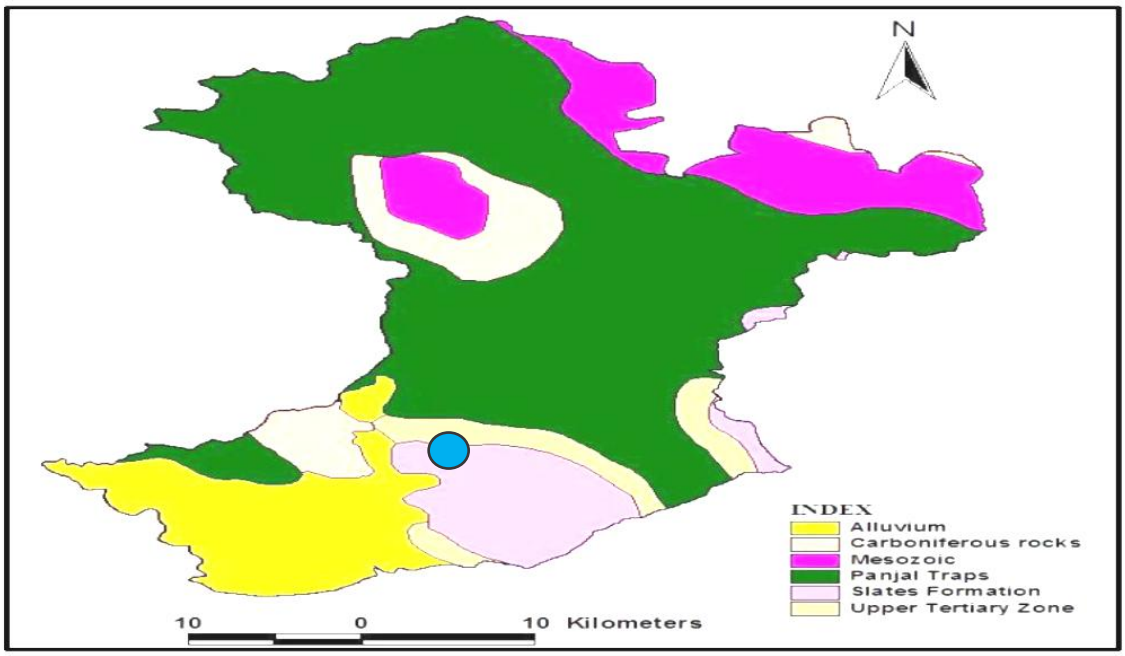


Figure 5.8: Geological Map of Anantnag District (blue dot showing the indicative location of the bridge)

Soil Type

The soils in J&K are loamy and there is little clay content in them. Poor in lime but with a high content of Magnesia, the soil is treated with chemical fertilizers and enriched with green manure and legume before cultivation. There are sufficient organic matter and nitrogen content in the alluvium of the Kashmir valley as a result of plant residue, crops stubble, natural vegetation and animal excretion. The valley of Kashmir has many types of soils like Gurti (clay), Bahil (Loam), Sekil (Sandy), Nambaal (Peats), Surzamin, Lemb, Floating garden soils and Karewa soils. No wonder, in Kashmir, the soil is virtually worshipped as a miracle of divinity as it is a source of wealth of the land. The soils of the Kashmir Valley are of two types *viz,* Hapludalfs and Ochraqualfs. Soils developed on Karewa tops and upland areas are medium to fine textured and known as Hapludalf. Soils found on plains are clay loam in nature and are dark brown.

Table 5.2: Soil Type of Anantnag District

Soils of Anantnag District		
Type of Soil	Area in Km^2	Area in (%)
Slity Clay Loam	-	80
Sandy to Clay Loam	-	20

Hydro-geologically, the district is divided into two distinct and well-defined aquifer systems, viz. hard rock or fissured aquifer constituted mainly by semi-consolidated to consolidated rock units and soft sedimentary or porous aquifer constituted mainly by unconsolidated sediments.
The fissured formation includes the semi-consolidated to consolidated rock formations exposed in the district are igneous, metamorphic and sedimentary origin. These forms low and high hill ranges through out the district. Fractured and jointed igneous, metamorphic rocks and the scree/talus deposits in the foothills form low to moderate potential aquifers with poor to moderate yields. Occurrence and movement of the ground water is mainly controlled by secondary porosity originated due to fracturing and faulting and related tectonic disturbances and weathering. Ground water oozes in the form of springs, seepages in the hilly areas and is utilizing for domestic purposes. There are numerous springs in the district generally concentrated along the contact zones and also in the hilly area.

The unconsolidated sediments comprising of fluvio-glacial and lacustrine deposits of Karewas and recent alluvium, terrace deposits and alluvial fan deposits constitute the porous aquifer system of the district. The sediments consist of sand, gravel, cobbles, pebbles, boulders interlayered with thick clay beds forms the prolific aquifer system. Occurrence and movement of ground water is mainly controlled by the primary intergranular porosity in the soft sedimentary Quaternary alluvium and the Karewa formations. This unconsolidated sedimentary deposit forms multi-layer major aquifer system in the area. The sedimentary formation is +300m thick in the district as revealed by the study and ground water exploration carried out by CGWB. Ground water in the district occurs in phreatic and confined conditions in these formations.

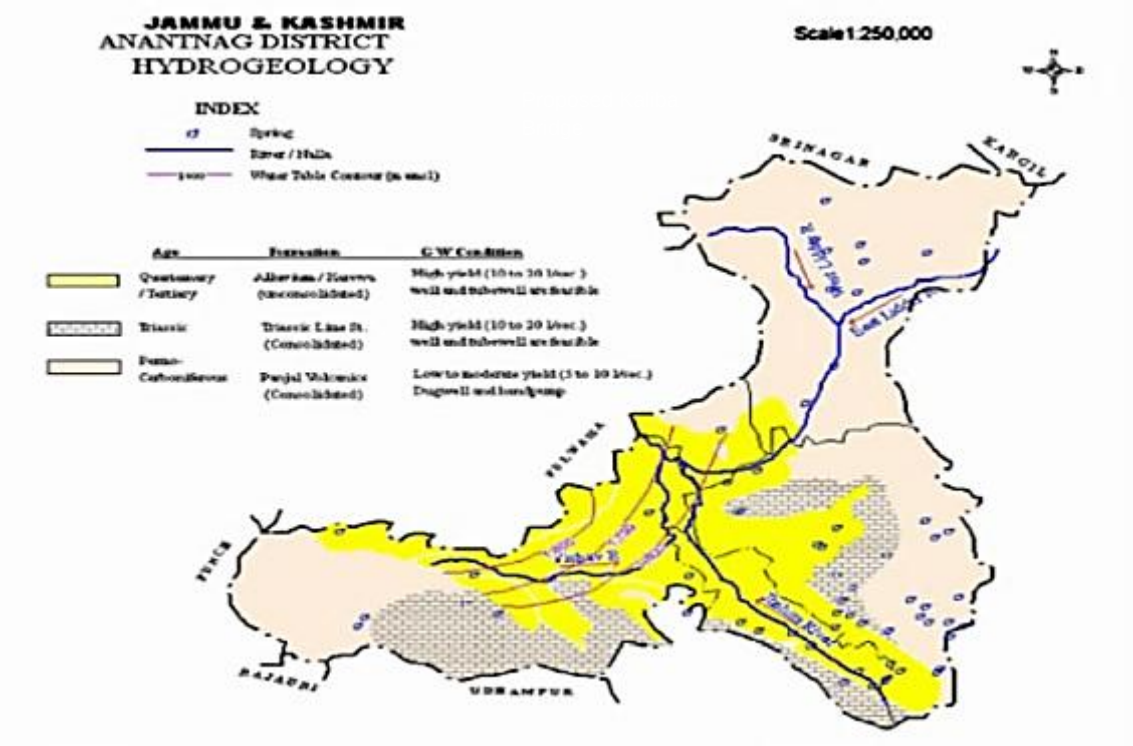


Fig 5.9: Map showing Hydro-Geology of the District Anantnag (Source: Ground Water Information Booklet, District Anantnag, March 2013)

5.5. Natural Hazards

The state is a multi-hazard prone region with natural disasters like earthquakes, floods, landslides, avalanches, high-velocity winds, snowstorms, cloud bursts, besides manmade disasters including road accidents and fires etc. occurring in various parts of the state. Along the subproject areas/ project influence area comes under flood hazard, earthquakes (under Zone-V classification), and man-made disasters including road accidents and fires which is synonymous with the roads in Kashmir due to lack of road safety.

5.5.1. Floods

Although flooding is a major hazard to lives and infrastructure the world over, mechanism and trends in flood hazards are poorly understood. Normally, the prolonged and high-intensity rainfall is the trigger for floods, however, the geomorphic setup and nature of the socio-economic development in the river basin would either ameliorate or exacerbate the flooding under various scenarios. Recently, the frequency of extreme rainfall events and floods has increased worldwide including the NW Himalayas. The extreme rainfall event, as evident from the 7-day antecedent rainfall data observed in the Jhelum basin, turned into one of the worst disasters in the flood history of the Jhelum compounded by the existence of the injudicious socioeconomic structures and massive land system changes in the floodplains that interfered with the hydraulic and hydrological processes during the flooding The scenario was further worsened due to the dilapidated flood control structures and the institutional failure on managing the enormity of the extreme flooding.

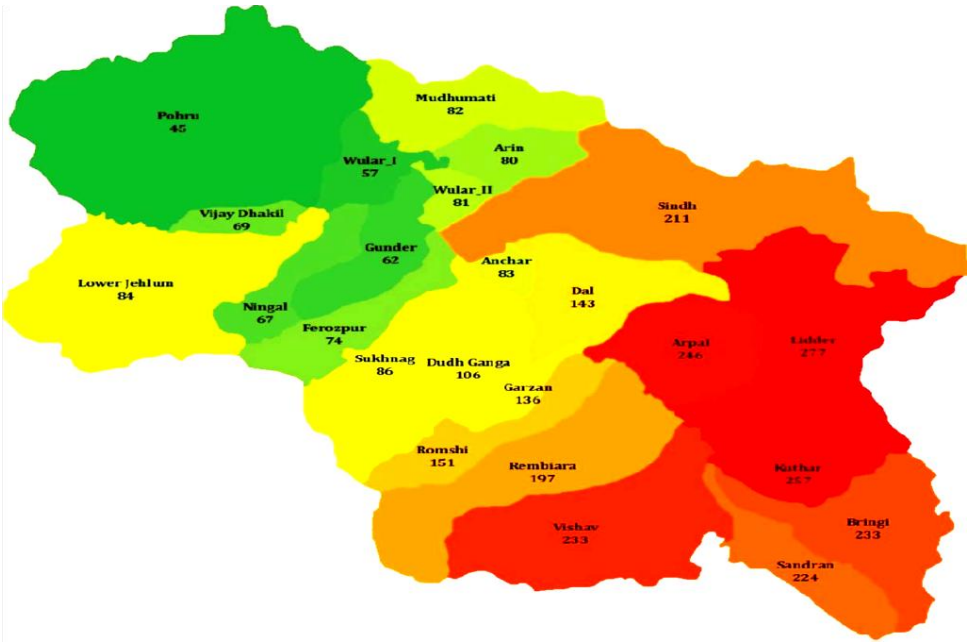


Fig 5.10: Cumulative precipitation over the Jhelum basin between 1 and 6 September 2014 (Source: TRMM data).

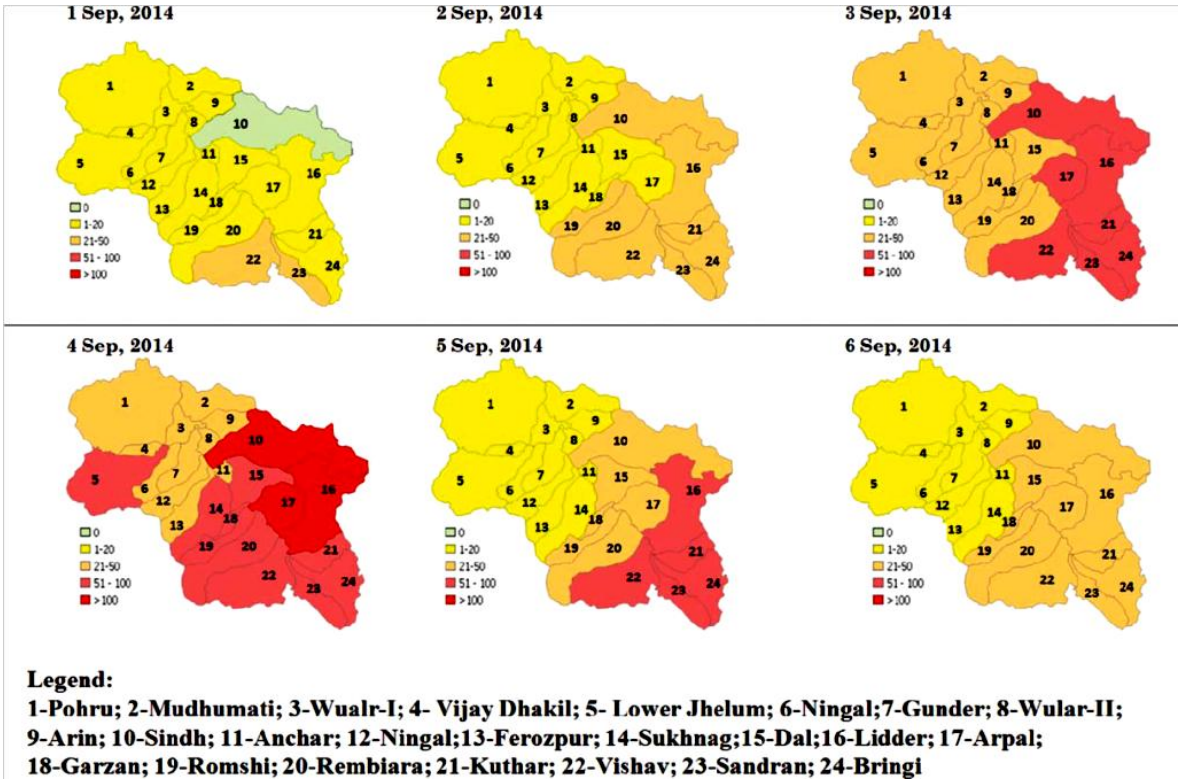


Fig 5.11: Spatial variation in rainfall for Jhelum basin between 1 and 6 September 2014 (Source: TRMM data). Rainfall categories: 0 (green), 1-20 mm (yellow), 21-50 mm (light brown), 51-100 mm (pink) and more than 100 mm (red colour).

The 2014 flood was very devastating killing more than 100 people and causing colossal loss to the infrastructure to the tune of INR 1 Trillion (World Bank 2015). The Jhelum waters, that used to be the provider of life and sustenance, suddenly became a monstrously destructive force against human life and the infrastructure that cohabit its backyards since millennia. The high discharge levels of the Jhelum persisted for more than a week, flooding the vast low lying areas of the valley. The scene was frightening making the people fear for a high human loss and destruction of the capital city, Srinagar. Even though there is a tremendous advancement in the flood hazard prediction globally during the last few decades, but there is insignificant progress in translating the benefits of the scientific advancements for the flood risk reduction of the society as was evident from the high loss of life and property during the 2014 Kashmir flooding. Dilapidated flood control infrastructure, shrinking of the wetlands, deforestation, high rate of the urbanization of Jhelum floodplains and siltation of the watercourses witnessed in the Kashmir valley during the last few decades has degraded the ability of the environment to absorb the excess rainwater in Jhelum basin and thus, increased the vulnerability of the basin to flooding which is manifest in the frequent flash floods and recurrent water logging observed in the floodplains of Jhelum

The Sadoora and adjoining villages were connected with the main district with a submersible causeway which was washed away with the catastrophic floods in September 2014. During rainy season, the village gets disconnected with other habitations and people of the area especially elderly people, students, woman, patients face a lot of difficulties in absence of connectivity. In order to redress the demand of the public, it is proposed to construct 3x30 meter Steel Trussed Girder Bridge with deck over Bringi Nallah.

The importance of road connecting with district headquarters is manifold as discussed above, and it was proposed to construct dual lane bridge in open trench foundation with RCC wall type abutments, steel trussed girder with RCC deck and wire gabion type protection works. The proposed 3x3 meter bridge will be a major/vital connecting link between various villages like Kamad, Ashajipora etc and District headquarter in Anantnag. The bridge will also serve indirectly to thousands of other souls of the adjoining areas as it links these areas with their orchid gardens and fields etc.

5.5.2. Earthquakes- History and Seismic Zonation

The Indian subcontinent has a history of devastating earthquakes. The major reason for the high frequency and intensity of the earthquakes is that India is driving into Asia at a rate of approximately 47 mm/year. Geographical statistics of India show that almost 54% of the land is vulnerable to earthquakes. The latest version of seismic zoning map of India given in the earthquake-resistant design code of India [IS 1893 (Part 1) 2002] assigns four levels of seismicity for India in terms of zone factors. In other words, the earthquake zoning map of India divides India into 4 seismic zones (Zone 2, 3, 4 and 5), unlike its previous version which consisted of five or six zones for the country. According to the present zoning map, Zone 5 expects the highest level of seismicity whereas Zone 2 is associated with the lowest level of seismicity.

The Jammu & Kashmir region is the westernmost extension of the Himalayan mountain range in India. Here it comprises of the Pir Panjal, Zanskar, Karakoram and Ladakh ranges. The Main Boundary Thrust (MBT) underlies the Pir Panjal Range and is known as the Panjal Thrust in the region. The Zanskar ranges which are part of the Great Himalayan range are underlain by the Zanskar Thrust. The Kashmir Valley lies between the Pir Panjal and the Zanskar thrusts, making it very vulnerable to earthquakes. Other northern parts of Jammu & Kashmir are heavily faulted. Along the Zanskar and the Ladakh ranges run a North West (NW) – South East (SE) trending strike-slip fault, the longest in the Jammu & Kashmir area. Apart from the routine small tremors, moderate to large earthquakes have hit nearly all parts of the state. However, it must be stated that proximity to faults does not necessarily translate into a higher hazard as compared to areas located farther away, as damage from earthquakes depends on numerous factors such as subsurface geology as well as adherence to the building codes. There are at least four regions of the Himalaya where earthquakes of magnitude 8 or above are likely to occur in the near future. 2005 earthquake of MW 7.6 has released the only 1/10th of the stress generated within the region and remaining has to go in future great earthquakes. The damage occurred in Uri, Kupwara and Anantnag districts in Kashmir province and the Poonch town and its surrounding areas are along the line of control. This earthquake was the strongest in over 120 years in the area. Efforts at all levels need to be taken to ensure whatever new structures are built can withstand future major earthquakes.

The proposed Sadoora Bridge in District Anantnag falls in a seismically active part (Zone-V) of Kashmir Valley. The design parameters for the 3x30 meter span Bridge at Sadoora should conform with the BIS Code of Practice. Keeping in view the maximum credible earthquake magnitudes in the region, the site area is classified in Zone-V as per the Bureau of Indian Standards (BIS) code of Practice (IS-1893-2002). These maximum credible earthquake magnitudes represent the largest earthquakes that could occur on the given fault, based on the current understanding of the regional Geo-tectonics. The earthquake zonation map of Jammu and Kashmir is given below:

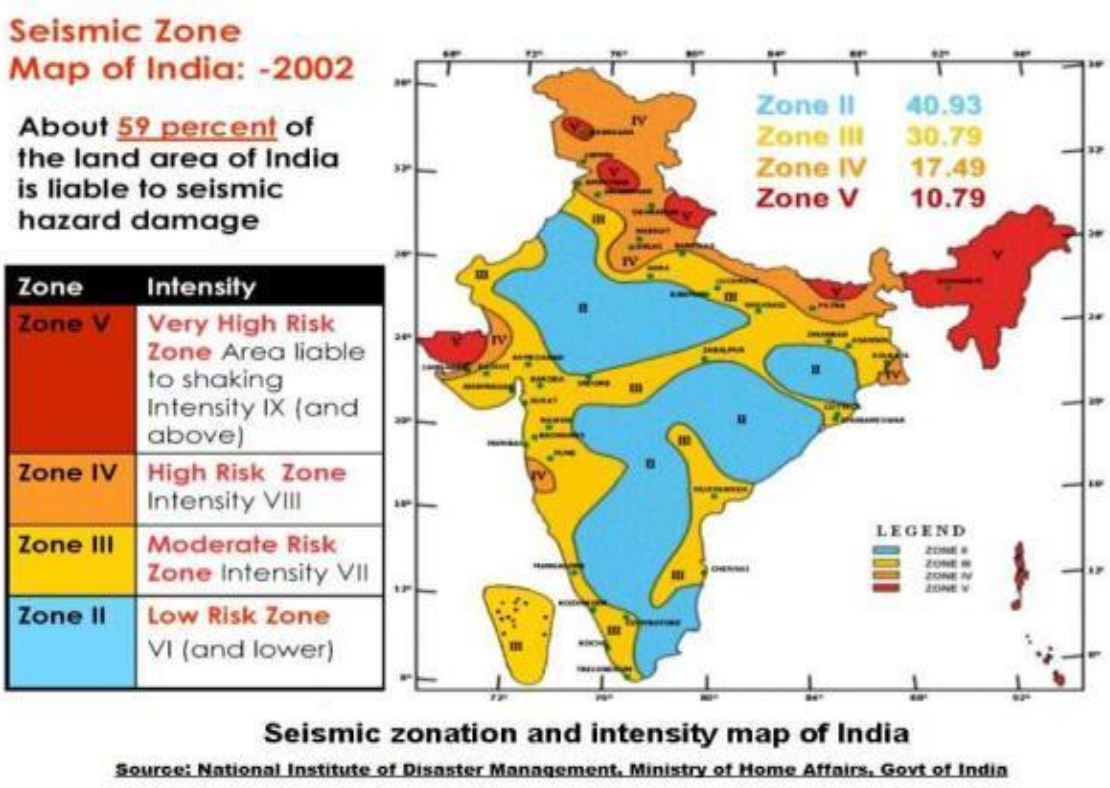


Figure 5.12: Seismic Zonation and Intensity Map of India.

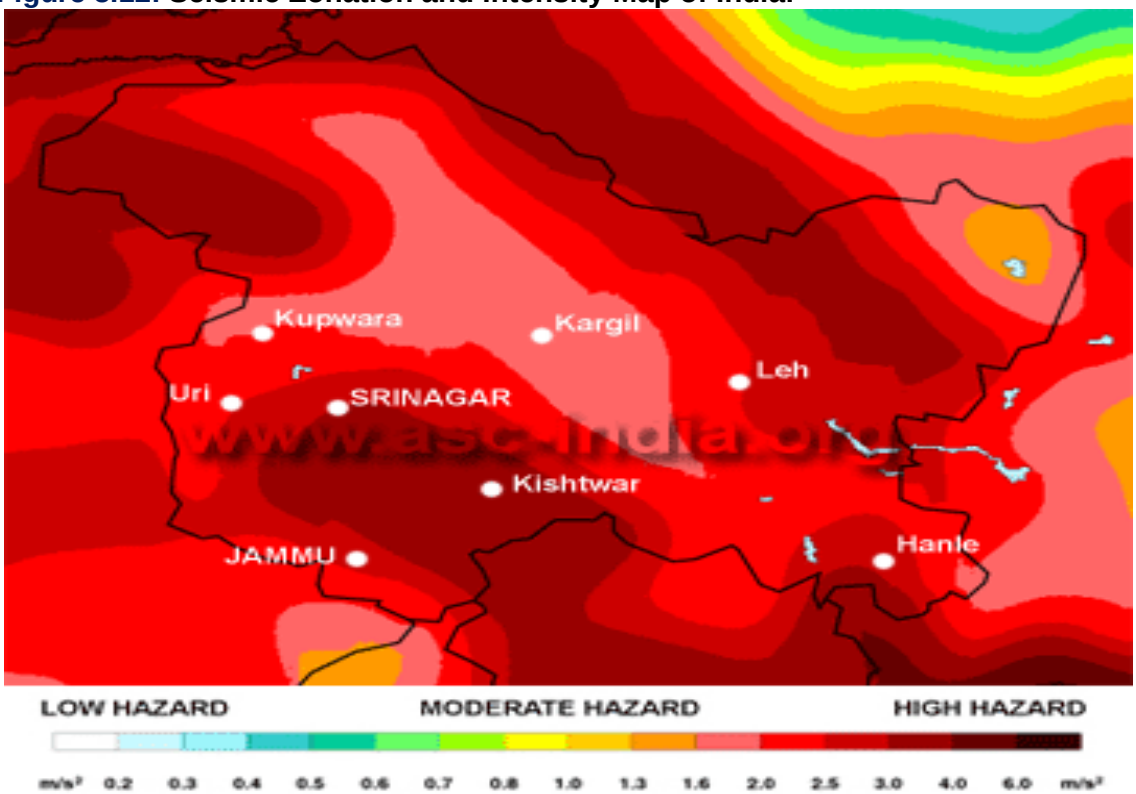


Figure 5.13: Map of Jammu and Kashmir showing earthquake zonation.

5.6. Air Environment

5.6.1. Meteorology and Climatology

The climate of the district is Temperate cum Mediterranean type. In the higher reaches the temperature remains cold through out the year. Average minimum and maximum temperature varies from –11°C to 33°C. The winter season starts from the middle of the November and severe winter conditions continues till the middle of February/March. The district receives an average annual precipitation of about 1103 mm in the form of rain and snow for about 70 days.

The climate varies considerable with the altitude. It is mild and salubrious in the lower elevations but very cold in higher ups. All the four seasons of the year are represented. Spring is cool and rather wet. Summer months (July to September) are dry and warm with the shade temperature rarely exceeding (31°C). Autumn is bright and pleasant while as winter is extremely cold and experiences heavy snow falls. Frost is experienced from middle of November onwards.
Owing to proximity of Peer Panchal Range, which stretches in its South and South-East, the district has a more temperate climate in summer than other districts of the Valley. In winter, however, snowfall is heavier and temperature is relatively low. Being engulfed on two sides by mountains, the monsoon does not generally reach the district. The rainfall is often excessive in spring, moderate in summer, deficient in autumn and moderate in winter.

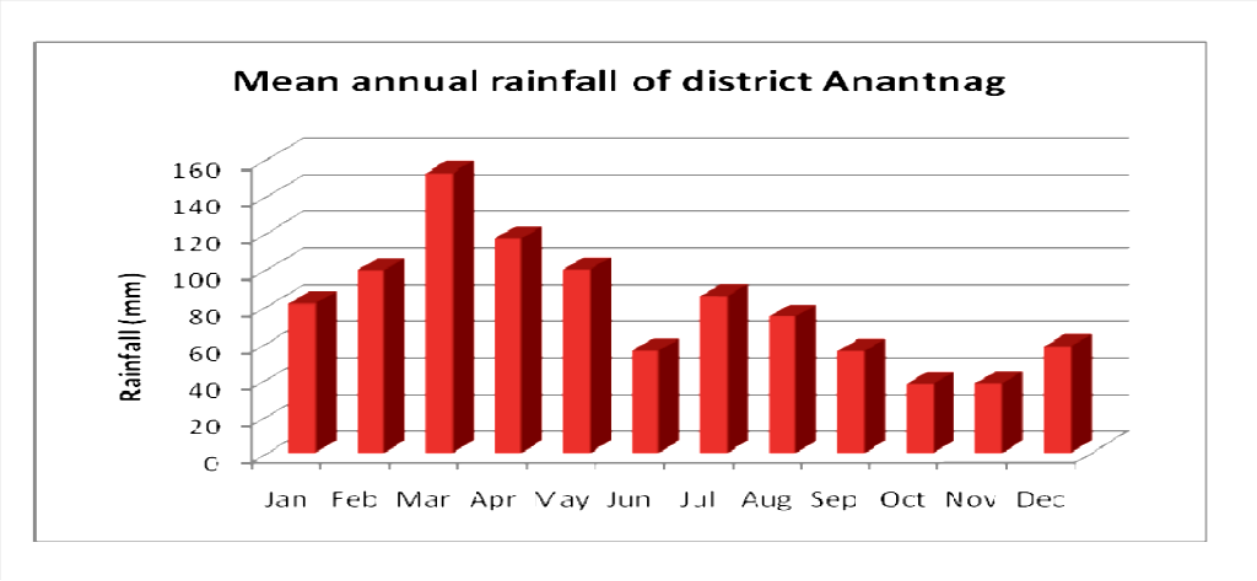


Figure 5.14: Mean Annual Rainfall of the District Anantnag (Source: Agriculture Contingency Plan for District Anantnag)

Table 5.3 gives the rainfall statistics for the Anantnag districts of Jammu and Kashmir for the four monsoon months, southwest monsoon season and annual.

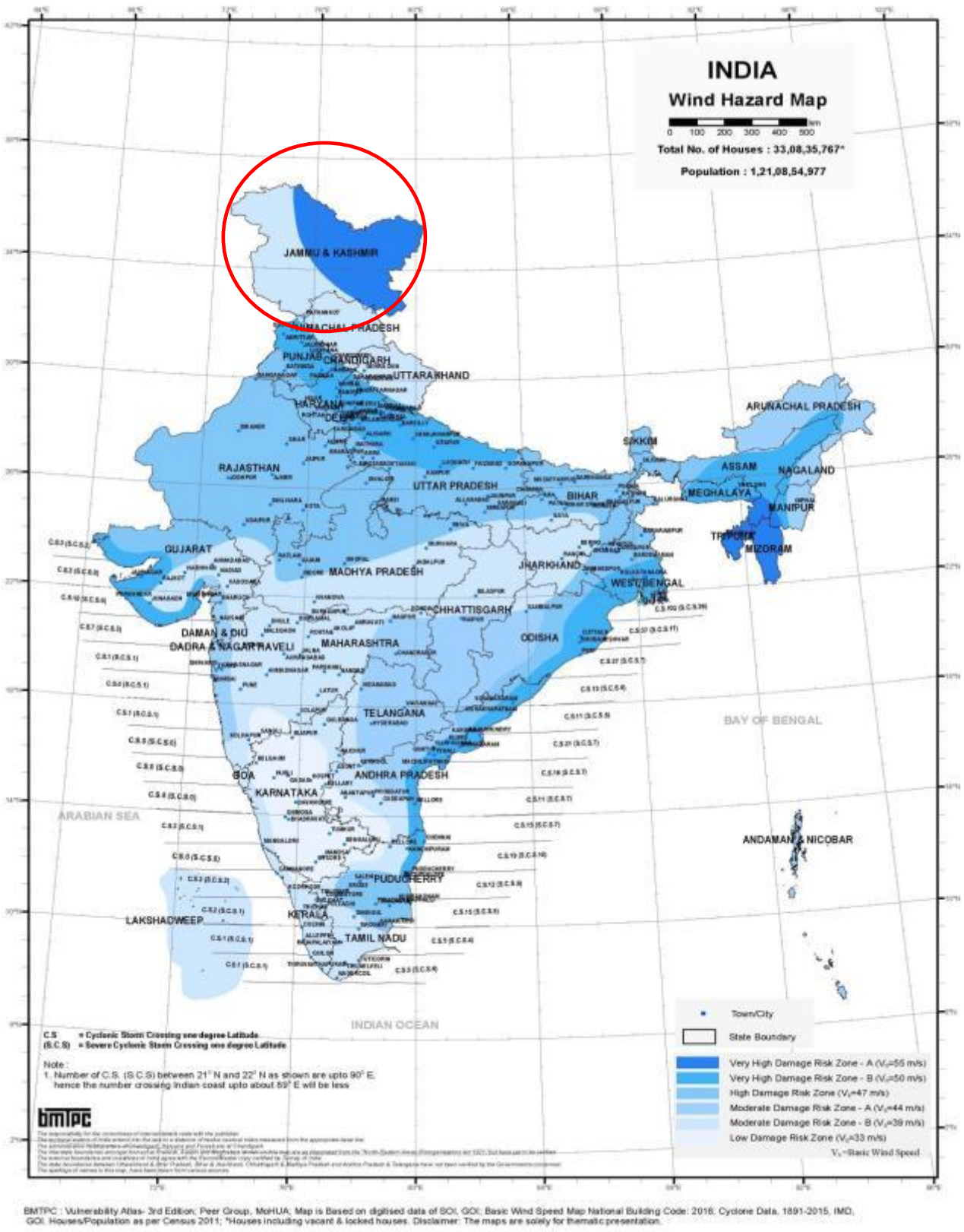
DISTRICT	JUNE		JULY		AUGUST		SEPTEMBER		MONSOON		ANNUAL	
	MEAN	CV	MEAN	CV	MEAN	CV	MEAN	CV	MEAN	CV	MEAN	CV
ANANTNAG	77.4	56.3	90.1	54.2	96.0	55.6	77.7	87.4	341.2	35.7	1054.3	40.7

Source: Met Monograph No.: ESSO/IMD/HS/Rainfall Variability/11(2020)/35

5.6.2. Wind

Wind speed and wind directions have a significant role in the dispersion of atmospheric pollutants and therefore, it affects the ambient air quality of the area. Ground-level concentrations for the pollutants are inversely proportional to the wind speed in the downwind direction, while in the upwind direction no effect is observed and in crosswind directions, a partial effect due to emission sources is observed. Winds are generally light but do gain some strength during the late summer and early part of the monsoon season. In the southwest monsoon season winds from easterly and south-easterly directions are more common with north-westerly blowing on some days. In the post-monsoon and winter seasons, the predominant wind direction is northwesterly. In the summer, winds are generally from the north-westerly direction but on some day they blow from the southeast.

March to July are the windiest month, whereas the October and November months are the calmest months with low wind speed conditions. Most predominant wind direction is north-west from March to May.



BMTPC : Vulnerability Atlas- 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Basic Wind Speed Map National Building Code: 2016; Cyclone Data, 1891-2015, IMD, GOI; Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

Figure 5.15: Wind Hazard map of India (Source: BMPTC)-

5.7. Noise Environment

Noise is perceived as one of the most undesirable consequences of road development. Though the level of discomfort caused by noise is subjective, there is a definite increase in discomfort with an increase in noise levels. The most commonly reported impacts of increased noise levels are interference in oral communication and disturbance in sleep. The main source of noise at the proposed bridge site of Sadoora will be from the operation of machinery during the construction stage. The impact on noise quality due to the project will be of significance in both constructions as well as operation stages.

5.8. Water Environment

Box 5.1: Bringi Nallah

Description – Surface Water Body (Bringi Nallah)
Sadoora bridge is proposed to be constructed on the Bringi Nallah (Right bank tributary of River Jhelum). This is the perennial Stream flowing through the villages of Wayilo, Divalgam, Adigam, Suhuf, Khadiwari, Hillar, Dehrana, Zaldara, Larkipore, Sadoora, Fathepora, Schen, Lalan and Danter. It originates from the glaciers of Sinthan in Anantnag district and confulence with River Jhelum At Danter. This stream is having a total length of 30 km and catchment area of 665.7 km^2 at an Altitude of 1586 m amsl. Its discharge in the upper catchement of High flow (Summer Season) and Low flow (Winter Season) is 57 m^3/s and 30.3 m^3/s respectively.

The Bringi watershed is drained by the Bringi stream which is fed by a number of tributaries, of which the important ones are East Bringi and West Bringi. The streams are mostly fed by seasonal snow melt which generally lasts up to August and September. Bringi stream joins River Jhelum at Anantnag. Three major springs occur in the Bringi watershed, namely Achabalnag, Kokernag and Kongamnag. At Achabalnag, water comes out from the base of Sosanwar hills from two sites that are 150 m apart, with one major outlet carrying 75% of the total discharge. At Kokernag, water comes out from several places along a 50m front at the base of a limestone hill and is channelled through a garden. At Kongamnag, water issues out from Karewas in the form of a pool, at the base of a limestone hill and is channelled through the surrounding villages. The stream is showing dendritic to sub dendritic pattern in upper reaches of catchment and more or less uneven drainage pattern in the lower portions.

To withstand extreme flooding condition at Bringi Nallah, protection around both sides of bridge abutments walls needs to be designed using appropriate protection techniques, which can withstand devastating floods. For bridge protection, simple stone pitching may not be durable and may result in deformation and collapse during heavy rains and flood.

No other surface water body exists within the project influence area (PIA) of the proposed bridge site.

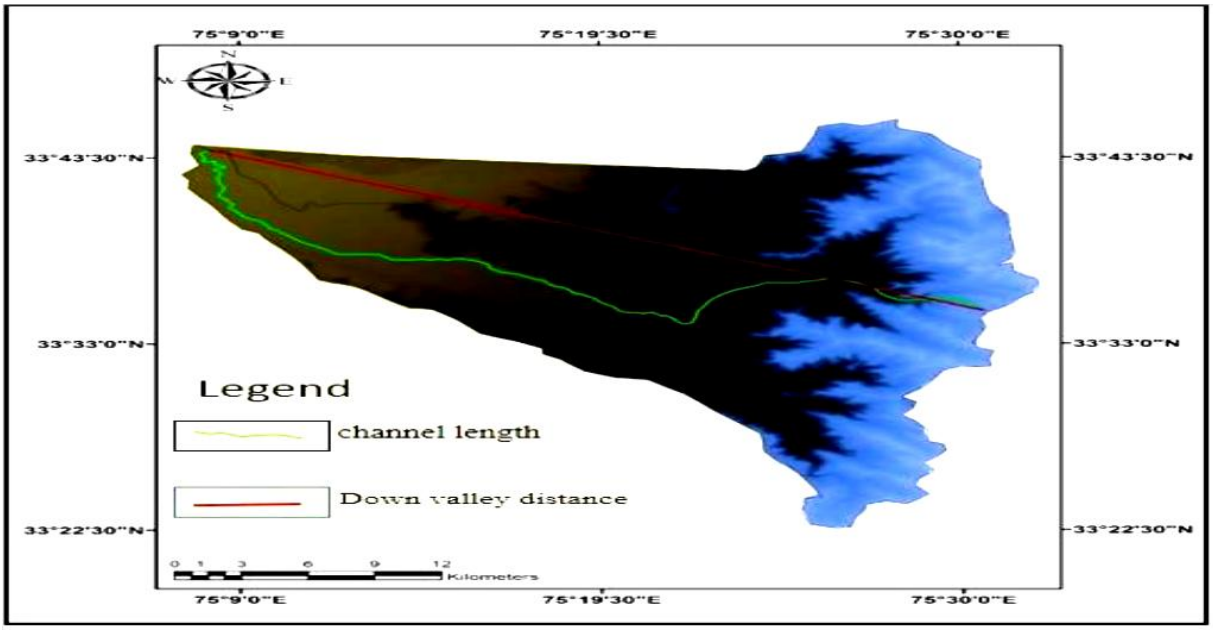


Figure:5.16: Showing sinuosity index of Bringi stream

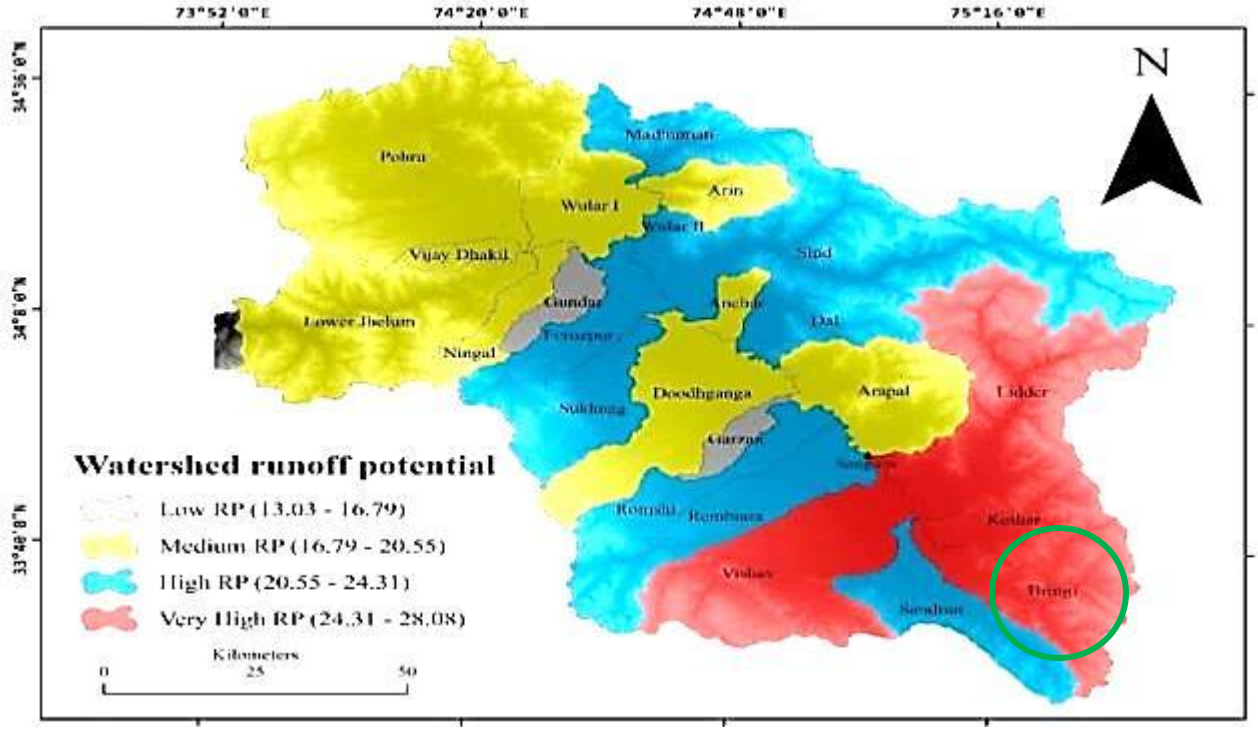


Figure 5.17: Comparative water yield potential categories of the Jhelum basin watersheds.(Green cirle showing vey high runoff potential Bringi Nallah/ Stream)

5.9. Biological Environment

Plant and animal communities are indicators of the environment. They respond not only to one environmental factor but also an interacting group of factors. The plant and animal communities integrate these influences and react sensitively to changes in the balance of environmental stresses. Vegetation is usually the most readily recognized component of ecosystems. Plant communities followed by used often to identify and biological balance through biotic or abiotic pressure or direct interference by man are readily recognized by changes in the physiognomy, structure and species composition of the flora and fauna. Since the ecological integrity is one of the fundamental factors towards attaining a sustainable ecosystem, following biological status survey in the study area (Project Influence Area) of Sadoora bridge site was undertaken.

5.9.1. Forests

The recorded forest in District Anantnag is 2002 sq.km. The proposed construction is located in the Sadoora village of Kamad block. There is no natural forest-like Reserved Forest, Protected Forest or natural heritage sites of national and international importance within the one km of project influence area.

5.9.2. Flora

The prevailing and predominant vegetative species are manly Willow & Poplar trees as observed in the direct project corridor/ area of influence in the study areas of the project area. The local flora in the study area usually denotes trees along the approach road, social forestry and any other sites of green cover in the project area. The commonly observed trees along the approaches from Sadoora side and Project Influence Area are Willow, Poplar, Ailanthus, Acacia (Kikar), Elm etc. No rare or endangered plant species were observed. The dominant species observed and documented during the field study is presented below;

Table 5.4: List of Flora in the Project Influence Area of Sadoora (Commonly found)

S.No	Common Name	Scientific Name
A	Scheduled Trees	
1	Mulberry	*Morus.sp*
2	Chinar	*Platanus oientalis*
A	Scheduled Trees	
3	Willow	*Salix alba*
4	Poplar	*Populus alba, Populus nigra*
5	Ailanthus	*Ailanthus altissima*
6	Acacia (Kikar)	*Robinia pseudo-acacia*
7	Elm (Brenn)	*Ulmus sp.*
8	Eastern Nettle (Bremji)	*Celtis tetrandra*
C.	Grasses & Shrubs	
9	Grass (Bermuda Grass, Doob)	*Cynodon dactylon*
10	Grass (Bakung)	*Poa annua*
11	Grass	*Stipa sibrica*

12	Grass (Bairan Ghaas)	*Chrysopogon gryllus*
13	Herb/ Shrub (false *Chamomile* Phake Ghas)	*Matricaria chamomilla* *Anthemis cotula*
14	Herb (Batak Nyoor)	*Trifolium repense*
15	Shrub (Goola)	*Plantago lanceolata*

5.9.2.1. Protected (Scheduled) Trees of the J&K State.

As per the Jammu & Kashmir Preservation of Specified Trees Act, 1969, Chinar (*Platanus orientalis*), Mulberry (*Morus sp*.) and Walnut (*Juglans regia*) are scheduled and protected trees of Jammu & Kashmir.

5.9.3. Fauna

No forest is present at the project site or in project influence area. There are no Schedule-I terrestrial mammals" species observed near the site. The terrestrial fauna is common domestic animals/ livestock. Animals were mainly observed are domesticated livestock like cows, goats, sheep, etc. and stray dogs and cats.

5.9.4. Wetlands

There is no wetlands site within one km radius of the proposed bridge project.

5.9.5. Ecological Sensitive Areas

The proposed bridge project at Sadoora in District Anantnag is a plain terrain area and floodplain area of River Jhelum and Bringi nallah/ stream. The project corridor (approaches and a bridge site) does not pass through any Biosphere Reserve, National Park, Wildlife Sanctuaries and ecologically sensitive areas.

5.10. Socio-Economic Profile

Anantnag is one of the six district of Kashmir valley situated in its south and south-western direction. Geographically the district lies between 33° 20' to 34° 13' N Latitude and 74° 30' to 75° 35' E Longitude. It is bounded by two districts of Kashmir division, one district of Leh (Ladakh Division) and three districts of Jammu division. The district Srinagar is in the North, district Pulwama in the Northwest, and district Kargil in the Northeast. Three districts of Jammu division are Doda in the East, Udhampur in the Southeast, Ramban and Kulgam in the Southwest respectively. Its entire southern sector and major parts of the eastern region is strewn with thick forests and mountains. The District Anantnag is situated at a distance of 55kms of the south-east of Srinagar.

The district Anantnag has a population of 1,078,692 peoples of which male and female were 55,767 and 518,925 respectively. There was change of 38.58 % in the population compared to population as per 2001. In the previous census of India 2001, Anantnag district records increase of 32.77 % to its population compared to 1991. The density of population as per 2011 is 302 person per sq km with compared to 2001, it was at 283

person per sq km. There are 1,53,640 houses in the district. Most of the people live in rural areas as per census 2011. The average literacy rate of Anantnag in 2011 was 62.69 % compared to 47.59 % of 2001. The male and female literacy were 72.66 % and 52.19 % respectively. With regards to its sex-ratio in Anantnag, it stood at 927 per 1000 male in 2011 and 911 per 1000 male in 2001. The total population of all who lived without roof at the census 2011 numbers to 750 families, while in 2001, 88 families lives on footpath or without any roof cover in Anantnag district. Out of the total Anantnag population for 2011, 26.23 % lives in urban regions and 73.77 % 0f population lives in rural areas of villages. Out of a total population of the district 389684 persons consisting of 36.13 percent are the workers. Out of these 176800 persons constituting 16.39 percent are main workers, 212884 persons constituting 19.74 percent are marginal workers. The percentage of non-workers stands at 63.87 percent, which is 1.66 percent lower than the percentage level of the total non-workers of the State. Schedule caste population is 1826 and schedule tribe population is 116006 in the district as per census 2011.

Sadoora Village is Dooru Sub District's 6th most populous village, located in Kamad Block across Bringi Nallah of Anantnag District, Jammu & Kashmir. It is located 6.7 km towards North from District head quarters Anantnag and 66.3 km from the capital city of Srinagar. Total geographical area of Sadoora village is 3.37 km^2 and it is the 8th biggest village by area in the sub district. The village Sadoora has population of 5482 of which 2874 are males while 2608 are females as per report released by Census India 2011. Population of Children with age of 0-6 is 1137 of which 690 are males while 447 are females. Literacy rate of Sadoora village is 59.86 % lower than state average of 67.16 %.

The Primary Census Abstract which is important publication of 2011 Census gives basic information on Area, Total Number of Households, Total Population, Scheduled Castes, Scheduled Tribes Population, Population in the age group 0-6, Literates, Main Workers and Marginal Workers classified by the four broad industrial categories, namely, (i) Cultivators, (ii) Agricultural Labourers, (iii) Household Industry Workers, and (iv) Other Workers and also Non-Workers. The characteristics of the Total Population include Scheduled Castes, Scheduled Tribes, Institutional and Houseless Population and are presented by sex and rural-urban residence.

Table 5.5: Primary Census Abstract (Census 2011) of Villages in the project area

District/ CD Town Block/ Town	Particulars	Total	Male	Female
Sadoora	Total No. of Households	691	-	-
	Population	5482	2874	2608
	Child (0-6)	1137	690	447
	Schedule Caste	0	0	0
	Scheduled Tribe	2	2	0

District/ CD Town Block/ Town	Particulars	Total	Male	Female
	Literacy	3282	1839	1443
	Total Workers	1794	950	844
	Main Worker	733	683	50
	Marginal Worker	1061	267	794
	Cultivators	655	102	553
	Agricultural labourers	235	120	115
Vesu	Total No. of Households	410	-	-
	Population	3,772	1,952	1,820
	Child (0-6)	899	493	406
	Scheduled Caste	3	1	2
	Scheduled Tribe	-	-	-
	Literates	2,210	1,239	971
	Total Workers	629	552	77
	Main Worker	307	259	48
	Marginal Worker	322	293	29
	Cultivators	31	29	2
	Agricultural labourers	131	127	4
Kamad	Total No. of Houses	453		
	Population	3,265	1,742	1,523
	Child (0-6)	455	255	200
	Scheduled Caste	1	-	1
	Scheduled Tribe	1	-	1
	Literates	2,119	1,257	862
	Total Workers	1,438	816	622
	Main Worker	561	496	65
	Marginal Worker	877	320	557
	Cultivators	194	117	77
	Agricultural labourers	283	74	209
Lallan	Total No. of Household	237	-	-
	Population	2,871	2,049	822

District/ CD Town Block/ Town	Particulars	Total	Male	Female
	Child (0-6)	307	157	150
	Schedule Caste	24	24	-
	Scheduled Tribe	3	3	-
	Literates	2,065	1,713	352
	Total Workers	1,934	1,588	346
	Main Worker	1,577	1,540	37
	Marginal Worker	357	48	309
	Cultivators	201	37	164
	Agricultural labourers	128	4	124

Source: District Census Handbook 2011, Anantnag

5.11. Recreation Resources

The recreational sites include Amusement Park, centre for musical & cultural activities. There is none of any recreational sites nearby of the proposed bridge project.

5.12. Archaeological, Historical, Heritage Sites and Religious/ Cultural Sites

No Archaeologic1l monuments under ASI's listing are located in the proposed bridge site at Sadoora within 1 km of project influence area.

5.13. Sensitive Environmental Receptors

No sensitive environmental receptors are observed close to the bridge site. A mosque is located approximately 350 away from the bridge site. However, a Bringi nallah/ stream is flowing at prposed site on which the sadoora bridge is proposed.

Table 5.6: Sensitive Environmental Receptors near Bridge Site at Sadoora.

S. No	Sensitive Feature	Location	Chainage	Alignment (RHS/LHS)[5]	Distance in meters (m) from the central alignment of the approach road
1	Mosque (Jamia Masjid)	Sadoora side	350 meter away from the bridge site	LHS	350 meters
2	Bringi nallah	Sadoora	Bridge to be constructed over Bringi Nallah	Both sides of the bridge site	-

[5] LHS-Left Hand Side RHS-Right Hand Side

5.14. Covid -19 (Coronavirus) A Pandemic Health Hazard

Overview

The **COVID-19 pandemic**, also known as the **coronavirus pandemic**, is an ongoing global pandemic of coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The outbreak was first identified in Wuhan, China, in December 2019. The World Health Organization declared the outbreak a Public Health Emergency of International Concern on 30 January 2020 and a pandemic on 11 March. As of November 2020, more than 80 million cases of COVID-19 have been reported in more than 188 countries and territories, resulting in more than 1.7 million deaths and about 58 million people have been recovered from the Coronovirus pandemic.

In India, more than 10 million people have been reported for the Covid-19 (Coronavirus) Pandemic with the unfortunate death of more than 148000 people with . Government of India is taking all necessary steps to ensure that we are prepared well to face the challenge and threat posed by the growing pandemic of COVID-19 the Corona Virus. With the active support of the people of India, we have been able to contain the spread of the virus in our country. The most important factor in preventing the spread of the Virus locally is to empower the citizens with the right information and taking precautions as per the advisories being issued by the Ministry of Health & Family Welfare.

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus. Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness.
The best way to prevent and slow down transmission is to be well informed about the COVID-19 virus, the disease it causes and how it spreads. Protect yourself and others from infection by washing your hands or using an alcohol-based rub frequently and not touching your face.
The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes, so it's important that you also practice respiratory etiquette (for example, by coughing into a flexed elbow).

At this time, there are no specific vaccines or treatments for COVID-19. However, many ongoing clinical trials are evaluating potential treatments. WHO will continue to provide updated information as soon as clinical findings become available.

Prevention

To prevent infection and to slow transmission of COVID-19, do the following:

- Wash your hands regularly with soap and water, or clean them with alcohol-based hand rub.
- Maintain at least 1-metre distance between you and people coughing or sneezing.
- Avoid touching your face.

- Cover your mouth and nose when coughing or sneezing.
- Stay home if you feel unwell.
- Refrain from smoking and other activities that weaken the lungs.
- Practice physical distancing by avoiding unnecessary travel and staying away from large groups of people.

Symptoms

COVID-19 affects different people in different ways. Most infected people will develop mild to moderate illness and recover without hospitalization.

Most common symptoms:

- fever.
- dry cough.
- tiredness.

Less common symptoms:

- aches and pains.
- sore throat.
- diarrhoea.
- conjunctivitis.
- headache.
- loss of taste or smell.
- a rash on the skin, or discolouration of fingers or toes.

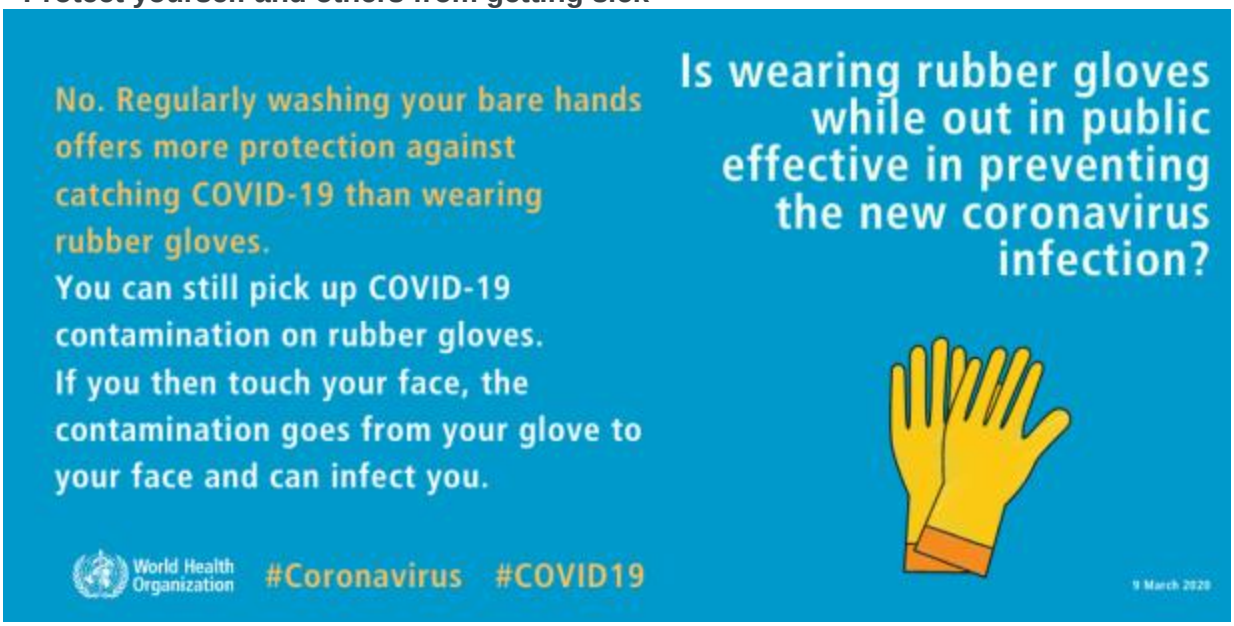
Serious symptoms:

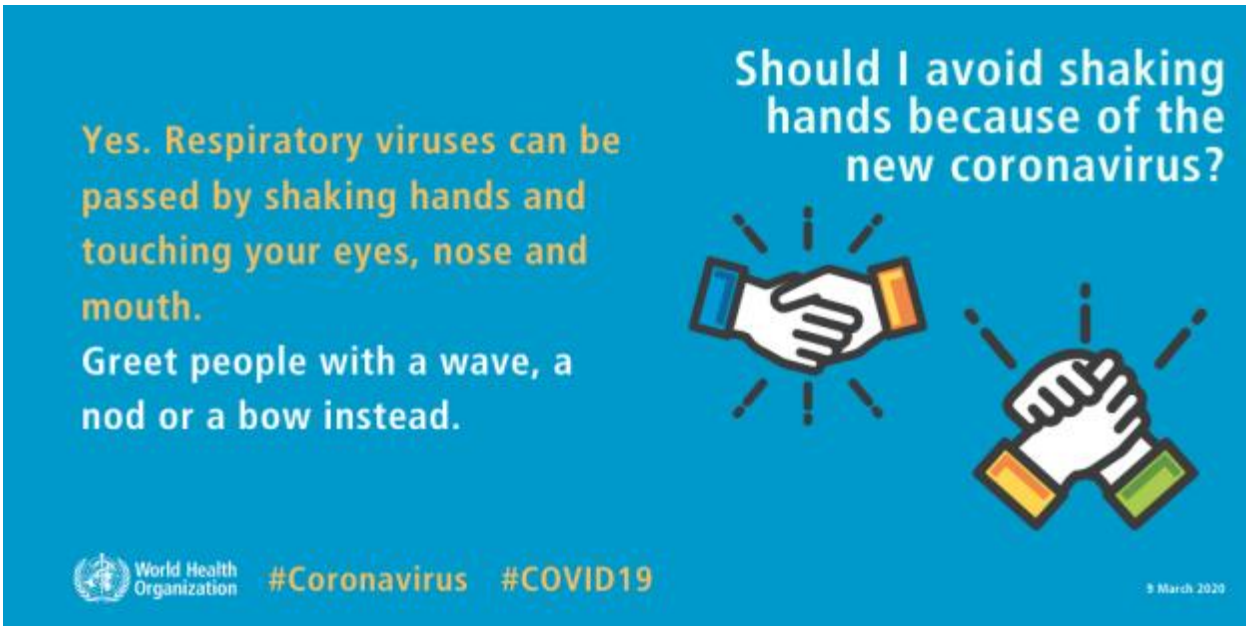
- difficulty breathing or shortness of breath.
- chest pain or pressure.
- loss of speech or movement.

Seek immediate medical attention if you have serious symptoms. Always call before visiting your doctor or health facility. People with mild symptoms who are otherwise healthy should manage their symptoms at home. On average it takes 5–6 days from when someone is infected with the virus for symptoms to show, however it can take up to 14 days.

Covid-19 (Coronavirus) Public Awareness through Info-Graphics Posters
World Health Organization (WHO) COVID-19 Info-graphics Social Safety Message

"Protect yourself and others from getting sick"






Protect yourself and others from getting sick
Wash your hands
• after coughing or sneezing
• when caring for the sick
• before, during and after you prepare food
• before eating
• after toilet use
• when hands are visibly dirty
• after handling animals or animal waste
World Health Organization


Protect yourself and others from getting sick
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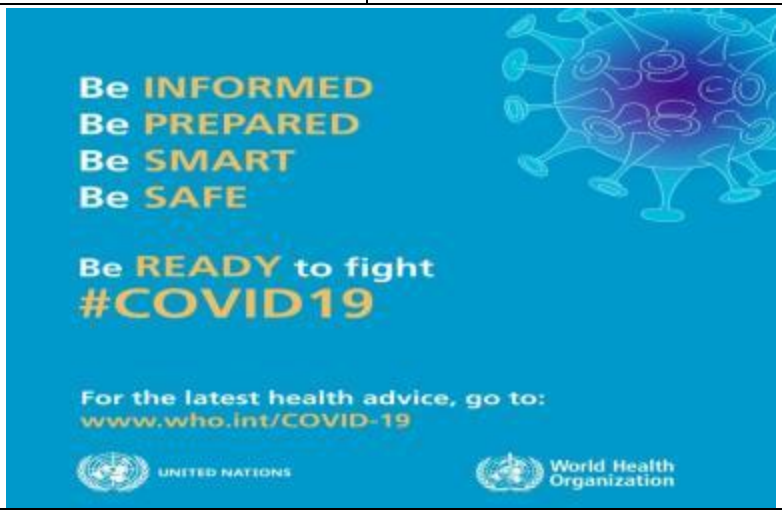
• after handling animals or animal waste
World Health Organization


Wash your hands
Wash your hands with soap and running water when hands are visibly dirty
If your hands are not visibly dirty, frequently clean them by using alcohol-based hand rub or soap and water
World Health Organization


Be SUPPORTIVE
Be CAREFUL
Be ALERT
Be KIND
Be READY to fight
#COVID19
For the latest health advice, go to:
www.who.int/COVID-19
UNITED NATIONS
World Health Organization


Be INFORMED
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Be SMART
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6. POTENTIAL ENVIRONMENTAL IMPACTS

6.1. Project Impacts & Issues

This section presents identification and evaluation of anticipated impacts during pre-construction, construction and operation phases of the proposed construction of 3x30 meter span bridge on Bringi Nallah at Sadoora in District Anantnag. The planning of proposed project intervention points towards the impacts in the pre-construction, the construction stages and the operation stages. The subsequent sections deal with the prediction of impacts due to the project on the physical, biological environment and socio & cultural environment Tables 7.1 & 7.2 below presents the general environmental impacts expected due to the proposed Sadoora bridge construction. Impacts have been assessed based on the information collected from the project activities as per design parameters/ drawings collected from the EPC contractor which is awarded to M/s Khanday Infrastructures Pvt. Ltd. screening & scoping of environmental attributes, and baseline data collected during the EIA study. The quantum of all the impacts on physical & biological and socio-economic environment has been discussed in detail in subsequent paragraphs.

The impact matrix for the project is given below in Table 7.1;

Table 6.1: Impact Matrix for Project

S. No.	Parameters	Const. of 3x30m bridge at Sadoora, Anantnag.
	Negative Impacts	
1.	Hand Pumps	Nil
2.	Pond Area	Nil
3.	Relocation Religious Properties	Nil
4.	Transfer of Agriculture Land (ha)	Nil
5.	No of trees to be felled	Nil
	Positive Impact	
1.	Enhancement Sites (Nos.)	Plantation and beautification of median and incidental spaces.
A.	Cultural/Religious Properties (Nos.)	-
B.	Silt and debris/waste traps at the outfall of drains	-
C.	Safe Access/traffic calming at Educational Institutes, hospitals etc (Nos.)	-
D.	Trees Saving (Nos)	-
E.	Wastes Reuse	-
F.	Proposed Plantation	Yes (Pine plantation near appoaches)
G.	Proposed Compensatory Plantation (if tree cutting requirement arises)	-
3.	**Bridge/ Approach Road Safety Measures**	
A.	Intersection/Access Improvement	2 (Approaches)
B.	Signage Boards (Nos.)	As per IRC Guidelines
C.	Sidewalk	Available (1.5m both sides)
D.	Traffic Calming Measures Locations	-

Anticipated environmental impacts on the physical, biological and socio-economic environment have been discussed in details in subsequent paragraphs.

Table 6.2 : Anticipated Impacts on Physical & Biological Environment

Project Activity	Planning and Design Phase	Pre-construction Phase		Construction Phase					Bridge/ Approach Road Operation
Environmental component Affected		Removal of Old Structures	Removal of trees and vegetation	Earth works including and borrow area	Laying of pavement	Vehicle & Machine operation & maintenance	Asphalt & crusher plants	Sanitation & Waste (labour campus)	Vehicle operation
Air		Dust generation during dismantling	Reduced buffering of air pollution, Hotter, drier microclimate in theproject area	Dust generation	Asphalt odour and emissions	Dust, Pollution	Soot, Odour, Gaseous Dust, Pollution	Odour / Smoke from Cooking of food	dust, véhiculer emissions
Land	Impact on productive land if land acquisition required	Generation of debris	Erosion and loss of topsoil	Erosion and loss of topsoil	Land contamination due to improper disposal of bitumen waste/ solid wastes	Contamination by fuel and lubricants and compaction	Contamination and compaction of soil at camp & Plants	Contamination from Wastes and sewage	--
Water	Impact on Water Sources/ Surface Water Body (Bringi nallah/ Stream)	Siltation due to loose earth	Siltation due to loose earth	Alteration of drainage, Break-in continuity of ditches Siltation, Stagnant water pools in quarries and borrow area.	Reduction of groundwater recharge area	Contamination by fuel and lubricants	Contamination by asphalt leakage or fuel	Contamination from wastes and untreated sewage disposal	Spill Contamination by fuel, lubricants and washing of vehicles
Noise		Noise Pollution	High Noise due to machinery	Noise Pollution	Noise pollution	Noise pollution	Noise Pollution	--	Noise from traffic movement
Flora	Tree cutting		Loss of Biomass and vegetation cover due to Removal of vegetation	Lowered productivity loss of ground for vegetation	--		Lower productivity Use as fuel wood	Felling trees for fuel	Compensatory plantation and nallah bank protection measures

Table 6.3: Anticipated Impact on Social and Cultural Environment

Project Activity	Planning and Design Phase	Pre Construction Phase			Construction Phase					Operation	
										Direct	Indirect Induced development
Env. Component Affected	Design decisions & Implementation policies	Land acquisition	Removal of Structures	Removal of trees & vegetation	Earth works including quarrying	Laying of Pavement	Vehicle & machine operation & maintenance	Asphalt and crusher plants	Labour Camps	Vehicle operation	-
Agricultural land	-	Change in land prices	Change in land economic value	Loss of standing crops	Loss of productive land	-	-	Dust on agricultural land reduce n productivity	-	-	Conversion of Agricultural Land
Buildings and built structures in Approach ROW	-	-	Loss of structures, Debris generation, Noise and Air pollution	-	Dust Deposition on structures	-	Noise, vibration may cause damage to structures near to the road	Dust accumulation on building and structure	-	Vibration and noise	Change in building use and characteristics
People and Community	Impact on nearby community structure,	-	Impact on people and loss of livelihood	Loss of shade & community tree.	Health hazard to people	Odour and dust	Noise and Air pollution and discomfort	Air and noise pollution and discomfort	Community clashes with migrant labour	Risk of an accident due to an increase in speed on the smooth carriageway	Induced pollution and an increase in the accident rate
Cultural Assets	-	Impact on access to cultural structure	Displacement loss of structure from RoW	--.	--	-	--	Dust accumulation	-	Damage from vibration & air pollution	-
Utilities and Amenities	-	-	Interruption in supply	-	-	-	Damage to utility and amenities	Dust accumulation on water bodies	Pressure on existing amenities		-
Labour's Health & Safety	-	-	-	-	Stagnation of water and disease	Asphalt odour and dust	Accident and injuries to labour/public	Impact on health due to inhale of dust	Health hazard from raw sewage disposal /wastes	Safety issues	-

6.2. Consideration of Environmental Impacts During the Design Stage of the Bridge Project

6.2.1. Hydrological Study

The Sadoora village was connected with main district with a 6x20 ft span submersible cause way, which was washed away due to devastating flood of September 2014. This shows the high discharge with turbulent flow regime of the Bringi Nallah which completely dislodged the causeway at the proposed bridge site of Sadoora. Therefore, hydrological study and runoff calculations for extreme flood/rains under the climate change scenarios is carried out and considered for designing of the proposed 3x30m Bridge at Sadoora with excess runoff flow/flood safeguard. No hydrological data were available for the Bringi Nallah and therefore the hydrological study was carried out and calculated based on the standard methodology of discharge data.

6.2.2 Hydrological Data of Bringi Nallah at Sadoora

Table 6.4: [6]Flood Discharge from X-sectional Area and observed Velocity for Sadoora Bridge

Chainage	Distance	HFL	BedLevel	(HFL-BL)	Area	Diff. in BL	Wetted Perimeter
m	X (m)		(BL)	m	m^2	Y(m)	√X^2+Y^2
51.41	0	1627.81	1626.41	1.4	0.00	0	0.00
59.43	8.02	1627.81	1625.47	2.34	15.00	0.94	8.07
63.03	3.6	1627.81	1626.03	1.78	7.42	-0.56	3.64
65.19	2.16	1627.81	1625.12	2.69	4.83	-0.91	2.34
68.68	3.49	1627.81	1624.76	3.05	10.02	-0.36	3.51
82.92	14.24	1627.81	1625.23	2.58	40.09	0.47	14.25
90.91	7.99	1627.81	1625.23	2.58	20.61	0	7.99
103.93	13.02	1627.81	1624.68	3.13	37.17	-0.55	13.03
105.40	1.47	1627.81	1625.17	2.64	4.24	0.49	1.55
110.90	5.5	1627.81	1625.51	2.3	13.58	0.34	5.51
125.33	14.43	1627.81	1626.20	1.61	28.21	0.69	14.45
134.47	9.14	1627.81	1626.38	1.43	13.89	0.18	9.14
142.78	8.31	1627.81	1626.41	1.4	11.76	0.03	8.31
				A=	*206.82*	*P=*	*91.80*
	Mean Velocity =			*2.50*	*m/s*		
Discharge of the nallah			*517.04*	*Cumecs*	*OR*	*18259.21*	*Cusecs*

[6] Note: Highest Flood Level (as per local enquiry) is 1627.81

6.2.3 Scour Depth Calculations for Sadoora Bridge Abutment

1	Maximum Discharge (cumec)	517.043
	Increase by 30% as per IRC 78-2000	672.16
2	Maximum Velocity (m/sec) discontinuation	2.50
3	HFL (m)	1627.810
4	Strata - Gravel/Cobbles Mixed with Non plastic fines . For the purpose of calculation the size of boulder is assumed as 20mm Average size of pebbles = db (mm)	2.00
5	[7]Silt Factor = Ksf = 1.76 x (db)^0.5	2.49
6	Clear waterway - Clear distance between piers/abuts (m)	89.100
7	Assuming the flow is concentrated in active channels only Discharge per unit width = Db (cumec/m)	7.544
8	Scour Depth = 1.34 x { (Db ^ 2) ^(1/3) } / { (Ksf) ^ (1/3) } (m) (Para 9.3.2 of IRC:SP:13-2004	3.803
9	According to IRC: 78-2000, CL:703.3 and IRC: SP: 13-2004, CL: 10.1 the maximum depth of scouring Dsm below HFL for the design of abutment having individual foundation without any floor protection may be considered for: 1. Flood without seismic combination :(Dsm= 1.27 dsm) 2. Flood with the seismic combination: for considering load combination of flood and seismic loads, Dsm= 0.9 times Dsm calculated at above at 1.	
10	Maximum Scour Depth for Case 1 (Flood without seismic combination) (m)	4.830
	Maximum Scour Depth for Case 2 (Flood with seismic combination) (m)	4.347
11	Maximum Scour Level (m)	1622.98
12	Average Bed Level a Abut Location (m)	1626.40
13	Maximum Founding Level (m) (Min. 2 meters below Max. Scour as per IRC-78-2000)	1620.98

6.2.2. Erosion at Bridge Abutments during Floods/Rains

Bringi Nallah is flowing across the project area which experienced flooding in floodplain area with high discharge in September 2014 resulting into dislodging/ washing away of a 6x20 feet span causeway at Sadoora. As per consultation with locals, the Bringi nallah experience high discharge/ flooding condition in nallah during episodes of heavy rainfall as evident in September 2014 floods.

To withstand extreme flooding condition at Bringi Nallah, protection around both sides of bridge abutments walls needs to be designed using appropriate protection techniques, which can

[7] As per soil report (Restricted)

withstand devastating floods. For bridge protection, simple stone pitching may not be durable and may result in deformation and collapse during heavy rains and flood.

6.2.3. Sliding of Backfilling with Abutments

Backfilling with abutments of the proposed bridge at Sadoora may slide due to uplift pressure of percolated rainwater. Therefore, while designing of abutments, weep holes (80 mm to 100 mm dia) with minimum 600 mm filter media for draining of rainwater may be considered to prevent sliding of backfilling and uplift pressure at abutments.

6.2.4. Seismic Factor in Design Bridge

The proposed bridge site at Sadoora on Bringi Nallah in Anantnag District is located in Seismic Zone V and prone to high-intensity earthquakes. While designing of bridge components, suitable seismic load factor must be taken into consideration. Anti-dislocation devise for slabs/spans should also be considered in bridge design/construction to withstand horizontal force during high-intensity earthquakes.

6.2.5. Snow Load on Proposed Bridge Site

The proposed of 3x30 meter bridge at Sadoora in Anantnag District receives heavy snowfall which normally occurs during extreme winter. The design team of the contractor has considered the design parameters based on the snow load and included in the design aspects..

6.2.6. Embankment Slopes and Spoils

Erosion problems may occur on exposed slopes of the nallah bank, newly constructed slopes and earth fills depending on soil type, angle of slope, the height of slope and climatic factors like the wind (direction, speed and frequency) and rain (intensity and duration). Soil erosion will add siltation to the runoff during the monsoon season.

6.2.7. Excavation Activity of Nallah Beds (Foundation Wells)

Construction of bridges involves the excavation of water channels bed and banks for the construction of the foundation and piers. If the residual spoil is not properly disposed of, increased sedimentation in downstream of the bridge may take place during the monsoon. Also, the bridge-end fills require armouring to ensure minimum gullying and slumping.

During the construction period, some amount of drainage alteration and downstream erosion/siltation is anticipated. Some of these alterations may be because of the construction of temporary traffic detours/diversion. Except for these temporary works, in almost all cases there should be an improvement in the drainage characteristics of the surrounding area due to improved design and added culvert/ditch capacity.

6.2.8. Quarries and Borrow Areas

The excavation of quarries and borrow pits used for obtaining aggregate materials and soil for approach road construction can cause direct, and indirect long-term major adverse impacts on the environment. While the loss of productive soil is the most direct negative impact from borrow areas, other significant indirect negative impacts can also occur. Since most of the construction materials would be available from existing quarries nearby, relatively few new borrow areas may be required. One of the long-term residual adverse impacts of borrow pits not reclaimed, is the spread of mosquitos. Mosquitoes breeding and multiplying in stagnant water that collects in these pits can affect human health in villages in close vicinity.

6.3. Anticipated Impacts During Construction and Operation Stages

Anticipated impacts on various environmental components during construction and operation phases of the proposed bridge at Sadoora in Anantnag District are described below:

6.3.1. Impact on Topography and Physiography

The proposed 3x30 meter span bridge at Sadoora in Anantnag District will be constructed near the existing temporary bridge (bailey type) without any land acquisition. Impact on the topography and physiography of the area would be negligible during construction and operation phases of the proposed bridge.

6.3.2. Impact on Soil

Soil is one of the most important components of the physical environment. During construction of the proposed bridge, the potential impacts on soil are discussed below

Construction Phase

During construction of the proposed bridge at Sadoora in Anantnag District, the contamination of the soil is anticipated due to improper disposal of oily wastes, solid wastes, spillage of fuel oil at camps site, open defecation by construction workers, raw sewage disposal from the camp site, etc. Improper disposal of used oil generated from the maintenance of vehicles, construction equipment and DG sets at the campsite/batching plant may also result in soil contamination.

Operation Phase

No impact is anticipated on the soil during the operation phase of the proposed bridge.

6.3.3. Impact on Water Resources

Construction Phase

The proposed 3x30m span bridge at Sadoora will be constructed on the Bringi Nallah. The foundation excavation debris and construction wastes on the course of nallah may also affect surface water hydrology and flow. Excavation of slurry from the foundation wells may result in contamination and turbidity issue of the Bringi nallah. Proper management of excavation of foundation wells and disposal of the slurry.

Operation Phase

During the operation phase, drainage pattern or hydrology of the Bringi Nallah will not be affected. Therefore, no impact is anticipated during the operation phase.

6.3.4. Degradation of Water Quality

Construction Phase

The surface and groundwater quality due to the proposed bridge at Sadoora may be degraded mainly in the following ways:

(i) by improper disposal of solid wastes, slurry during the excavation of foundation wells, oily wastes, used oil waste, etc.
(ii) by raw sewage generated from camp, batching plant and bridge construction site,
(iii) open defecation by workers on the course of Bringi Nallah.

During the construction phase, debris and construction wastes, if not cleared, may deteriorate surface water quality of the Bringi Nallah.

Operation Phase

During the operation phase, there is no probability of degradation of water quality during normal operations of the proposed bridge at Sadoora.

6.3.5. Impact on Ambient Air Quality

Construction Phase

During the construction phase, there will be two main sources of air emissions *i.e.* mobile sources and fixed sources. Mobile sources are mostly vehicles involve in construction activities of the proposed bridge while emissions from fixed sources include diesel generator set, construction equipment and excavation activities, those produce dust emissions.

A certain amount of dust and gaseous emissions will also be generated during the construction phase from the batching plant. The pollutants of primary concern include Fine Particulate Matter ($PM_{2.5}$) and Respirable Particulate Matter (PM_{10}). However, suspended dust particles may be coarse and will be settled within a short distance of the construction site. Therefore, the impact on ambient air quality will be temporary and restricted within the closed vicinity of the construction activities for the proposed bridge and batching plant.

A considerable amount of exhaust emissions of carbon monoxide (CO), unburned hydrocarbon, sulphur dioxide (SO_2), particulate matters, nitrogen dioxide (NO_2), etc, will be generated from the DG set, construction equipment and batching plant. Batching plant should be located away from the populated areas and be fitted with the air pollution control equipment and emission shall meet National Emissions Standards/J&K State Pollution Control Board standards. Further, the batching plant must be sited at least 250 m in the downwind direction from the nearest human settlement.

Ambient air quality monitoring should be carried out during the construction phase. If monitored parameters are above the prescribed limited, suitable control measures must be taken.

Operation Phase

No adverse impact is anticipated on ambient air quality during the operation phase. Traffic movement on the bridge will result in vehicular emissions, which will be mingled with the ambient air within 500 m from the bridge.

6.3.6. Impact on Noise

Construction Phase

The proposed construction of the bridge at Sadoora in Anantnag District will be confined to the project site. During the construction phase, the noise will be generated from the batching plant, operation of construction equipment's at a bridge construction site, operation of DG sets and vehicles transporting construction materials. During the construction phase, the noise levels are expected to be increased between 10-20 %. However, these noise levels will be temporary and intermittent mostly during works in day time only.

Table 6.6: Source of Noise Pollution and Impact Categorization.

S.No.	Phase	Source of Noise pollution	Impact categorization
1.	Pre-construction	• Man, material & machinery movements • establishment of labour camps, onsite offices, stockyards and construction plants	• all activities will last for a short duration and also shall be localized in nature

2.	Construction Phase	• Plant Site - stone crushing, asphalt production plant and batching plants, diesel generators etc • Work zones - Community residing near to the work zones	• Plant Site: Impact will be significant within 250m. • Work zones: Such impacts again will be temporary as the construction site will go on changing with the progress of the works.

Construction - Related Noise

With regards to noise-related impacts, the construction phase is a difficult stage. During this period noise impacts will be high due to operation of construction machinery and the conflict with the regular traffic (through access road to the bridge construction site) requiring more honking of vehicle horns and more stop and go (acceleration and deceleration process).

All temporary noise-related impacts near the project will occur during the construction activities. This will occur along the construction zone as well as construction camps, hot mix plants, WMM plants, crusher and quarry sites (if required).

Typical noise levels associated with the construction is given in **Table 6.7**. The magnitude of the impact will depend upon the specific types of equipment to be used, the construction methods employed and the scheduling of the work.

Table 6.7: Typical Noise Levels Associated with Highway Construction

S.N.	Activity Noise Levels	(d(B)A)
1.	Grading & Clearing	84
2.	Excavation	89
3.	Foundations	88
4.	Finishing of Road	84

Operation Phase

During the operation phase, the noise will be generated through the movement of the vehicles on the bridge.

6.3.7. Impact on Management of Spills and Wastes

During the construction of the proposed bridge at Sadoora, demolition wastes excavated earth from the foundation, construction derbies, used oil from the maintenance of DG set and construction equipment, lube oil containers, solid waste, etc will be generated. Such wastes may cause deterioration of soil quality and surface water/runoff flow in Bringi Nallah. These wastes must be collected and disposed of appropriately.

6.3.8. Impact on Flora, Fauna and Ecosystem

During the construction and operation phases of the proposed bridge at Sadoora, no adverse impact is anticipated on flora and fauna as no tree cutting is involved in the project.

6.3.9. Impact on Socioeconomic Environment

There is no land acquisition required for the proposed bridge construction. The construction and operation phases of the proposed bridge will have a beneficial impact on the social environment. Increase in income of local people is expected as some of local unskilled, semiskilled and skilled persons may gain direct or indirect employment during the construction phase of the proposed bridge. Since the immigration of the workforce during the construction phase is likely to be very small, the social impacts on literacy, health care, transport facilities and cultural aspect are expected to be insignificant.

Construction stage

6.3.9.1. The influx of Construction Workers

Although the construction contractors are likely to use un-skilled labour drawn from local communities, use of specialized construction equipment will require transporting personnel not likely to be found locally. Sudden and relatively short-lived influxes of construction workers to communities in the project area will have the potential to 'skew' certain demographic variables and the traditional social coherence.

It is anticipated that the construction labour inputs for the construction of the proposed bridge at Sadoora in Anantnag District will be in the order of about 30-40 persons per day. However, this number will fluctuate and the number in any particular activities will be lower.

6.3.10. Economic Impacts

The relatively short-lived economic impacts of the construction phase are likely to be experienced in local communities for the duration of construction, as workers will make everyday purchases from local traders. This is likely to give a short-lived stimulus to these traders that will disappear as soon as the construction is complete. Wider, flow-on economic impacts will be experienced in other sectors of the economy as a result of the purchase of construction materials and the payment of wages and salaries.

Operation Stage

During the operation phase, the proposed bridge will provide safe movement of traffic and reduce the travel time. The proposed bridge will also facilitate the movement of people and vehicles and ease of access due to the construction of Sadoora Bridge. The agricultural produce in the Sadoora, Kamad, and adjoining areas will be easily procured and delivered to the main town and city centre. Also, the proposed bridge is more essential as the connecting road is vital in reaching to agriculture fields and orchids. Therefore, a positive impact is anticipated on the socio-economic environment during the operation phase.

6.3.11. Impact on Religious Structures and Cultural Properties

No religious place is located near the bridge site.

6.3.11.1. Common Property Resources

The partial or total impact on these common property resources is anticipated due to the construction of the project. However, no such resources were observed near the bridge. One mosque is located approximately 350 meters away from the bridge site (LHS of approach road-Sadoora side) and does not fall into the impact zone.

Adverse socio-economic impacts include all disruptions on the social and economic interactions of communities due to the project. This involves an effect on both the adjacent communities (mostly direct) as well as the nearby communities (mostly indirect).

6.3.12. Impacts Relating To Human Health & Safety

Poor sanitation arrangement and improper methods used for collection and disposal of solid wastes and effluent, accommodation without ventilation, unhygienic food, electrical safety, the risk from mosquito and reptile etc at the construction workers camp will impact human health and safety.

6.3.13. Safety Aspects

Increase of incidence of accidents is anticipated due to disruptions of traffics movements in the construction work zones at bridge site and access road. Safety for workers at the worksite and health problems at Labour camps

- Occupational health and safety risks to workers due to inadequate housekeeping and unsafe work practices at work sites.
- Health problems to workers due to inadequate sanitation and un-healthy environment at labour camps/plant sites.

6.3.14. Impact of Pandemic Disease Covid-19 (Coronavirus)

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus. Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness.

In the workplace of construction sites, labour campsites, site offices etc., the best way to prevent and slow down transmission is be well informed about the COVID-19 virus, the disease it causes and how it spreads. To protect yourself and others from infection by strictly following the COVID-19 Standard Operational Procedures (SOP's) of the Government protocol and guidelines from World Health Organization (WHO), International Labour law (ILO) and other agencies.

7. ANALYSIS OF ALTERNATIVES

This chapter presents a comparative analysis of various alternatives considered to avoid or minimize impacts that would be inevitable if technically (based on design and geometrics) best-fit alignment is followed. The component 2 of Jhelum and Tawi Flood Disaster Recovery Project" is 'to restore and improve the connectivity disrupted due to the disaster (deluge of September 2014) through the reconstruction of damaged infrastructure like bridges. The infrastructure will be designed to withstand earthquake and flood forces as per the latest official design guidelines. The affected areas will benefit from the restored access to the markets thereby increasing the economic growth in these areas and timely access to health and education services. Based on the above assessment, bridge design parameters have been adopted as per the latest official design guidelines mandated for the seismic Zone-V as per BIS standards for the construction of the proposed bridge at Sadoora in District Anantnag. The synoptic descriptions of the design parameters are presented in Chapter 2 are flexible in design to avoid most of the impacts. An analysis of various alternatives is attempted to arrive at the technically and Environmentaly and socially best-fit alternative.

The analysis of alternative is a documented illustration/evidence to show and ensure that final decisions taken are;

- Following the project objectives.
- In compliance with the country laws, policies and legal requirements.
- To confirm that the project is actually needed and not imposed and not to lead any major loss or destruction to natural resources either directly or indirectly.
- To confirm that the implementation of the project will not lead to any major crisis or conflict in the community during implementation.
- To confirm that the Public/Government financial resources are not wasted for wrong projects/infrastructural works without the consideration of views of the stakeholders.
- To confirm that no individual and biased approach (for example implementation of a personal ambition using public money in a secretive manner) from the responsible implementing official/s has taken place.
- In accordance with the actual requirements of the local people.
- Following the World Bank policies and procedures.
- To create climate-resilient and flood-proof bridge/road infrastructure.

These were also an integral part of the analysis of alternatives throughout the project preparation.

As per environmental screening exercise and assessment survey/ database, the essential bridge connectivity is missing between Sadoora village and the rest of the adjoining habitations/ villages due to the lack of proper bridge connectivity. The Sadoora village was connected with main district with a 6x20 feet span submersible cause way, which was washed away due to devastating flood of September 2014.

The land acquisition and resettlement is not involved and by this factual narrative

Several alternatives are analyzed for avoiding localized environmental impacts & arriving at the best-fit alignment.

7.1. With or Without Project Scenario

The 'with' and 'without' project scenarios are analyzed for the development of the state by the back-drop of the requirement of reliable quality infrastructure for sustained growth economy and consequent well-being of local people.

Providing better connectivity will ensure that goods and people from areas covered by the bridge construction can move in and out of the areas quicker and save time. Increased trade and commerce activity are expected as agriculture and horticulture are the main activity for growth. By construction of bridge, climate-resilient and flood-proof infrastructure. The project has been designed to connect the various settlements with better access.

If the proposed bridge project at Sadoora is not constructed, there is every likelihood that the people of the project area will continue to suffer and quality of life will be deteriorated and impacted by flood further. The Sadoora village was connected with main district with a 6x20 feet span submersible cause way, which was washed away due to devastating flood of September 2014 and a temporary single lane bailey bridge was installed. As a present scenario of no proper bridge exists, people will continue to suffer due to the lack of proper bridge connectivity. As residents and village habitants have to cross Bringi nallah and to reach Sadoora and district HQ and other towns, it is extremely difficult to cross this nallah during rainy season and episodes of the heavy downpour. In the absence of the project, the J&K Govt may find it difficult to generate resources for such a bridge infrastructure which is required and for the benefits of the people at large. Increased air pollution, is anticipated mainly attributed to the movement of construction vehicles which is temporary and site-specific. Noise levels will rise due to the operation of machinery and construction vehicles as well.

Therefore, the "with" project scenario, with its minor adverse impacts is more acceptable than the "without" project scenario which would mean an aggravation of the existing problems. Potential benefits of the construction of the bridge project at Sadoora are substantial and far-reaching both in terms of the geographical spread and time. The bridge is a major/vital connecting link between Sadoora, Kamand , Vessu, Lallan, Ganoora, Ugjan and Asajipora besides connecting district headquarter Anantnag. The proposed bridge is to be constructed on Sadoora, Kamand Road connecting vast area to NH 44.The bridge will also serve indirectly to thousands of other souls of the other adjoining areas as it links these areas with National Highway and district head-quarter.

Hence, it is clear that the implementation of the project will have definite advantage to the area in order to create climate resilient and flood proof Bridge.

8. PUBLIC CONSULTATION AND DISCLOSURE

8.1. Introduction

Public consultation/meeting was conducted in Sadoora village in September 2018 and June 2020 for the proposed "Construction of 3x30 meter Single Span Steel Trussed Girder Bridge on Bringi Nallah at Sadoora village in District Anantnag. Consultation has been followed in accordance with the World Bank's ESMF-JTFRP protocol which is the pre-requisite for the environmental screening process and environmental assessment. The purpose and objective of this consultation is the involvement of residents/ stakeholders and to make them cognizant about the proposed bridge project activity of the subproject. Consultation with the stakeholders/ participants were conducted and participated based on the procedural guidelines of reaching public required for the preliminary baseline characteristics of environmental and social screening. Details of the consultation are captured in Table 8.1 below;

Table 8.1: Public consultation details

S. No.	Name of the Project	Location of Consultation	Date of Consultation	Geo-coordinates of Location
1.	Construction of 3x30m Truss Girder Bridge on Bringi Nallah at Sadoora-Asajipora Kamad Road, Anantnag.	Sadoora Sub-District Dooru Tehsil Anantnag in District Anantnag	10-09-2018 18-03-2019 11-07-2020	33° 6'77.52"N Lat 75° 14'53.44"E Long

A reconnaissance survey was conducted for the proposed bridge at Sadoora in 2018 and 2020. Baseline information was also collected from the adjoining areas in close proximity within the Project Influence Area (PIA) in June and July 2020 and informal consultations were undertaken with the project stakeholders to take the views and propositions about the project activities.

The following section highlights the level of consultative procedure adopted at various stages, strategies to participatory and continued consultation and specific inputs from the stakeholder's consultation in project planning.

8.2. Identification of Stakeholders

Consultations were conducted with both primary and secondary stakeholders in the project area. The primary stakeholders Sadoora area consulted are usually (i) Local community having their permanent or temporary residences (ii) Roadside shop owners (iii) Road users and (iv) Community Leaders. While the secondary stakeholders are mostly the project officials, village representatives and social activists

Table 8.2: Identification of Stakeholders

1	Primary Stakeholders (Main stakeholders)	• Potential PAPs, stakeholders and Community leaders
2	Secondary	• Groups of affected persons;

Stakeholders (Other Stakeholders)	• Village representatives- like Sarpanch and members, PRI's, Village Level health workers, Patwaris • Local voluntary organizations like NGOs etc • Field level Engineers, Assistant Engineers, Junior Engineers), PIU/ PWD (R&B, Government of J&K. • Other project stakeholders such as official of line Department

8.3. Consultations with Stakeholders

Consultation with the community was carried out at Sadoora Village (refer Table 9.1) of the project to inform and educate the Project-Affected-People (PAP's) and other stakeholders about the proposed action before the finalization of design to include their inputs. The consultation was also carried out to identify the problems associated with the proposed project and the needs and values of the population likely to be impacted by the project. Locations were selected which represent the predominant land uses of the project area and also included all sections of people in the project region -from agricultural labourers to landowners, employee and business community and shop keepers. In each of these consultations, the villagers were briefed about the project (the RoW width, the length of the alignment, the locations where it would be crossing etc) and the potential benefits of the project.

The various forms of public consultations (consultation through ad-hoc discussions on site-along project corridor) have been used to discuss the sub-project and involve the community in planning the design and mitigation measures. The signatures/photographs of participants in the public consultation are given **in Annexures.**

8.4. Objective of the Public Consultation

The process of public participation/consultations was taken up as an integral part of the sub-project in accordance with World Bank guidelines and the following objectives:

- To educate the general public, especially potentially impacted or benefited communities/individuals and stakeholders about the proposed sub-project activities;
- To familiarize the people with technical and environmental issues of subproject for better understanding;
- Dissemination of information to local communities through the public consultation by briefing the project including its benefits.
- Informal by group consultations in the sub-project vicinity at field level.
- The environmental concerns and suggestions made by the participants were listed out, discussed and suggestions were accordingly incorporated in the EMP.

8.5. Issues Discussed during Public Consultation

The issues discussed during public consultation for the proposed bridge project at Sadoora Village in District Anantnag are given below:

- About the proposed bridge project, source of assistance and its implementation/execution etc.
- Information on perceived benefits from the proposed bridge project including travel time, fuel cost, noise and air pollution.
- People were updated about the Covid-19 Pandemic crisis happening throughout the world and its increased spread at National and State level. People were apprised about the importance of Social Distancing, wearing of masks, sanitization/ frequent washing. People were also informed that the construction works will not start unless the Contractor for this project will implement stringent measures/ Guidelines as devised/ recommended by the World Health Organization/ Ministry of Health, Govt. of India/ International Labour Organization and Local Administration guidelines.
- People were also informed that Covid-19 Marshal/ Officer will be also appointed and mobilized by the contractor during the commencement of the works until the completion of the project. This exercise will ensure that the stringent Govt. protocol and international guidelines are strictly followed.
- Covid-19 WHO/ ILO guidelines Government protocol will form the part of the EIA/ EMP report for its effective implementation in this project.
- Information on the impacts from the proposed bridge project during construction stage in terms of inconvenience to the public, air and noise pollution, etc. The occurrence of a disaster like floods and cloud bursting in past.
- Whether construction activities will cause any type of health hazard or not?
- Discussions among the public for sharing of information related to the proposed bridge project, environment policy of World Bank, direct and indirect impacts of improvement/construction work on the environment.
- Any loss of land/structure/business or other community property due to the proposed bridge project.
- Presence of any historical or cultural monuments near the project area and any impact is seen due to the proposed bridge project?
- Any possible problems to be faced by the local people in their daily activities due to the proposed bridge project construction work.

8.6. Outcome and Feedback received from the Public Consultation

During the consultation process of the proposed sub-project, people have expressed keen interest in the proposed bridge project at Sadoora village. The local people are expecting flood resilient bridge to be developed as they suffered due to the lack of the proper bridge and were apprised about the project details.

In the consultation process about the proposed bridge project, local people, students, businessman and fruit growers/farmers, expressed their keen interest. People, in general, were

very enthusiastic about the benefits of the sub-project as it will be providing direct connectivity with the rest of the habitations with the Sadoora Village. The major problems faced by concerned people are difficulties being faced by them in the absence of proper bridge on Bringi Nallah. People are ready to extend all supports during the execution of the sub-project.

PIU (R&B) ensured that the requisite environmental and social management measures shall be incorporated in EMP and public consultation shall be a regular process during all stages of the sub-project execution to solve any issues arising out of proposed works.

The valuable feedback received from the consultation conducted in project influence area with the residents are summarized below;

- Flood resilient bridge design to be implemented in synchronization with the 2014 floods and Bringi nallah discharge flow regime during flash floods as a lesson learnt.
- Safety Protocol during excavation- People suggested that the construction zone must be properly barricaded to avoid the local kids for swimming purpose which may possess safety issues during well-foundation. Contractor to ensure that safety marshals/ safety officer in place will not allow any person especially kids to enter into open trenches or excavated area
- Covid-19 SOP Protocol- Locals advised during labour influx for the construction of the bridge, proper standard operating procedure to be followed.
- Noise generating activities should be scheduled only during working hours (Day time).
- Proper and timely disposal of construction wastes shall be ensured.
- Geometric correction/ alignment of approach road surface should be followed strictly as per design protocol.
- Local people must be preferred for employment in the project activity. As enough labourers are available in the area which will be beneficial for the contractor.

9. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (EMP)

9.1. Introduction

Environmental Management Plan (EMP) has been prepared which mainly centred on the understanding of the interactions between the environmental and social setting and the project activities and the assessment of the likely impacts. Mitigation measures for anticipated environmental and social impacts have been elaborated as specific actions which would have to be implemented during the project implementation. The EMP would help the contractor and PIU to implement the project in an Environmentaly sustainable manner and where contractor for this bridge project, understand the potential environmental and social impacts arising from the proposed bridge construction on Bringi Nallah at Sadoora in District Anantnag and to take appropriate actions/ mitigation measures to properly mitigate/manage such environmental and social impacts. EMP can thus be considered to be an overview document for contractor of this bridge project that will guide EMP of all anticipated impacts. This EMP may also be considered as flexible and will be further developed by the Contractor in the Contractor's Environment Management Plan (EMP).

9.2. Proposed Works of Sadoora Bridge Project

The proposed components of construction of bridge project consist of the following works:

1. Construction of 3x30 meter 3 span steel trussed girder bridge
2. Construction of Approaches on both sides
3. Protective Works- Nallah training Works etc.

9.3. Outline of EMP and its Implementation Strategy

The EMP is a guiding tool which discusses the potential environmental impacts and specific mitigation/management measures for the proposed construction of 3x30 meter bridge at Sadoora, Anantnag. It refers to the responsibilities ensuring commitment for implementation and means of verifying/ supervision whether the same has been implemented properly. The timing and frequency of monitoring along with the supervision responsibility and reporting requirements are also provided in the Environmental Management Plan. As a part of the EMP, the Contractor will commit to the identification of the environmental impacts at the project site. In case of any future changes in the bridge project design, the EMP will need to be updated to reflect the new scope of the activities. Such revisions will be finalized in consultation with the World Bank.

The PIU (R&B) will be responsible to ensure implementation of EMP for the performance of all by the Contractor of this bridge project with the overall accountability resting with the JTFRP-PMU. Whereas, the TAQAC will ensure periodic quality audit/ guidance to the PIU and Contractor and by imparting regular training, monitoring, and ensuring that all EMP provisions and requirements are translated into contract document and that these requirements are implemented to their full intent and extent.

Overall responsibility will be of Contractor for effective implementation of EMP and adherence to all the mitigation measures as outlined in this EMP associated with their respective activities. The Contractor will be required to comply with the provisions of the EMP.

9.4. Environmental Management Measures for the Design stage

9.4.1. Hydrological Study for Design of Proposed Bridge

The Sadoora village was connected with main district with a 6x20 ft span submersible causeway, which was washed away due to devastating flood of September 2014. This shows the high discharge with turbulent flow regime of the Bringi nallah which completely dislodged the causeway. Therefore, hydrological study and runoff calculations for extreme flood/rains under the climate change scenarios are carried out and considered for designing of the proposed 3x30m bridge at Sadoora with excess runoff flow/flood safeguard. No hydrological data were available for the Bringi Nallah and therefore the hydrological study was carried out and calculated based on the standard methodology of discharge.

9.4.2. Sliding of Backfilling and Prevent Uplift Pressure at Abutments

In both abutments of the proposed bridge of Sadoora, weep holes (80 mm to 100 mm dia) should be provided with minimum 600 mm this filter media for draining of rainwater to prevent sliding of backfilling and to avoid any uplift pressure.

9.4.3. Seismic Factor in Design Bridge

The proposed bridge at Sadoora in District Anantnag is located in Seismic Zone V and prone to high-intensity earthquakes. Therefore, seismic load factor must be taken into consideration while designing of bridge components.

As the bridge is located in the highest seismic risks zone, therefore, seismic arresters should be provided in the bridge as an anti-dislocation device for slabs/spans to withstand horizontal force during an earthquake.

9.4.4. Snow Accumulation on the Proposed Bridge

The proposed bridge site at Sadoora received high snowfall during extreme winter. Accumulation of snow on the bridge may put additional load on the proposed bridge. Therefore, the snowfall load should be considered while designing the proposed bridge.

9.4.5. Approaches for Bridge

The approach/approach slab provides a transition between the road pavement and the bridge. The approach/approach slab acts as an intermediate bridge to span the portion of embankment directly behind the abutment which was excavated to construct the abutment. Therefore, approach slab as per IRC guidelines and well-designed approaches to connect the bridge with the existing road should be ensured during the design of the Sadoora bridge.

9.4.6. Safety Signage for Bridge

For the safety of road users and bridge, necessary approach road safety signage, hazard signage and warning signage with reflective tapes need to be provided before and at the proposed bridge as per IRC guidelines.

9.5. Environmental Management Plan (EMP)

The Environmental Management Plan (EMP) will guide the Environmentaly-sound construction of the 3x30 meter Three Span Steel Trussed Girder Bridge On Bringi Nallah at Sadoora-Asajipora kamad Road in District Anantnag" and ensure efficient lines of communication/ coordination between the PIU, Contractor, PMU and TAQAC. The EMP has been prepared for three stages of bridge project construction activities as (i) Pre-construction Stage; (ii) Construction Stage; and (iii) Demobilization Stage. EMP for the above bridge project has been prepared and presented in **(Table 9.1)**. A different set of guidelines, checklists, strip mapping plan and reporting formats for implementation of EMP are given as Annexures in this EIA Report of bridge project at Sadoora.

The purpose of the EMP is to ensure that the activities are undertaken in a responsible non-detrimental manner with the objectives of:

(i) provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on-site;
(ii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject;
(iii) detail specific actions deemed necessary to assist in mitigating the environmental impacts of the subprojects; and
(iv) ensure that safety recommendations are complied with.

Budgetary provisions for the implementation of EMP shall be integrated with part of the construction contract in the form of technical specifications and environmental performance requirements. The costs to be incurred on implementation of EMP shall be incidental to the civil works and therefore, no separate environment budget/cost will be provided to the contractor for implementation of EMP. The contractor will ensure effective implementation of EMP during pre-construction, construction and demobilization/ operation stages. EMP for operation stage will be implemented by PIU/PMU.

The Contractor is deemed not to have complied with the EMP if; i), within the boundaries of the project site/ ancillary sites, site extensions and haul/ access roads there is evidence of a contravention of clauses, if environmental damage ensues due to negligence, the contractor fails to comply with corrective action measures or other instructions issued by the PIU / JTFRP-PMU within a specified timeframe and the Contractor fails to respond adequately to complaints from the public

Table 9.1: Environmental Management Plan (EMP) of Construction of 3x30m span Steel Trussed Girder Bridge on Bringi Nallah At Sadoora in District Anantnag.

S. No.	Environmental Issues	Environmental Mitigation Measures	Responsibilities	
			Implementation	Supervision/ Monitoring
A.	**Design Phase**			
A.1	Hydrological Study for designing of Bridge	The Sadoora village was connected with the main district through 6x20 ft span submersible causeway, which was completely washed away due to devastating flood of September 2014. The hydrological study have been carried out for designing of the proposed bridge with flood safeguard to be implemented effectively .	Design Team	PIU
A.2	Erosion at Bridge Abutments During Floods/ High Discharge	Bridge protection works around both sides of abutment walls will be provided with proper slopes and as per design Wire Gabion works with granular backfill have been used for the nallah training works and to be followed.	Design Team	PIU
A.3	Sliding of Backfilling and Uplift Pressure at Abutments	In both abutments of the proposed bridge weep holes (80 mm to 100 mm dia) will be provided with minimum 600 mm filter Media for draining of water to prevent sliding of backfilling and to avoid any uplift pressure.	Design Team	PIU
A.4	Impact of Seismic Activity/ Earthquake on Bridge	The proposed bridge is located in Seismic Zone V and prone to high-intensity earthquake. Therefore, seismic load factor must be taken into consideration while designing of bridge components.	Design Team	PIU
A.5	Dislocation of Span of During Seismic Activity/ Earthquake	As the bridge is located in high Seismic Risk Zone V. Therefore, Seismic Arresters should be provided to withstand horizontal force during the earthquake and as an anti-dislocation device for slabs/spans.	Design Team	PIU
A.6	Snow Accumulation on the Proposed Bridge	The project is located in snowfall area. Accumulation of snow on the bridge may affect the integrity of the proposed bridge. Snow load should be considered while designing the proposed bridge.	Design Team	PIU
A.7	Approaches for Bridge	Approach slab as per IRC guidelines and well-designed approaches to connect the bridge with the existing road both sides should be ensured during the design of the proposed bridge.	Design Team	PIU
A.8	Safety of Proposed Bridge and its Uses	For the safety of road users and bridge, necessary road safety signage, hazard signage and warning signage with reflective tapes need to be provided before and at the proposed bridge as per IRC guidelines.	Design Team	PIU

B.	**Pre-Construction Stage**			
B 1	**Pre-construction Activities By the Contractor**			
B 1.1	Appointment and Mobilization of Environment & Safety Officer	• The contractor will appoint qualified and experienced Environment & Safety Officer (ESOs) who will work dedicatedly and ensure implementation of EMP including Occupational, Health and Safety of workers issues at the camp, batching plant and bridge construction work site. • Contractor to inform the PIU for the appointment and mobilization of Environmental Safeguard Officer (ESO).	Contractor	PIU TAQAC
B 1.2	Appointment and Mobilization of Covid-19 "Marshal"	• The contractor will appoint and mobilize Covid-19 "Marshal" for effective implementation of the Covid-19 protocol/ guidelines issued by the Government and World Health Organization (WHO) at Workplace/ construction sites.	Contractor	PIU, TAQAC
B 1.3	Regulatory Approvals	• Permission from Irrigation & Flood Control Department for construction of the bridge on Bringi Nallah and other related works like approach roads and nallah training works • Labour license from the Department of Labour. • If contractors open new stone quarry or borrow areas, prior Environmental Clearance will be obtained from SEIAA/DEIAA. • For set–up of Stone Crusher Plant and Batching Plant, D.G Sets- Consent to Establish and Consent to Operate will be obtained from J&K State Pollution Control Board (J&KSPCB) or if contractor intends to procure construction materials from local authorized third party agencies then the contractor will collect and submit necessary clearance/approval from authorized third party agencies.	Contractor	PIU
B 1.4	Arrangements for Temporary Land Requirement for Camp	The contractor as per prevalent rules will carry out negotiations with the landowner for obtaining their consent for temporary use of land for construction camp etc.	Contractor	PIU, TAQAC
B 1.5	Location of Batching Plant	The batching plant will be sited sufficiently away from settlements. Such plant will be located at least 250 m away from the nearest settlement preferably in the downwind direction. Consent to Establish and Consent to Operate will be obtained from J&K State Pollution Control Board (as required) before the establishment and operation of batching plant.	Contractor	PIU, TAQAC

B 1.6	Other Construction Vehicles, Equipment and Machinery	All vehicles, equipment and machinery to be procured for construction of the bridge will conform to the relevant Bureau of Indian Standard (BIS) norms/Central Pollution Control Board (CPCB) standards. The discharge standards promulgated under the Environment Protection Act, 1986 and Motor Vehicles Act, 1988 will be strictly adhered to. The silent/quiet equipment like DG set as per regulations will be used at the bridge construction site. The contractor will maintain records of Pollution Under Control (PUC) certificates for all vehicles used during the contract period, which will be produced to PIU for verification whenever required.	Contractor	PIU, TAQAC
B 1.7	Procurement of Aggregate	The contractor will finalize the approved quarry/crusher for procurement of aggregate for the proposed bridge construction after assessment of the availability of sufficient materials, quality and other logistic arrangements. The Contractor will also work-out road network and report to PIU, which will be inspected before approval.	Contractor	PIU, TAQAC
B 1.8	Labour Requirement	The contractor preferably will use unskilled/semiskilled labour from the local area to give the maximum benefit to the local community. Contractor to be followed strictly the Covid-19 protocol while mobilizing the labourers from the local community or outside	Contractor	PIU, TAQAC
B 1.9	Construction Vehicles, Equipment and Machinery	• All vehicles and equipment to be procured for the proposed bridge work at Sadoora, Anantnag will conform to the relevant Bureau of Indian Standard (BIS) norms. The discharge standards promulgated under the Environment Protection Act, 1986 and Motor Vehicles Act, 2019 will be strictly adhered to. • The silent/quiet equipment like DG set as per regulations will be used at the construction site or labour camp. • The contractor will maintain records of Pollution Under Control (PUC) certificates for all vehicles used during the contract period, which will be produced to PIU for Monitoring and whenever required.	Contractor	PIU, TAQAC
B.2	**Pre-Construction Activities By The PIU**			
B 2.1	Tree cutting	• No tree cutting is involed in the bridge project at Sadoora. However, if any tree cutting is involved such loss of trees will be compensated by 1:6 ratio (i.e. for loss of 1 tree, 6 trees will be planted) or greater and transplantation of the same trees may be envisaged wherever applicable.	PIU	PIU
B 2.2	Environmental Monitoring-Baseline Data	Ambient air quality, noise levels and water quality monitoring on the six-monthly basis as per environmental monitoring plan and following the instruction of Environmental Specialist of PMU.	PIU	PMU, TAQAC

B 2.3	Information Dissemination and Communication Activities	• Before construction activity, information dissemination will be undertaken by the contractor at the project site. The wider dissemination of information to the public will be undertaken by PMU through the disclosure of EIA / EMP reports on the website of PMU-JTFRP. • Project information Board showing the name of work, project cost, duration, date of commencement, date of completion, executing agency and contact details (including telephone numbers) shall be at Sadoora Approach Side. • Information boards will also be set up at the sites of construction camps and labour camps, plants and stockyard site. Details of Nodal officer with telephone numbers will be displayed for registering complaint/grievances by stakeholder/general public	Contractor	PIU, TAQAC
C.	**Construction Stage**			
C.1	**Protection of Trees**			
C.1	Safeguarding of Trees and Plantation	• Trees (like Elm, Willow and poplar) close to the approach road at an average distance of 2-3 meters will be covered/ wrapped with protective green mesh fibre cloth around the base tree trunk area by 6 feet in height. • No stockpiling of any construction will be allowed around or close to scheduled trees. • Make-shift steel barricading will be provided around each tree in an active work zone where foundation/ excavation takes place. • Any other trees within the area near the construction site will be marked with same horizontal reflective strips and green mesh as per the above measures.	Contractor	PIU, TAQAC
C.2	Impact on Water Resource during the construction of the bridge	The following mitigation measures are recommended during the construction of the proposed bridge at Sadoora, Anantnag: • Construction of Sadoora bridge should be done during least flow or no flow area. • The Curtain should be provided over the flowing water to avoid the falling of construction material in water. • Construction wastes should be collected and disposed of in an Environmentaly sound manner as soon as construction is over. • The construction of the bridge should not affect existing flow pattern and drainage system around the proposed bridge at Sadoora, Anantnag. • Flowing water will be diverted with guide bunds and cofferdams at pier locations	Contractor	PIU, TAQAC
C	**Construction Stage**			

C.1	**Site Clearance (Clearing and Grubbing)**			
C 1.1	Clearing, grubbing and Levelling	• If required vegetation will be removed from the construction zone (approaches) before the commencement of construction. • All works will be carried out such that the damage or disruption to flora other than those identified for cutting is minimum. Only ground cover/shrubs that impinge directly on the permanent works or necessary temporary works will be removed with prior approval of PIU. • The Contractor, under any circumstances, will not cut or damage trees. • Vegetation with a girth size of over 30 cm will be considered as trees and shall be compensated.	Contractor	PIU, TAQAC
C 2.	**Protection of the Trees**			
C 2.1	Safeguarding of Trees and Plantation	• Trees close to the approach road will be covered/ wrapped with protective green mesh fibre cloth around the base tree trunk area by 6 feet in height. • No stockpiling of any construction will be allowed around or close to scheduled trees. • Make-shift steel barricading will be provided around each tree in an active work zone where foundation/ excavation takes place. • Any other trees within the area near the construction site will be marked with same horizontal reflective strips and green mesh as per the above measures.	Contractor	PIU, TAQAC
C 3.	**Water Pollution**			
C 3.1	Impact on Water Resource during the construction of the bridge	The following mitigation measures are recommended during the construction of the proposed bridge at Sadoora, Anantnag: • Construction of Sadoora bridge should be done during least flow or no flow area. • Curtain should be provided over the flowing water to avoid the falling of construction material in water. • Construction wastes should be collected and disposed of in an Environmentaly sound manner as soon as construction is over. • The construction of the bridge should not affect existing flow pattern and drainage system around the proposed bridge over Briingi nallah/ stream at Sadoora, Anantnag. • Flowing water will be diverted with guide bunds and cofferdams at pier locations	Contractor	PIU, TAQAC

C 3.2	Water Pollution from construction material	• The contractor will take all precautionary measures to prevent entering of wastewater into streams, water bodies or the irrigation system during construction. The contractor will avoid construction works close to the streams or water bodies during monsoon. • Contractor shall not wash his vehicles in river water and shall not enter riverbed for that purpose. • Any type of construction wastes will not be disposed of in rivers or water bodies.	Contractor	PIU, TAQAC
C 3.3	Water Pollution from Fuel and Lubricants	• The Contractor will ensure that all construction vehicle parking locations, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refuelling sites will be located at least 250 m away from rivers and irrigation canal/ponds. The Contractor will submit all locations and layout plans of such sites before their establishment and will be approved by the Environmental Specialist of PIU. The contractor will ensure that all vehicle/machinery and equipment operation, maintenance and refuelling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground. Wastewater from vehicle parking, fuel storage areas, workshops, wash down and refuelling areas will be treated in an oil interceptor before discharging into on land or into surface water bodies or other treatment systems. • In all, fuel storage and refuelling areas, if located on areas supporting vegetation, the topsoil will be stripped, stockpiled and returned after cessation of such storage. • The contractor will arrange for collection, storing and disposal of oily wastes to the pre-identified disposal sites • All oil spills used oil will be disposed off following J&K State Pollution Control Board (JKSPCB) guidelines.	Contractor	PIU, TAQAC
C 3.4	Water Pollution from wastes	• The contractor will take all precautionary measures to collect and dispose of construction wastes generated from the proposed bridge construction site (if any). • No solid or hazardous wastes (oil contaminated waste) from the campsite will be dumped on nallah or in open areas. Such wastes will be collected and disposed of in an Environmentaly sound manner as per environmental regulations. • At the bridge construction site at Sadoora, portable wet/dry toilets (bio-digestion type) shall be provided for workers.	Contractor	PIU, TAQAC
C 3.5	Waste Water from Labour Camp	• Wastewater generated from the sanitary facilities at labour camp will be treated in septic tank followed by soak pit. • No untreated raw sewage/wastewater will be discharged into any water body. • Workers will not be allowed for open defecation. Proper toilets fitted with a septic tank and soak pit will be provided for workers at the camp site.	Contractor	PIU, TAQAC

C 4	**Air Pollution**			
-=	Dust and Gaseous Pollution	• The contractor will take every precaution to reduce the level of dust and gaseous pollution from the batching plant and bridge construction site. • The contractor will procure the batching plant and construction machinery, which will conform to the pollution control norms specified by the MoEF&CC/CPCB/J&KPCB. The excavated materials at the bridge construction site will be collected and disposed of properly so that it does not generate fugitive dust emissions. • LPG shall be used as fuel for cooking of food at construction labour camp instead of fuelwood. • Personal Protective Equipment (PPE) should be provided as a mandatory effort to the construction workers at the batching plant. • Regular maintenance of vehicles (project vehicles and material transportation) and equipment's will be carried and vehicular pollution check should be made mandatory. • Mask and other PPE should be provided as a mandatory effort to the construction workers in dust prone areas.	Contractor	PIU, TAQAC
C 4.2	Emission from Construction Vehicles, Equipment and Machinery	• The contractor will ensure that all vehicles, equipment and machinery used for construction works are regularly maintained and conform that pollution emission levels and comply with the requirements of CPCB and/Motor Vehicles Rules. The contractor will submit Pollution Under Control (PUC) certificates for all vehicles for the project. • DG set will be provided with the chimney of adequate height as per CPCB guidelines (Height of stack in meter = Height of the building + 0.2 √KVA).	Contractor	PIU, TAQAC
C 5	**Noise Pollution**			
C 5.1	Noise Levels from Construction Vehicles and Equipment's	The contractor will confirm the following: • All construction equipment used in excavation, concreting, etc, will strictly conform to the MoEF&CC/CPCB/J&KSPCB noise standards. • All vehicles and equipment used in construction works will be fitted with exhaust silencers/mufflers. • Maintenance and servicing of all construction vehicles and machinery will be done regularly. • Only acoustic enclosures fitted DG sets will be allowed at the construction site and labour camp. • Noise monitoring shall be carried out in construction areas through the approved monitoring agency.	Contractor	PIU, TAQAC

C. 6	**Procurement of Construction Materials**			
C 6.1	Procurement for Aggregate and other construction materials	• No borrow area will be opened without permission of the Environmental Specialist and without obtaining necessary regulatory permission. The location, shape and size of the designated borrow areas will be as approved by the Environmental Specialist and in accordance to the IRC recommended practice for borrow pits for road embankments (IRC 10: 1961). The borrowing operations will be carried out as specified in the guidelines for siting and operation of borrow areas. • The unpaved surfaces used for the haulage of borrow materials, if passing through the settlement areas or habitations; will be maintained dust-free by the Contractor. A sprinkling of water will be carried out twice a day to control dust along such roads during their period of use. • During dry seasons (winter and summer) frequency of water sprinkling will be increased in the Sadoora approach side and PIU will decide the sprinkling time depending on the local requirements. The contractor will rehabilitate the borrow areas as soon as the borrowing of soil is over from a particular borrow area following the approved borrow area Redevelopment Plan.	Contractor	PIU, TAQAC
C 6.2	Transporting Construction Materials	• All vehicles delivering fine materials like aggregate, cement, earth, sand, etc, to the bridge site at Sadoora will be covered by Tarpaulin to avoid spillage of materials. • The existing road used by vehicles of the contractor or any of his subcontractor or suppliers of materials will be kept clear of all dust/mud or other extraneous materials dropped by such vehicles. • The contractor will make an effort to transport materials to the site in non- peak hours	Contractor	PIU, TAQAC
C 6.3	Quarry Operations & Crushers	The Contractor shall obtain materials for approved quarries. The crushers will be operated after obtaining consent to establish and consent to operate from J&KSPCB.	Contractor	PIU, TAQAC

C.7	**Construction Works**			
C 7.1	Slope Protection and Control of Soil Erosion	• The Contractor will construct slope protection works as per design parameters, to control soil erosion and sedimentation through use of Retaining Walls, methods, dykes, sedimentation chambers, basins, fibber mats, mulches, grasses, slope, drains and other devices. • All temporary sedimentation, pollution control works and the maintenance thereof will be deemed as incidental to the earthwork or other items of work and as such no separate payment will be made for them. • The contractor will ensure the following aspects wherever applicable: - After completion of embankment, the side slopes will be covered with grass and shrubs as per design specifications. - Turfing works will be taken up as soon as possible provided the season is favourable for the establishment of grass sods. Other measures of slope stabilization will include mulching netting and seeding of batters and drain immediately on completion of earthworks. - In borrow pits, the depth shall be so regulated that the sides of the excavation will have a slope not steeper than 1 vertical to 2 horizontal, from the edge of the final section of the bank.	Contractor	PIU TAQAC
C 7.2	Handling of Cement Bags	• Cement bags will be stored and emptied in a covered area to control fugitive dust emissions. • While handling and emptying cement bags, workers will wear masks, hand gloves and protective goggles. • Manual transferring of cement bags from one place to another place will not be allowed. For this purpose, the trolley will be used.	Contractor	PIU, TAQAC

C 7.3	Work-zone safety Management	• The Contractor shall prepare the bridge construction/ work zone safety plan as per provisions under the IRC 67-2001, SP-55 for safe work zone to be duly approved by the environmental specialist of PIU/PMU before the start of bridge works. • Both sides of the bridge to be barricaded and to delineate construction zone as well as material stacking areas. The bridge construction site at Sadoora (Bringi Nallah) shall be appropriately barricaded to prevent entry and accidental tress passing of workers, staff and others into the construction site. • Contractor to take necessary safety measures at the bridge construction work zone during events of torrential rains or in rainy season. Bringi nallah carry have a high discharge from the upper catchment area during high precipitation. • Public/ local entry to the construction will be highly restricted especially Children. No child will be allowed to enter site for the swimming/ bathing etc. • All operational areas shall be access controlled. Watch and ward facilities at all times shall be provided by the contractor. • Proper retro-reflective warning signage will be installed on the access road next to the construction site about the movement of construction machinery and vehicles. • There shall be adequate lighting arrangement at night to prevent mishaps after construction activity ceases for the day. • All the retro safety signage as per IRC 55 will be erected at the construction site on Bringi Nallah (especially during excavation/ well foundation works) for generating awareness among the local community	Contractor	PIU, TAQAC
C 7.4	Occupational Health and Safety of Workers	• The contractor will prepare and follow the OHS plan, including provisions for an emergency response plan. • All workers will be provided with required personal protective equipment • Emergency Telephone Numbers shall be displayed at camp and plant site. • Medical facilities shall be provided for workers at the Labour camp and plant site.	Contractor	PIU, TAQAC
C 8	**Archaeological Resources and Cultural properties**			

C 8.1	Chance Found Archaeological Property	• All fossils, coins, articles of the the value of antiquity, structures and other remains or things of geological or archaeological interest discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the relevant legislation. • The contractor will take reasonable precautions to prevent his workmen or any other persons from removing and damaging any such article or thing. He will, immediately upon discovery thereof and before removal acquaintss the PIU of such discovery and carry out the PIU instructions for dealing with the same, waiting which all work shall be stopped. • The PIU will seek direction from the Archaeological Survey of India (ASI) before instructing the Contractor to recommence the work in the site.	Contractor	PIU, PMU TAQAC
C 8..2	Impacts on Cultural Properties	• All necessary and adequate care shall be taken to minimize the impact on cultural properties which includes cultural sites and remains, places of worship including mosques, temples, shrines, etc., graveyards, monuments and any other important structures as identified during design stage. • Relocation and enhancement measures shall be taken up as per design and in consultation with the local community. Access to such properties from the road shall be maintained clear and clean.	Contractor	PIU, TAQAC
C 9	**Personal Safety**			
C 9.1	Personal Safety Measures for Labours and Staff	The contractor will take necessary measures for the personal safety of all workers during the construction of Sadoora Bridge; • Protective safety shoes, gumboots, hand gloves, protective goggles, etc (as required) will be provided to the workers employed in excavation, steel rebaring, and bending concrete works, erection of pump station, etc. • Welder's protective eye-shields will be provided to workers who are engaged in welding works. • Earplugs will be provided to the workers exposed to high noise levels. • Safety vests will be used by workers when on a construction site. • The Contractor will comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress. The contractor will make sure that during the construction work all relevant provisions of Building and other Construction Workers (Regulation of Employment and Conditions of Services) Act, 1996 are adhered to. • The Contractor will not employ any person below the age of 14 years for any work.	Contractor	PIU, TAQAC

C 9.2	Traffic and Safety	• The Contractor will take all necessary measures for the safety of traffic during construction and provide, erect and maintain such barricades, including signs, markings, flags, lights and flagmen as proposed in the traffic control plan/drawings and as required by the Environmental Expert for the information and protection of traffic approaching or passing through the section of any existing crossroads. • The Contractor will ensure that all signs, barricades, pavement markings are provided as per the MoRTH specifications. • Before taking up of construction, a Traffic Control Plan will be devised and implemented to the satisfaction of the Environmental Expert of PIU.	Contractor	PIU TAQAC
C 9.3	Emergency Management	• Emergency numbers will be displayed at the construction sites and campsite, • First boxes will be made available at the construction site and campsite, • Fire extinguishers for petroleum oil fire and electrical fire will be made available at the camp site, fuel storage site, construction site etc. • Designated vehicles, which can be used as an ambulance will be available at the construction site at all the time.	Contractor	PIU, TAQAC
C 9.4	Risk Force Measure	• The contractor will make required arrangements so that in case of any mishap during, operation of machinery/ construction vehicles, dismantling, excavation, concrete pouring, hot asphalt handling and erection of pumps, all necessary steps can be taken for prompt first aid treatment. • Construction Safety Plan for the bridge project site, embankment development, protection works, ancillary sites to be prepared by the contractor and will identify necessary actions in the event of an emergency.	Contractor	PIU, TAQAC
C 9.5	First Aid Facility	The contractor will arrange for : • A readily available first aid unit including an adequate supply of sterilized dressing materials, burn ointment and appliances as per the state Factories Rules will be maintained all the time by the contractor. • Availability of first aid tBringid persons will be ensured at the project site during the construction phase. • Availability of suitable transport will be ensured at all times to take an injured or sick person(s) to the hospital.	Contractor	PIU, TAQAC
C 9.6	Informatory Signs and Hoardings	The Contractor will provide, erect and maintain informatory/safety signs, hoardings written in English and local language, wherever required or as suggested by the Environmental Specialist of PIU.	Contractor	PIU TAQAC

C 10	**Labour Camp and Project Site Management**			
C 10.1	Accommodation for Labourers	• The contractor will follow all relevant provisions of the Building and the other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 for construction and maintenance of labour camp. • The location, layout and basic facility provision of each labour camp will be submitted to PIU before their construction. • The contractor will maintain necessary well ventilated living accommodation, toilets, bathrooms and ancillary facilities functionally and hygienically. • Proper ventilation along with standard exhaust fans will be provided in labour accommodation rooms. • Regular cleaning and sweeping will be ensured at the labour campsite. • Systematic waste collection management at labour camp to be managed as per SWM Rules 2016. • Standard First Aid Kits/units including an adequate of sterilized dressing materials.	Contractor	PIU, TAQAC
C 10.2	HIV/AIDS Prevention Measures	• Necessary HIV/AIDS prevention measures will be taken at the labour camp • HIV/AIDS awareness program will be organized by the contractor's Environment & Safety Officer.	Contractor	PIU, TAQAC
C 10.3	Potable Water for Workers	• The contractor will construct and maintain labour accommodation in such a fashion that uncontaminated clean water is available for drinking, cooking, bathing and washing. The contractor will also provide potable water facilities within the precincts of workplace/pump stations in an accessible place, as per standards set by the Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996. • The contractor will also provide the following: a) Supply of sufficient quantity of potable water (as per IS) at construction site/labour camp (site at suitable and easily accessible places and regular maintenance of such facilities). b) If any water storage tank is provided that will be kept such that the bottom of the tank at least 1 meter above the surrounding ground level. c) If water is drawn from any existing well/ hand pump, which is within 30 meters proximity of any toilet, drain or other sources of pollution, the well will be disinfected before water is used for the drinking. • PIU will be required to inspect the labour camp once in a week to ensure the compliance of the EMP.	Contractor	PIU, TAQAC

C 10.4	Sanitation and Sewage System at Labour Camp	The contractor will ensure that : • The sewage system for the camp will be designed, built and operated in such a fashion that no health hazard occurs and no pollution to the air, groundwater or adjacent watercourses take place, • Separate toilets/bathrooms, as required, will be provided for men and women, marked in vernacular language, • Toilets will e provided with septic tank followed by soak pit. • Adequate water supply will be provided in all toilets and urinals, • Night soil can be disposed of with the help of municipality or disposed of by putting a layer of it at the bottom of a permanent pit prepared for the purpose and covered with 15 cm layer of waste or refuse and then covered with a layer of earth for a fortnight.	Contractor	PIU, TAQAC
C 10.5	Waste Disposal	• The contractor will provide garbage bins in the camp & construction site and ensure that these are regularly emptied and disposed off hygienically according to Solid Waste Management Plan as per Solid Waste Management Rule 2016. • Burning of wastes at the construction site, labour camp and bridge/roadside will not be allowed. • The solid waste generated at the construction site & labour camp will be collected in covered waste bins and segregated as biodegradable (food waste, paper, etc) and non-biodegradable (plastic, polyethene bag, etc) wastes. Polyethene/plastic wastes will be stored in empty cement bags and to be sent for recycling through scrap dealer. Biodegradable (food waste, paper, etc) solid waste will be disposed of in the compost pit.	Contractor	PIU, TAQAC
C 11	**Environmental Monitoring**			
C 11.1	Environmental Monitoring-Construction Stage	• The PIU will carry out environmental monitoring for Ambient Air Quality, Noise levels and Water Quality on the six-monthly basis as per environmental monitoring plan and in accordance with the instruction of Environmental Specialist of PMU.	PIU	PMU, TAQAC

C 11.2	**COVID-19** (Corona-Virus) Pandemic Protocol Compliance at Workplace and Labour Camp	[8] COVID-19 Guidance for the Construction Workforce- When working in the construction industry, the following tips can help reduce the risk of exposure to the coronavirus: • Encourage workers to stay home if they are sick. • Allow workers to wear masks over their nose and mouth to prevent them from spreading the virus. • Continue to use other normal control measures, including personal protective equipment (PPE), necessary to protect workers from other job hazards associated with construction activities. • Advise workers to avoid physical contact with others and direct employees/contractors/visitors to increase personal space to at least six feet, where possible. Where work trailers are used, all workers should maintain social distancing while inside the trailers. • Train workers how to properly put on, use/wear, and take off protective clothing and equipment. • Encourage respiratory etiquette, including covering coughs and sneezes. • Promote personal hygiene. If workers do not have immediate access to soap and water for handwashing, provide alcohol-based hand rubs containing at least 60 per cent alcohol. • Use Environmental Protection Agency-approved cleaning chemicals from List N or that have label claims against the coronavirus. • To the extent tools or equipment must be shared, provide and instruct workers to use alcohol-based wipes to clean tools before and after use. When cleaning tools and equipment, workers should consult manufacturer recommendations for proper cleaning techniques and restrictions. • Keep in-person meetings (including toolbox talks and safety meetings) as short as possible, limit the number of workers in attendance, and use social distancing practices. • Clean and disinfect portable Jobsite toilets regularly. Hand sanitizer dispensers should be filled regularly. Frequently-touched items (i.e., door pulls and toilet seats) should be disinfected. • Encourage workers to report any safety and health concerns.	Contractor	PIU, TAQAC

[8] OSHA- Occupational,Safety and Health Adminintration , OSHA: COVID 19 Guidelines www.osha.gov/coronavirus

		• Contractor to follow strictly Covid-19 Guidelines as given in Annexures XIV to XV and Standard Operating Procedures (SOP). • Updated measures/ guidelines/ SOP will be issued to the Contractor for compliance	Contractor	PIU, TAQAC PMU
D	**Contractor's Demobilization**			
D.1.1	Clean-up Operations, Restoration and Rehabilitation	• The contractor will prepare the project and labour campsite restoration plan, which will be approved by the PIU/ Environmental Expert. The clean-up and restoration operations are to be implemented by the contractor before demobilization from the construction site and labour camp. The contractor will clear all temporary structures, debris, construction wastes, garbage, night soils, etc in an Environmentaly sound manner. • All disposal pits or trenches will be filled in and effectively sealed off. • Construction places including camp and any other area used/affected due to the project operations will be left clean and tidy at the contractor's expense to the entire satisfaction to the PIU.	Contractor	PIU, TAQAC
D.1.2	Land Rehabilitation	• All surfaces hardened due to construction activities will be ripped & imported materials thereon removed. • All rubbles to be removed from the site to an approved disposal site. Burying of rubble on-site is prohibited. • Surfaces are to be checked for waste products from activities such as concreting or asphalting and cleared in a manner approved by the Engineer. • All embankments are to be trimmed, shaped and replanted to the satisfaction of the PIU. • Borrow pits are to be closed and rehabilitated following the pre-approved management plan for each borrow pit. The Contractor shall liaise with the PIU regarding these requirements.	Contractor	PIU, TAQAC
E	**Post Construction (Operation) Stage**			
E 1	**Activities to be Carried out by the PIU**			
E.1.1	Environmental Monitoring- Post Construction Stage	• The environmental monitoring Laboratory of JTFRP-PMU will carry out environmental monitoring for Ambient Air Quality, Noise levels and Water Quality on the six-monthly basis as per environmental monitoring plan and in accordance to the instruction of Environmental Specialist of PMU.	PIU	PMU

E.1.2	Slope/ Protection Monitoring	During rains/ snowfall, regular monitoring will be carried for bridge & Bringi nallah protection works and scour protection work/ slope management. In case any indication of erosion, deformation and collapse of protection, necessary measures will be taken to control such issues.	PIU	PMU
E.1.3	Monitoring of Plantation and Landscape areas under environmental enhancement	Continuous watch and monitoring of plantation carried out under plantation implemented and for its performance and survival rate. The plantation will be properly guarded by watch and ward personnel. Provision will be made for manure application and watering on schedule. Pine plantation landscape management/ beautification of the bridge environs.	PIU	PMU

9.6. Environmental Management Plan (EMP) - Protection of Clause for Non-conformity to EMP

The Contractor will implement necessary mitigation measures for which responsibility is assigned to him as stipulated in the EMP. Any lapse in implementing the same will attract the damage clause as detailed below:

- Any complaints of public, within the scope of the Contractor, formally registered with the PIU and communicated to the Contractor, which is not properly addressed within the time-period intimated by the PIU shall be treated as a major lapse.
- Non-conformity to any of the mitigation measures like unsafe conditions, non-collection of excavated material (during the laying of drainage pipes) regularly and other unattended Health, Safety & Environment (HSE) issues, as stipulated in the EMP Report (other than stated above) shall be considered as a minor lapse.
- On observing any lapses, PIU shall issue a notice to the Contractor, to rectify the same.
- Any minor lapse for which notice was issued and not rectified, first and second reminders shall be given after ten days from the original notice date and first reminder date respectively. Any minor lapse, which is not rectified, shall be treated as a major lapse from the date of issuing the second reminder.
- If a major lapse is not rectified upon receiving the notice PIU shall invoke reduction, in the subsequent interim payment certificate.
- For major lapses, 10% of the interim payment certificate will be withheld, subject to a maximum limit of about 0.5% of the contract value.
- If the lapse is not rectified within one month after withholding the payment, **the amount withheld shall be forfeited immediately.**

9.7. Environmental Monitoring Plan

The monitoring programme consists of performance indicators, reporting formats and necessary budgetary provisions. The Contractor's monitoring plan should be following the baseline environmental monitoring, locations provided in the Environmental impact assessment report.

The monitoring plan has the following objectives:

- To ensure effective implementation of EMP
- To evaluate the performance of mitigation measures proposed in the EMP
- To comply with all applicable environmental, safety, labour and local legislation
- To ensure that public opinions and obligations are taken into account and respected to the required satisfaction level
- To modify the mitigation measures or implementing additional measures, if required

The environmental monitoring plan is discussed below:

Ambient Air Quality Monitoring (AAQM)

The ambient air quality parameters viz: Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2), Carbon Monoxide (CO), Particulate Matter (PM_{10} and $PM_{2.5}$), shall be monitored six monthly at identified locations from the start of the construction activity. The ambient air quality parameters shall be monitored following the National Ambient Air Quality Standards. The duration and the pollution parameters to be monitored and the responsible institutional arrangements are detailed out in the Environmental Monitoring Plan.

Noise Quality Monitoring

The noise levels shall be monitored at designated locations following the Ambient Noise Quality standards. The duration and the noise pollution parameters to be monitored and the responsible institutional arrangements are detailed in the Environmental Monitoring Plan.

Surface Water Quality Monitoring

Surface Water quality parameters such as pH, BOD, COD, DO coliform count, total suspended solids, total dissolved solids, Hardness, Conductivity etc. shall be monitored at all identified locations during the construction stage as per standards prescribed by Central Pollution Control Board. The duration and the pollution parameters to be monitored and the responsible institutional arrangements are detailed out in the Environmental Monitoring Plan

The monitoring requirement for the different environmental components have been prepared is presented in Table 9.2 below;

Table 9.2: Environmental Monitoring Plan

Attribute	Project Stage	Parameter	Special Guidance	Standards	Frequency	Duration	Location	Implementation
Air	Pre-Consuction, Construction & Operation Stage	PM_{10}, $PM_{2.5}$, SO_2,NO_2,CO	Use method specified in National Ambient Air Quality Standards (NAAQM).	National Ambient Air Quality Standards (NAAQM).	Six Monthly (Summer and Post Monsoon Seasons)	24 hours of Sampling	At Sadoora Bridge site, Batching Plant, Workers Campsite, Project Office Site	PIU through Environmental Monitoring Laboratory
Surface Water	Pre-Construction, Construction & Operation Stage	pH, BOD, COD, Oil & Grease, Total Suspended Solid (TSS), Total Dissolved Solid (TDS)	Grab sample collected from source and Analyses as per standard Methods for Examination of Water and Wastewater	Indian Standards: for Inland Surface Water (IS: 2296, 1962	Six Monthly (Summer and Post Monsoon Seasons)	Grab Sampling	Bringi Nallah/ Stream at Sadoora Bridge site	PIU through Environmental Monitoring Laboratory
Noise	Pre-Consuction, Construction & Operation Stage	Hourly Level Equivalent (Leq) on dB (A} scale	Equivalent noise levels using an integrated noise level meter kept at it a distance of 1 m from the edge of the pavement	MoEF Noise Rules. 2000	Quarterly (Summer and Post Monsoon Seasons)	Leq in dB(A) of daytime and night time	Bridge site, Batching and HMP Plant, Workers Campsite,	PIU through Environmental Monitoring Laboratory
Borrow Area	Construction Phase	As per Guidelines	Visual Observations	-	Before opening at least once in a month during operation, Post Rehabilitation.	-	Borrow area Location	Contractor/PIU, TAQAC
Tree Cutting	Pre-Construction	Only identified/ marked trees	EMP/ Inspection	EMP	After getting approval/ permission of Walnut tree.	Once	Identified trees	Contractor/ PIU
Tree Plantation	Operation Phase	Survival Rate	Plantation of tall saplings	National Green Highways policy and IRC guidelines (IRC : SP:21-2019)	Quarterly to two years post plantation	-	Areas where the plantation is being done	Contractor/PIU TAQAC

9.8. Performance Monitoring Indicators

Physical, biological and environmental management components identified as of particular significance in affecting the environment at critical locations have been suggested as Performance Indicators (PIs). The Performance Indicators shall be evaluated under three heads as:

- Environmental condition Indicators to determine the efficacy of environmental management measures in the control of air, noise, water and soil pollution;
- Environmental management indicators to determine compliance with the suggested environmental management measures
- Operational performance indicators have also been devised to determine the efficacy and utility of the proposed mitigation measures

The performance indicators of the proposed bridge of Sadoora is provided in Table 9.3 below;

Table 9.3: The Performance Indicators for Project Implementation

S.No.	Indicator	Details	Stage	Responsibility
A		**Environmental Condition Indicators and Monitoring Plan**		
1	Air Quality	The parameters to be monitored, frequency and duration of monitoring, as well as the locations to be monitored, will be six monthly summer and post-monsoon seasons	Baseline (pre-construction) Construction Post-construction	PMU, PIU Environmental Monitoring Laboratory of PMU through TAQAC
2	Noise Levels	Quarterly, Hourly Level equivalent (Leq).	Baseline (pre-construction) Construction Post Construction	PMU, PIU Environmental Monitoring Laboratory of PMU through TAQAC
3	Water Quality	Nearby rivers, surface water body, six-monthly summer and post-monsoon seasons	Baseline (pre-construction) Construction Post Construction	PMU, PIU Environmental Monitoring Laboratory of PMU through TAQAC agency
B	**Environmental Management Indicators and Monitoring Plan**			
1	Construction Camp	Locations of construction camps have to be identified and parameters indicative of the environment in the area has to be reported.	Pre Construction	PIU/Contractor
2	Borrow Areas	Locations of borrow areas have to	Pre	

		be identified and parameters indicative of the environment in the area has to be reported	Construction	PIU/Contractor
3	Tree Protection	Protective Measures of Scheduled Trees	Pre Construction/ Construction	Contractor/PIU
4	Tree Cutting	Progress of Tree removal marked for cutting is to be reported, if any	Pre Construction	PIU/Contractor to Forest Department
5	Tree Plantation	Progress of measures suggested as part of the strategy is to be reported	By end of the Construction	PIU/Forest Department
6	Occupational Health & Safety Measures	Occupational, Health & Safety of workers engaged in construction activities	Daily	Environment & Safety Officer of the Contractor.
7	Bridge Protection Work and Scour Protection	Monitoring of Bridge Protection and Scour Protection	During rains	PIU/ TAQAC

9.9. Monitoring Plans for Environment Conditions

For each of the environmental components, the environmental monitoring plan specifies the parameters to be monitored; location of the monitoring sites and duration of monitoring. The monitoring plan also specifies the applicable standards, implementation and supervising responsibilities. The monitoring plan for the various environmental condition indicators of the project in construction stages is already presented in **Table 9.2**. Monitoring plan does not include the requirement of arising out of regulation provision such as obtaining NOC/Consent for plant site operation.

Furthermore, periodical site monitoring should be carried out by the Environmental Expert of PIU for surveillance & monitoring of safety of the construction site.. The brief description of measures has been given in **Table 9.4** below:

Table 9.4: Brief Description of Measures

Sl. No.	Locations of Work Site	Bridge Site Safety Measures
1	Construction Sites	Caution boards, Safety Cones, Delineators
2	Deep Cutting	The construction zone should be barricaded with applicable safe G.I Sheet or arrangement to be made as per the plan approved by the PIU / PMU. [Provide Safety Sign Boards and Safety Barriers marked with reflective tapes]
3	Temporary Diversion (if any)	Diversion Board, Barricading Diversion with reflective tape for illumination at night at the all diverted locations
4	Safety for the Workers	Helmets, Safety-Shoes, Goggles, Dusk mask. etc

9.10. Reporting System

The contractor will follow the reporting system for the implementation of the environmental management plan and its indicators. The Contractor will report the PIU on corrective measures and implementation status of mitigation measures as per the environmental management plan. The EMP compliance report will comprise the photographic evidence (with date, time and geo-reference) for implemented mitigation measures in the monitoring reports.

Table 9.5: The Reporting System and Requirements

S.No	Item	Stage	Contractor	PIU/ TAQAC
			Implementation & Reporting to PIU	Supervise/ Field Compliance Monitoring
1.	Setting up of construction Camp	Pre-Construction	One Time	One Time
2.	Identification of disposal locations for constructional & other wastes from Bridge Project	Pre-Construction	One Time	One Time
3.	Tree cutting	Pre-Construction	One Time	One Time
4.	Top Soil Preservations	Pre-Construction	One Time	
5.	EMP Implementation Report	Construction	Monthly	Monthly
7.	Pollution Monitoring	Construction	Six Monthly	Six Monthly
8	Cleaning and Restoration on Demobilization	On completion of construction of Bridge at Sadoora	One Time	One Time

The contractor will take all reasonable steps to protect the environment on & off the project site and to avoid, minimize and mitigate impacts due to the bridge construction work activities creating pollution to environment and other causes as a consequence of methods of operations.

9.11. Budgetary Provision for EMP

Mitigation measures proposed in the EMP will be implemented by the Contractor and under the supervision/ monitoring by the PIU/TAQAC. The works to be undertaken by the contractor have been quantified and the quantities included in the respective BOQ items. The essentials of environmental health and safety and effective implementation of COVID-19 Standard Operating Procedures (SOP) as per Govt. guidelines/ measures to be followed by the contractor have been included in the annexures of this EIA report.

The indicative split up of capital and recurring cost for the environmental management plan for the project is presented in following **Table 9.6;**

Table 9.6: Budgetary Allocation- Indicative Cost for EMP Implementation for the "Construction of 3x30 meter Steel Trussed Girder Bridge at Sadoora in District Anantnag.

S. No.	Component	Item	Unit	Unit Cost (INR)	Quantity	Total Cost	Responsibility
A	**Pre-Construction Stage**						
1	Air	Baseline Monitoring Ambient Air Quality at 1 location especially near sensitive receptors/ Settlements.	No.	7000	24 hr sample, One time monitoring Location ($PM_{2.5}$, PM_{10}, SO_2 and NO_2)	7000	PMU
2	Water	Surface Water Quality sample from Bringi Nallah location	No.	5000	Grab Sample from Bringi Nallah Location (pH, TSS, TDS, BOD, COD, Oil & Grease, Turbidity)	5000	PMU
3	Noise	Noise Measurements at 1 location near sensitive receptors/ Settlement	No.	3000	Hourly measurements for 24 hours.	3000	PMU
B. Construction Stage							
4	COVID-19 "Standard Operating Procedure" as per Govt. Guidelines for Construction site/ Workplace/ Campsite	Masks, Sanitizer Equipments (sensor-based/ dispenser based), appointment of Covid -19 "Marshal for SOP implementation"	Lump Sum			200000	PIU/ Contractor
5	Air	Ambient Air Quality at 1 bridge location within the construction zone and operational plant sites. (except for the monsoon)	No.	7000	24 hr sample, (Six monthly) ($PM_{2.5}$, PM_{10}, SO_2 and NO_2)	21000	PMU
6	Water	Surface Water Quality at 1 location (six monthly)	No.	5000	Grab Samples at 1 Location at Bringi Nallah (pH, TSS, TDS,	15000	PMU

S. No.	Component	Item	Unit	Unit Cost (INR)	Quantity	Total Cost	Responsibility
		1 Ground Water/ Public Water Source (six monthly)		7000	BOD, COD, Oil & Grease, Turbidity) Parameters as per IS 10500:2012	21000	PMU
9	Noise	Noise measurements at 1 location near sensitive receptors/ Settlements within the construction zone (Quarterly)	No.	3000	Hourly measurements for 24 hours.	18000	PMU
10	Air	Dust Suppression Measures	Cost part of the civil works.				
11	Labour camp and Ancillary Facilities	Labour Camp and all associated facilities as per EMP	Cost part of the civil works.				
12	First Aid Kits	First Aid Kits at the construction site, camp and ancillary sites	Cost part of the civil works. -				
Project Enhancement by PMU-JTFRP							
13	Embankment Protection/ Slope Stability	Plantation/ Grass engraining with indigenous shrubs	Lump Sum			50000	PMU
14	Plantation Dive	Tree Plantation (Pine/ *Cedrus deodara*)	Lump Sum			50000	PMU
C. **Operation Stage (Post Construction Monitoring)**							
15	Air	Ambient Air Quality at 1 location near Sadooa approach road side	No.	7000	24 hourly sample, one-time monitoring (Post Construction)	7000	PMU
16	Noise	Noise Levels at 1 location near sensitive receptors	No.	3000	One time monitoring (Post Evaluation)	3000	PMU

S. No.	Component	Item	Unit	Unit Cost (INR)	Quantity	Total Cost	Responsibility
17	Water	Surface Water Quality at 1 location (Brinji Nallah/ Stream)	No.	5000	One time monitoring (Post Evaluation) 1 Sample	5000	PMU
Total Budget						**405,000**	

9.12. Formats For Reporting

Formats for reporting/monitoring the progress/parameters achieved will be finalized by PIU/ TAQAC in consultation with the Contractor.

9.13. Environmental Compliance Report

The contractor shall submit a monthly progress report as per the reporting format approved by the PIU on the status of the implementation of the EMP. Environmental Compliance report will systematically contain a copy of regulatory permissions/consents/clearance, geo-referenced photographs with date and time for EMP/mitigation measures implementation, environmental monitoring report, accidents report, etc.

ANNEXURE-I: Environment and Social Screening Data Sheets

Part A: General Information

1. Name of the sub-project	Construction of 3x30 meter Three Span Steel Trussed Girder Bridge on Bringi Nallah at Sadoora-Asajipora Kamad Road in District Anantnag	
2. Type of proposed activity (tick the applicable option and provide details)		
▪ Road		-
▪ Bridge		√
▪ Fire Station		-
▪ Hospital/Health Facility		-
▪ Educational Institute		-
▪ Building for Livelihoods		-
▪ Flood Infrastructure Related		-
▪ Other Public Building		-.
▪ Any Other (Please Specify)		-
3. Location of the proposed sub-project		
▪ Name of the Region	Kashmir (J&K State)	
▪ Name of the District	Anantnag	
▪ Name of the Block	Kamad	
▪ Name of the Settlement	Sadoora, Asajipora, Kamad	
▪ Latitude	33° 6′ 77.52"	
▪ Longitude	75° 14′ 53.44"	

4a. Proposed Nature of Work (tick the applicable options)	
▪ Minor Repairs	-
▪ Major Repairs/Rehabilitation	-
▪ Upgrading/Major Improvement	-
▪ Expansion of the facility	-
▪ New Construction	√
▪ Any Other	-
4b. Size of the sub-project (approx. area in sq. mt/hac or length in mt/km, as relevant)	3x30 meter Steel Trussed Girder Type Bridge
5. Land Requirement (in hac./sq.mt.)	
▪ Total Requirement	Nil
▪ Private Land	Nil
▪ Govt. Land	Nil
▪ Forest Land	Nil
6. Implementing Agency Details (sub-project level)	
▪ Name of the Department/Agency	Roads & Buildings Department
▪ Name of the contact person	Er. Basharat Jaleel
▪ Designation	Executive Engineer (Xen)
▪ Contact Number	+91-9419590800
▪ E-mail Id	-
7. Screening Exercise Details	
▪ Date on which it was carried out	10/09/2018
▪ Name of the Person	Yadullah Shah/Vikas Sharma
▪ Contact Number	+91 9622672672/ 9419125803
▪ E-mail Id	yaadshah@gmail.com jkerasocial@gmail.com

Part B (1): Environment Screening

Question	Yes	No	Details
1. **Is the sub-project located in whole or part within 1 km of the following Environmental sensitive areas?**			
a. Biosphere Reserve		No	
b. National Park		No	
c. Wildlife/Bird Sanctuary		No	
d. Wildlife/Bird Reserve		No	
e. Important Bird Areas (IBAs)		No	
f. Habitat of migratory birds (outside protected areas)		No	
g. Breeding/Foraging/Migratory route of Wild Animals (outside protected areas)		No	
h. Area with threatened/rare/ endangered fauna (outside protected areas)		No	
i. Area with threatened/rare/ endangered flora (outside protected areas)		No	
j. Reserved/Protected Forest		No	
k. Other category of Forest		No	
l. Wetland		No	
m. Natural Lakes		No	
n. Rivers/Streams	Yes		3x30 meter bridge at Sadoora is proposed to be constructed over Bringi Nallah/ Stream
Question	**Yes**	**No**	**Details**
o. Swamps/Mudflats		No	
p. Zoological Park		No	
q. Botanical Garden		No	

4. Is the sub-project located in whole or part within 500m of any of the following sensitive features?			
a. World Heritage Sites		No	
b. Archaeological monuments/ sites (under ASI's central/state list)		No	
c. Historic Places/Monuments/ Buildings/Other Assets (not listed under ASI list but considered locally important or carry a sentimental value)		No	
d. Religious Places (regionally or locally important)		No	
e. Reservoirs/Dams		No	
f. Canals		No	
g. Public Water Supply Areas from Rivers/Surface Water Bodies/Ground Water Sources		No	
4. What is the High Flood Level in the sub-project area?			
5. Is any scheduled/protected tree like Chinar, Mulberry or Deodar likely to be affected/ cut due to the project?		No	
6. Is the sub-project located in a landslide/heavy erosion prone area or affected by such a problem?		No	
7. Is sub-project located in an area that faces water paucity or water quality issues?		No	

Part B (2) : Result/Outcome of Environmental Screening Exercise		
1.	Environment Impact Assessment Required	No
2.	Environment Clearance Required	No
3.	Forest land Clearance/Diversion Required	No
4.	Tree Cutting Permission Required	No
5.	ASI (Centre/State) Permission Required	No

6.	Permission from ULB/Local Body/Department Required	Yes, permission from Irrigation & flood control department is required.-
7	Any other clearance/permission required	Only Statutory clearances and NOC's / PUC's for establishment or operation of stone crushers, Hot Mix plants, generators, vehicles etc shall be required to be obtained by the Contractor during execution stage.

Part C (1): Social Screening

1. Does the sub-project activity require acquisition of land?			
Yes		No	√
Give the following details:	Private Land (sqmts/hac.)		Nil
	Govt. Land (sqmts/hac.)		Nil
	Forest Land (sqmts/hac.)		Nil
2. Does the proposed sub-project activity result in demolition/removal of existing structures?			
Yes		No	✓
If so, give the following details:			
Number of public structures/buildings		Nil	
Number of common property resources (such as religious/cultural/drinking water/wells/etc.)		Nil	
Number of private structures (located on private or public land)		Nil	
3. Does the proposed project activity result in loss of crops/trees?			
Yes		No	✓
4. Does the proposed project activity result in loss of direct livelihood/employment?			
Yes		No	✓
5. Does the proposed activity result in loss of community forest/pastures on which nearby residents/local population are dependent?			
Yes		No	✓
If yes, give the details of the extent of area to be lost (in acres/hac)			

6. Does the proposed project activity affect scheduled tribe/caste communities?			
Yes		No	✓

Part C (2): Result/Outcome of Social Screening Exercise

S. No.	Result/Outcome	Outcome
1.	Answer to all the questions is 'No' and only forest land is being acquired	NA
2.	Answer to any question is 'Yes' and the sub-project does not affect more than 200 people (i.e. either complete or partial loss of assets and/or livelihood)	No RAP is required
3.	Answer to any question is 'Yes' and the sub-project affects more than 200 people (i.e. either complete or partial loss of assets and/or livelihood)	No SIA/RAP required

ANNEXURE-II: Site Photographs of the Bridge Location at Sadoora

View of Brinji Nallah/ Stream at Sadoora

Downstream side of Brinji Nallah at Sadoora

Upstream side of Brinji Nallah at Sadoora

Proposed site for the bridge construction of 3x 30 meter span bridge at Sadoora, Anantnag.

Existing temporary bailey bridge on RHS of the poposed bridge. This temporary was constructed after 2014 floods and was damaged number of times.

Odds and ends of the damaged bridge (which was washed away during 2014 floods) near proposed bridge site downstream.

Approach road from Sadoora side (view from Brinji nallah)

Approach road from Sadoora side (view from approach oad towards Brinji nallah)


Approach road from the Kamad side


Approach road from the Kamad side. A small 4-5 ft water channel is running close to the the existing Kamad road.




Stone Crusher unit near sadoora Project site from Kamad side

ANNEXURE-III: Site Photographs of the Bridge Location at Sadoora and public consultation

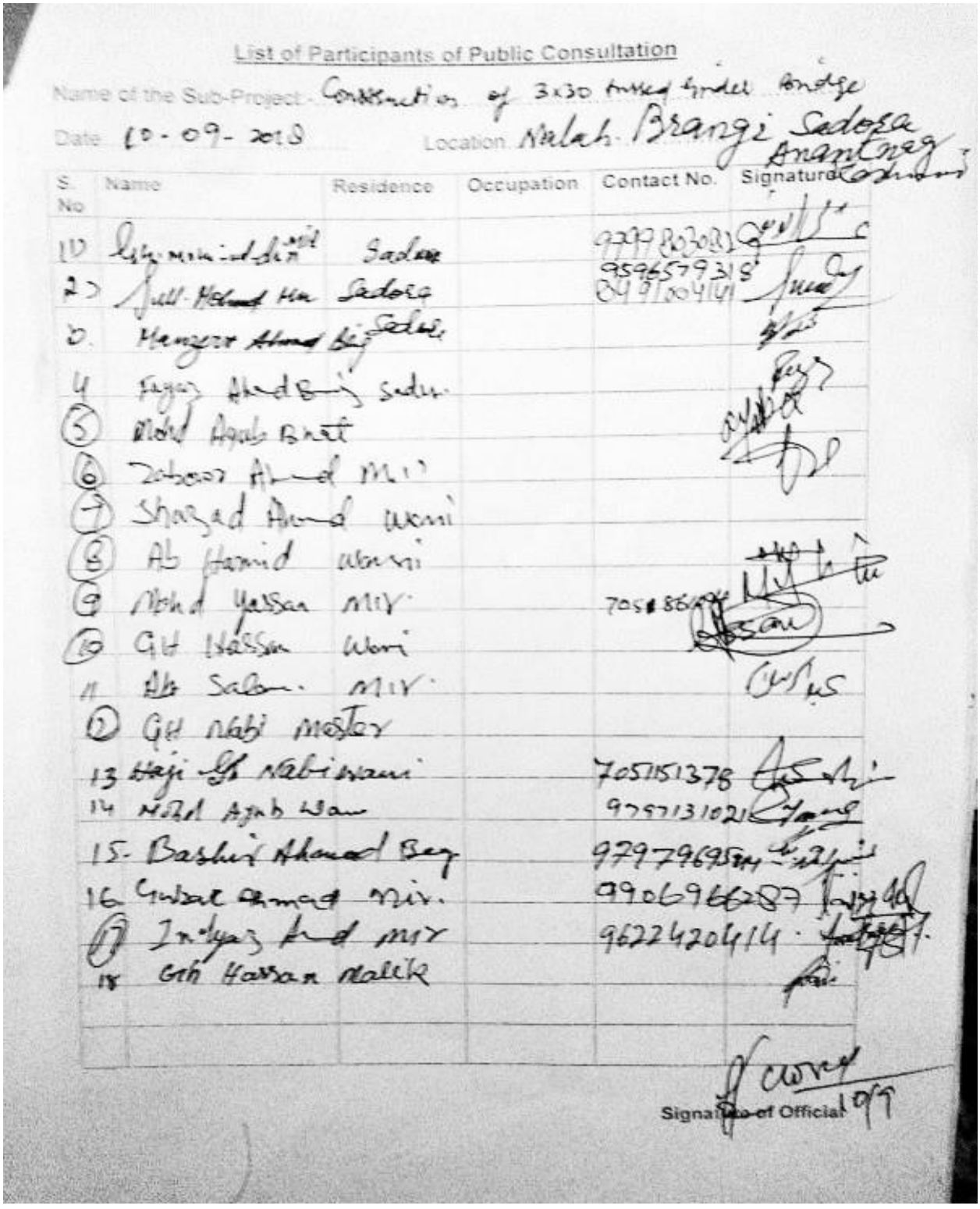
View of Proposed Bridge Site at Sadoora and onsite Public Consulation

Public Consulation at Sadoora

Consultation at Bridge Site

Consultation was conducted in the Sadoora (Kamad Block). Proposed bridge project was discussed with the local people and participated in this process. People here are suffering as direct access route does not exist and they have to cross the Nallah by foot. A temporary bridge was there which was washed away by September 2014 floods. Construction of the proposed bridge at Sadoora on Bringi Nallah will address their problems manifold like transportation horticultural/ agricultural produce, other goods etc.

ANNEXURE-IV: List of consulted participants and their signatures during consultation held on 10.09.2018 and 18.03.2019



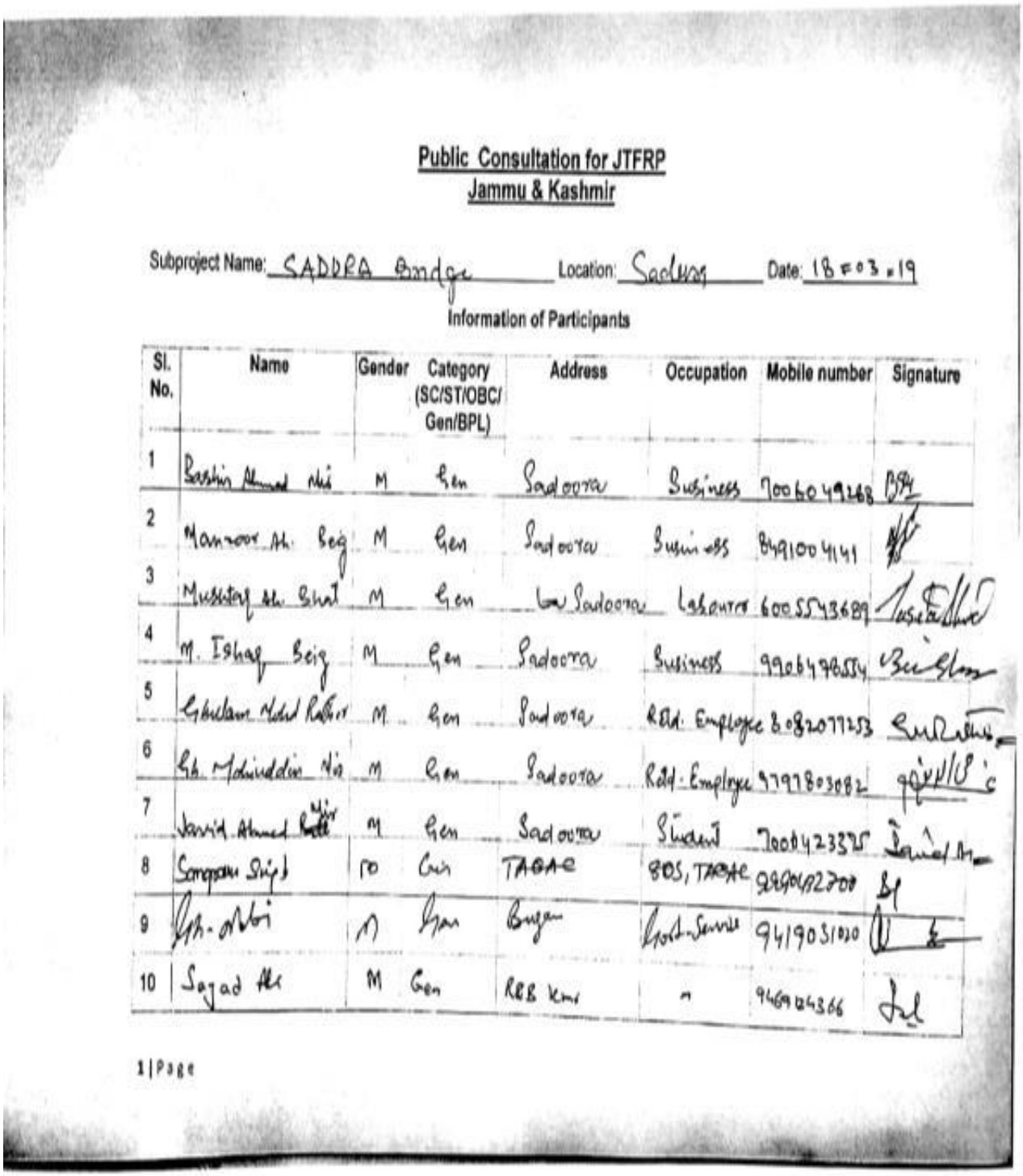
List of Participants of Public Consultation

Name of the Sub-Project: Construction of 3x30 mtrs Girder Bridge

Date: 10-09-2018 Location: Nalah Brangi Sadoora Anantnag

S. No	Name	Residence	Occupation	Contact No.	Signature
10	[illegible]	Sadoo		[illegible]	
2>	[illegible]	Sadora		9596579318	
3.	[illegible]	Sadora			
4	[illegible]	Sadu			
5	[illegible]				
6	[illegible]				
7	[illegible]				
8	[illegible]				
9	[illegible]				
10	[illegible]				
11	[illegible]				
12	[illegible]				
13	[illegible]			7051151378	
14	[illegible]			9797131021	
15	[illegible]			[illegible]	
16	[illegible]			9906966287	
17	[illegible]			9622420414	
18	[illegible]				

Signature of Official



Public Consultation for JTFRP
Jammu & Kashmir

Subproject Name: SADORA Bridge Location: Sadoora Date: 18-03-19

Information of Participants

Sl. No.	Name	Gender	Category (SC/ST/OBC/ Gen/BPL)	Address	Occupation	Mobile number	Signature
1	Bashir Ahmad Mir	M	Gen	Sadoora	Business	7006049268	
2	Manzoor Ah. Beg	M	Gen	Sadoora	Business	8491004141	
3	Mushtaq Ah. Bhat	M	Gen	Sadoora	Laborer	6005543689	
4	M. Ishaq Beig	M	Gen	Sadoora	Business	9906496554	
5	Ghulam Mohd Rather	M	Gen	Sadoora	Retd. Employee	8082077253	
6	Gh. Mohiuddin Mir	M	Gen	Sadoora	Retd. Employee	9797803082	
7	Javid Ahmad Mir	M	Gen	Sadoora	Student	7006423325	
8	Sangram Singh	SC	Gen	TAGAE	BDS, TAGAE	9906822700	
9	Gh. Nabi	M	Gen	Bugan	Govt. Servant	9419031020	
10	Sajad Ali	M	Gen	RBB Kmd	-	9469243666	

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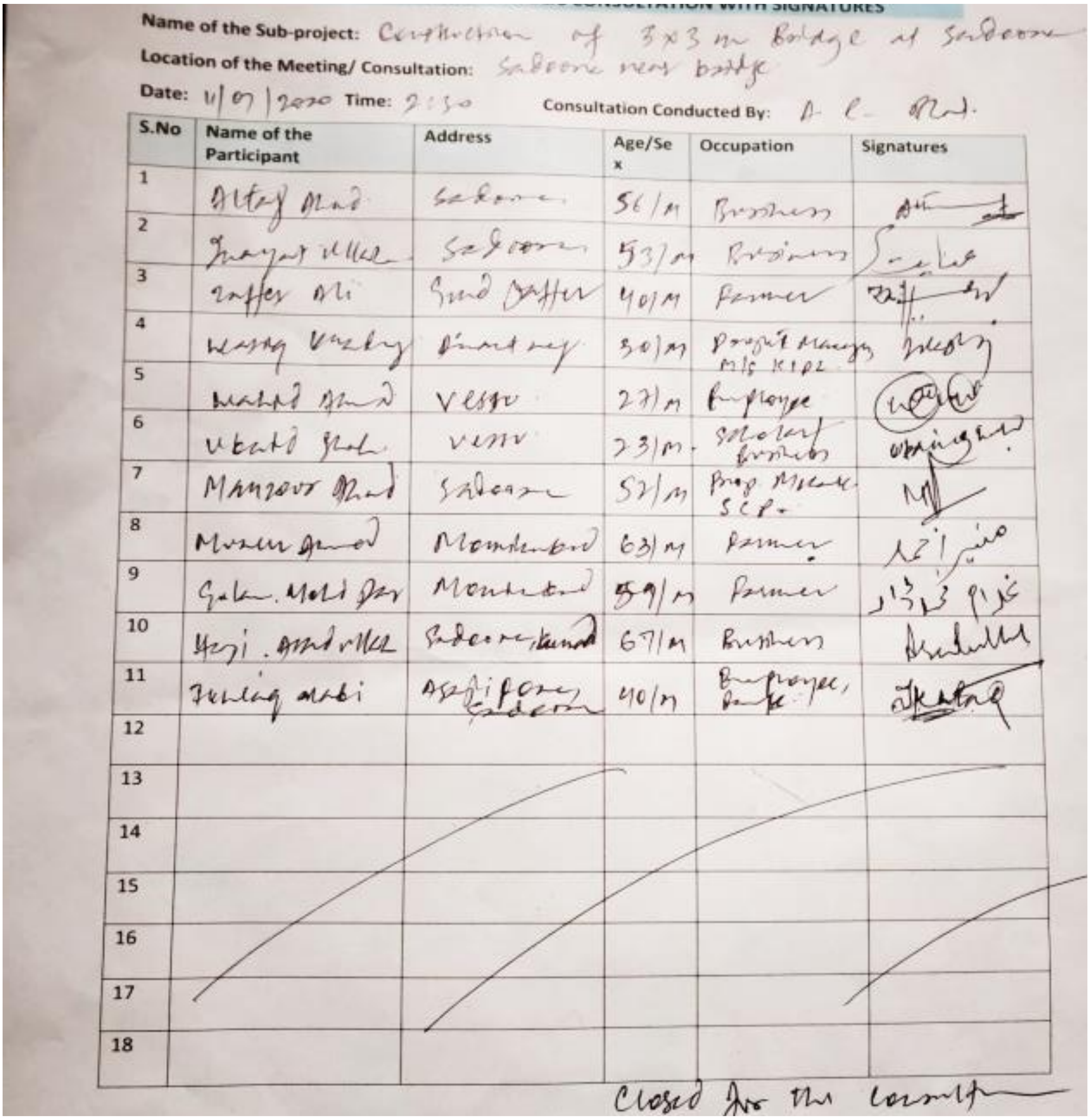

Name of the Sub-project: Construction of 3x3 m Bridge at Sadoora
Location of the Meeting/ Consultation: Sadoora near bridge
Date: 11/07/2020 Time: 2:30 Consultation Conducted By: A. R. Mir

S.No	Name of the Participant	Address	Age/Sex	Occupation	Signatures
1	Altaf Ahmad	Sadoora	56/M	Business	[signature]
2	Inayat Ullah	Sadoora	53/M	Business	[signature]
3	Zaffer Ali	Syed Jaffer	40/M	Farmer	[signature]
4	Wasim Rafiq	[illegible]	30/M	Project Manager M/s KIPL	[signature]
5	Wahid Ahmad	Vessu	27/M	Employee	[signature]
6	Ubaid Shah	Vessu	23/M	Safety officer	[signature]
7	Manzoor Ahmad	Sadoora	52/M	Prop. Medical Store	[signature]
8	Muneer Ahmad	Mominabad	63/M	Farmer	منیر احمد
9	Gulam Mohi Dar	Mominabad	59/M	Farmer	غلام محی ڈار
10	Haji Abdullah	Sadoora, Kamad	67/M	Business	[signature]
11	Ishfaq Nabi	Asajipora, Sadoora	40/M	Employee, Bank	[signature]
12					
13					
14					
15					
16					
17					
18					

Closed for the consultation

ANNEXURE-V: Guidelines For Siting, Management And Redevelopment of Labour Camp

A. Overview

Labour camp include accommodation for workers/labourers along with other basic amenities such as kitchen, potable water supply, sanitation (toilets, bathrooms, washing areas and water supply for such needs), first aid room as well as garbage collection and

disposal facility. The guidelines outlined here aims to facilitate the contractor in implementing the measures in the EMP there by reducing the impact on the environment.

B. Criteria for Locating the Site

To the extent possible, fertile lands shall be avoided for locating camp site.

C. Finalization of Selected Site

After identification of the site, the Contractor should fill up the prescribed reporting format provided in EMP as annexure and submit the same for approval to the Environmental Expert of PIU. The selected site shall be approved by Environmental Expert of PIU, after considering the compliance. No agreements or payments shall be made to the land owner/s prior to receipt of a written approval from the Environmental Expert of PIU. Any consequence of rejection prior to the approval shall be the responsibility of the Contractor and shall be restored at his own cost. After obtaining a written approval from the Environmental Expert of PIU for the selected site, the Contractor has to enter into an agreement with the landowner to obtain his/her consent before commencing any operation/activities in the land. The agreement should also mention its type, duration, amount and mode of payment as well as the preferences of the owner regarding site maintenance and redevelopment.

D. Designing And Setting Up of Labour Camp

The following facilities should be provided in a labour camp to ensure safe, clean and hygienic accommodation for the workers.

(i) **Site preparation**: The site should be graded and rendered free from depressions such that the water does not get stagnant anywhere. Fencing should be constructed all around the camp to prevent the trespassing of humans and animals. The approved layout plan should be strictly adhered to while setting up the camp.

(ii) **Accommodation**: Contractor will follow all relevant provisions of the Building and the other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 for construction and maintenance of labour camp. The height of the worker's and labour accommodation shall not be less than 3m from floor level to the lowest part of the roof. The camp shall be floored with concrete, shall be kept clean, with proper cross ventilation, and the space provided shall be on the basis of one sqm per head or as per the relevant regulation, whichever is higher. Fire and electrical safety pre-cautions shall be adhered to. Cooking, sanitation and washing areas shall be provided separately. The contractor will maintain necessary living accommodation and ancillary facilities (including provision of clean fuel to prevent damage to forests and to prevent fuel wood cutting and burning by labour) in functional and hygienic manner. The site must be graded and rendered free from depressions such that water does not get stagnant anywhere. The entire boundary of the site should be fenced all around with barbed wire so as to prevent the trespassing of humans and animals.

(iii) **Drinking Water**: The Contractor should provide potable water within the precincts of every workplace in a cool and shaded area, which is easily accessible as per standards set by the Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996. All potable water storage

facilities will be on a safely raised platform that is at least 1m above the surrounding ground level. Such facilities shall be regularly maintained from health and hygiene point of view. If necessary, water purifier unit shall be installed for providing potable water.

(iv) **Sanitation Facilities**: Adequate nos. of toilets shall be provided separately for males and females (depending on their strength), with markings for identification in vernacular language. All such facilities must have adequate water supply with proper drainage and disposal facility. They shall be maintained, cleaned and disinfected daily using proper disinfectants. Location and design of soak pit should be in such a way that it doesn't pollute the ground water. Drains and ditches should be treated with bleaching powder on a regular basis. The sewage system for the camp must be properly designed, built and operated so that no health hazard occurs and no pollution to the air, ground or adjacent watercourses takes place.

Portable toilets may be brought to use at construction site and the night soil from such units has to be disposed through designated septic tanks so as to prevent pollution of the surrounding areas. In the main camp, no night soil or sewerage shall be disposed of at any place other than the septic tanks constructed at the site. All these facilities shall be inspected on a weekly basis to check the hygiene standards.

(v) **Waste Disposal**: The Contractor should provide garbage bins in the camp and ensure that these are regularly emptied and disposed off in a hygienic manner. No incineration or burning of wastes shall be carried out by the Contractor. Separate bins shall be provided for biodegradable and non-biodegradable wastes. The disposal of kitchen waste and other biodegradable matter shall be carried out in pits covered with a layer of earth within the camp site. Discarded plastic bags, paper and paper products, bottles, packaging material, gunny bags, hessian, metal containers, strips and scraps of metal, PVC pipe scrubber and poly urethane foam, auto mobile spares, tubes, tires, belts, filters, waste oil, drums and other such materials shall be either reused or sold /given out for recycling.

(vi) **Day Crèche Facility**: At construction site, provision of a day crèche shall be made so as to enable women to leave behind their children while going to work. At least one attendant shall be provided to take care of the children at the crèche. At construction site where 20 or more women are employed, there shall be at least one shelter for use of children under the age of 6 years belonging to such women.

Shelters shall not be constructed to a standard lower than that of thatched roof, mud walls and floor with wooden planks spread over mud floor and covered with matting. Such areas shall be safely barricaded (no sharp sheets or barbed wires that may injure a child) from rest of the camp for the safety of children. Shelters shall be provided with suitable and sufficient openings for light and ventilation. There shall be adequate provision to keep the place clean. The size of a crèche may vary according to the number of children on a camp site.

(vii) **Mess and Kitchen Facilities**: The Contractor shall adhere to the sanitary/hygiene requirements of local medical, health and municipal authorities at all times. Adoption of such precautions as may be necessary to prevent soil and water pollution at the site while operating mess or kitchen facilities.

(viii) First Aid Facilities: At every workplace, a readily available first-aid unit including an adequate supply of sterilized dressing materials and appliances should be provided. Suitable transport should be provided to facilitate taking injured and ill persons to the nearest hospital. Adequate personal protective equipments and fire fighting equipments as detailed out in EMP should be made available in the camp and provided to the staff / workers.

(ix) Health Care Facilities: Health problems of the workers should be taken care of by providing basic health care facilities. If there is no hospital or clinic, which can be accessed in half an hour's time, then a temporary health center should be set up for the construction camp. The health centre should have at least a doctor and a nurse, duty staff, medicines and minimum medical facilities to tackle first aid requirements or minor accidental cases, linkage with nearest higher order hospital to refer patients of major illnesses or critical cases.

The health centre should carryout quarterly awareness programme of HIV – AIDS with the help of AIDS control society as well as about community living and hygiene practices in day to day living. Posters should be exhibited in the health care clinic.

E. Operation of Labour Camp

Throughout the functioning period of the camp, hygienic environment must be ensured by (i) provision of safe drinking water, (ii) proper maintenance of toilets including daily cleaning and disinfection using proper disinfectants, (iii) regular cleaning of drains by removing the silt and solid waste, (if any) and (iv) appropriate waste management practices. While it is of utmost importance to ensure that fire-fighting equipments like fire extinguishers are in working condition, it should also be monitored that construction workers use the personal protective equipments provided to them and they are replaced when necessary. All these facilities should be inspected on a weekly basis to achieve the desired levels of safety and hygiene standards.

F. Preparation of Labour Camp Management And Re-development Plan

After the site for the labour camp has been finalized and approved by Environmental Expert of PIU, the Contractor should prepare a labour camp management and redevelopment plan to be submitted to PIU for approval prior to setting up of the camp and it should comprise the following details:

Section–1: Details of site: Copy of approved site identification report along with location plan, showing the site, its survey no., access road, project stretch, distance form the project stretch, surrounding features and land use like residences, water bodies etc., photograph of the site showing the topography and other existing features.

Section-2: Site preparation: Activities that should be undertaken for preparing the site based on EMP and this guideline.

Section-3: Arrangements/ facilities within the camp: List of facilities to be provided along with its details like area, no of people to be accommodated and a layout plan showing the plan of the site with all the facilities planned like quarters, labour camp, mess, common facilities, toilet facilities, etc.

Section-4: Mitigation measures that should be undertaken as per the EMP and this guideline while setting up of the camp and operation of the camp should be separately listed out here.

Sectoin-5: Other details: Any other relevant detail like list of awareness camp to be provided to workers, details of information dissemination etc. should be included.

Section 6: Re-development plan, which should indicate following points: (i) List of structures to be demolished and list of the clean-up activities that needs to be undertaken, (ii) Proposed use of the land in the post construction phase, if it is a public property, (iii) Presence of existing facilities that could be put in use by the land owner if it is a leased out private land or by the community in case of a public property.

Section-7: Annexure-(a) Working drawings: Electrical plan showing the electrical network planned for the site, location of generators, master switch boards etc. and plumbing drawing showing the network of water supply lines, water tank, drainage facilities etc. (b) Copy of permissions obtained from local governing body / community etc. as applicable, (c) Copy of agreement entered with site owner, in case of leased out site.

All the drawings should have north direction marked in it along with prevailing wind direction. Necessary dimensions and specifications should be provided where ever necessary. The labour camp management plan should be submitted to the Environmental Expert of PIU for a written approval before any physical work is undertaken on a particular site. The Environmental Expert of PIU will carefully examine the proposals in light of the various EMP and regulatory provisions and provide suggestions, as necessary to the Contractor who shall incorporate it in the management plan. Contractor shall be responsible for satisfactory and timely implementation of these EMP requirements.

G. Re-development of The Labour Camp

The Contractor should clear all temporary structures; dispose all building debris, garbage, night soils and any other waste as per the approved debris management plan. All disposal pits or trenches should be filled in, disinfected and effectively sealed off. Entire camp area should be left clean and tidy, in a manner keeping the adjacent lands neat and clear, at the Contractor's expense, to the entire satisfaction of landowner and the Environmental Expert of PIU.

These activities should be completed by the Contractor prior to demobilization. Once the Contractor finishes his job, he needs to obtain a certificate from the owner, stating that the site has been re-developed to his/her satisfaction and in tune with the agreement. Then following documents needs to be submitted to the Environmental Expert of PIU by the

- Copy of approved site identification report
- Photographs of the concerned site 'before' and 'after' setting up the camp.
- Certificate from the owner stating his/her satisfaction about status of re-development of the site.

Engineer-in-charge/Environmental Specialist of PIU (ERA) shall ensure, through site verification that all clean-up and restoration operations are completed satisfactorily and a written approval should be given to the Contractor mentioning the same before the 'works completion' certificate is issued/recommended. The PIU (ERA) shall ensure through site inspection that the Contractor has restored the site properly & completely. The site can then be handed over to the concerned owner or local bodies or for local communities as the case may be. Certification/documentation pertaining to approval for clean-up and

restoration operations and thereafter handing-over to the owner shall be properly maintained by the Contractor.

ANNEXURE-VI: Guidelines to Ensure Worker's Safety During Construction

In order to ensure worker's safety while undertaking various operations/stages of construction many safety measures needs to be followed, which are listed down below:

A. Labour Camp/ Site Office

- Install perimeter fencing.
- Ensure good visibility and safe access at site entrances.
- Provide adequate warning signs at the entrance and exit, as necessary.
- Provide adequate space/area for loading and unloading, storage of materials, equipment and machineries.
- Display emergency procedure and statutory notices at conspicuous locations.
- Provide areas for collecting garbage and other waste material, and also arrange for their regular/periodic disposal.
- Arrange appropriate storage, transportation and use of fuel, other flammable materials and explosives in line with the license requirements obtained from concerned authorities.
- Provide defined access roads and movement areas within the site.
- Ensure availability of first aid facilities and display notices at various work places showing the location of first aid facilities and emergency contact numbers. Provide and enforce use of PPE at construction sites.

B. House Keeping Practices

- Provide proper slope in kitchen, canteens, washrooms, toilets and bathrooms for easy and immediate draining of water.
- Keep all walkways and circulation areas clear and unobstructed at all times.
- Ensure that spillages of oil and grease are avoided and in case of accidental spills, these are immediately collected.
- Use metal bins for collection of oily and greasy rags.
- Do not leave tools on the floor or in any location where they can be easily dislodged.
- Keep windows and light fittings clean.
- Maintain the workplace floors dry and in a non-slippery condition
- Provide and maintain proper drainage system to prevent water logging and unhygienic conditions.
- Ensure that protruding nails in boards or walls are moved or bent over or removed so that they do not constitute a hazard to people.
- Store all flammable materials like HSD in appropriate container with proper cover and labels – as required for various products.
- Display 'no smoking' signs in areas with high risks of fire, (*eg.* near fuelling areas, diesel/oils/lubricant/paint storage area, hessians, rubber, wood and plastic etc.) in and around working area.

C. Safety During Excavation

- During excavation of foundations, necessary safety measures will be taken by the contractor.
- Excavation of 1.5 meters deep or greater require a sides protection unless the excavation is made entirely in stable rock
- Safe access and egress will be require including ladders, steps, ramps, or other safe means of exit of workers in excavated depth of 4 feet (1.22 meters) or deeper
- Excavated earth will be collected and disposed in pre-identified site with the approval of PIU.
- To ensure elimination of excavation hazards, excavation will be carried in the presence of competent person.
- Suitable barricading will be provided

D. Handling of Cement Bags

- Cement bags will be stored and emptied in covered area to control fugitive dust emissions.
- While handling and empting cement bags, workers will wear mask and goggle and hand gloves.
- Manual transferring of cement bags from one place to another place will not be allowed. For this purpose, trolley will be used.

E. Steel Bars Reinforcement for Foundation and Roof

- Manual cutting of steel bars for reinforcement will be discouraged
- Only skilled workers will be deployed by the contractor for steel bar bending and rebaring reinforced structures.
- Correct hand and power tools will be used to tie and cut steel bars.
- Workers engaged in steel bar bending and reinforcement will be provided helmet, suitably strong and flexible leather gloves and safety shoes.
- Workers will take extra caution and attention when walking on steel bar mattes and areas that contain exposed steel bar.
- First aid facilities will be provided at the site to provide first aid incase of cuts or injuries to workers. After providing first aid, injured worker will be taken to hospital for further treatment.

F. Operation of Trucks And Dumpers

- Ensure that only tBringid, authorized and licensed drivers operate the vehicles.
- Enlist help of another worker before reversing the vehicle.
- Switch-off the engine when not in use to save fuel, prevent accidents and unnecessary noise and air pollution.

- Lower the tipping bodies when the machine is unattended, but if it is necessary to leave them in the raised position they should be blocked to prevent their fall by fixing a sturdy support below.
- Carryout periodic servicing as per the manufacturer's requirements. All records of maintenance and repairs should be in writing and available for verification.
- Keep the vehicle tidy and the cabin free from clumsy utilities, which might obstruct the controls and create hazards.
- Avoid carrying additional passengers in the cabin or on the body of the dumper, while in field operation other than the connected workers.
- Provide stop blocks when the vehicle is tipping into or running alongside excavations or when it is parked.
- Do not overload the vehicle.
- Carry only well secured loads and use proper covers and fasteners.

G. Manual Handling and Lifting

- Avoid manual handling of heavy materials.
- Pre-assess the actual requirement of manpower in case of emergency situations.
- All concerned persons shall be tBringid in proper methods of lifting and carrying.
- In all manual operations where groups of workers are involved, a team leader with necessary training to handle the entire work force in unison has to be provided for.
- Watch and ward to control/supervise/guide movement of equipments and machineries, loading and unloading operations, stability of the stockpiled materials and irregularly shaped objects have to be provided for safety and security of workers.
- Carriageway used by the workers must be free from objects.
- Loading and unloading from vehicles shall be under strict supervision.

H. Electrical Hazards

- Statutory warning leaflets/posters are to be distributed/displayed by the Contractor in the vicinity of work site for the benefit of all workers, officers and supervisors as well as the public, indicating the do's and don'ts and warning related to electrical hazards associated with operations to be executed/in progress.
- All wires shall be treated as live wires.
- Report about dangling wires to the site-in-charge and do not touch them.
- Only a qualified electrician should attempt electrical repairs.
- Train all workers about electrical safety.
- Shut down the equipment that is sparking or getting over heated or emitting smoke at the time of operation, if it is not the normal way of working of such machines.
- Inform technical person/s for required maintenance.
- Never use damaged wires for electrical connection.

I. Use And Storage of Flammable Gas

- Store filled gas/LPG cylinder in a secure area – mark this as a no smoking area.

- Transport, store, use and secure cylinders in upright position.
- Ensure proper ventilation at the ground level in locations where LPG is in use.
- Avoid physical damage to the cylinders.
- Never weld near the cylinder.
- Store empty cylinders secured and upright.
- Make sure that the cylinder is closed immediately after use.
- Investigate immediately if there is the smell of LPG or gas.
- Never use destenched gas/LPG on site.
- Make sure that there is no other unrelated fire in the vicinity of the cylinder.

J. Gas Welding

The welders and welding unit should follow all the basic principles of welding for safety and security:

- Use face shield to protect the eyes.
- Use goggles, particularly when chipping slag and cutting strips.
- Use gloves long enough to protect wrists and forearms against heat, sparks, molten metal and radiation hazards.
- Use high-top boots/gum boots to prevent sparks, splinters, sharp edges of metal and hot welded strips, welding rods, electric cables etc. from injuring the legs.
- Avoid inhaling the noxious fumes and gasses from burning electrodes by using gas masks and screen of the work area to prevent the glair moving outside it.
- Keep the key hung from the regulator control for split seconds operations to stop the valve in case of any accidental damage or leakage to supply pipeline that may catch fire and cause accidents in case Acetylene or LPG cylinder.
- The welding area should have sufficient openings with fixed exhaust ventilators or adequate air flow openings to remove poisonous fumes and gases.
- Take precautions of wearing hard hats or fiber helmets to prevent injury due to fall of any object and accidental injury from projections while welding.
- Welders operating above ground should have adequate safety belt secured to stable platform to prevent accidental fall or injury from the scaffold. All electrical and gas connection lines up to the welder should be sufficiently insulated and protected from sharp edges and sharp objects. These shall not come into contact with hot metal.
- Do not use gas cylinders for supporting work or as rollers.
- While using LPG cylinders for welding, follow all safety precautions as has been prescribed by the supplier company.
- Avoid fire hazards and accidents by posting safety supervisors to oversee the activities of workers.
- Do not store explosives, high inflammable materials, loose hanging overhead objects, hot welded strips etc. near gas cylinders.
- Close all valves, switches and circuits while leaving the work place under proper lock and key. In case of mobile units, proper carriage procedures have to be followed for safety and security of men and materials.

K. Fire Safety Practices

- Store flammable material in proper areas having adequate fire protection systems.
- Display sufficient warning signs.
- Install fire alarm wherever required and test regularly.
- Inspect fire extinguishers regularly and replace as necessary.
- Train selected personal on use of fire extinguishers
- Fire escape route should be kept clear at all times and clearly indicated
- Display escape route maps prominently on each side.
- Provide sufficient exit signs at prominent locations for directing people to the escape staircases and routes.
- Train workers about the escape route and assembly point/s.
- Carryout fire drill periodically.

L. Noise Hazards And its Control

- Plan camp lay-out in a manner that ensures barriers/buffers between residential/ office units and high noise generating zones.
- Use sound meters to measure the level of noise and if it exceeds 75 dB(A), then ensure preventive measures.
- Make personnel aware of noisy areas by using suitable warning signs and insist on use of ear protectors/ear plugs to prevent excess noise affecting the workmen.
- Reduce noise at source by: use of improved equipments; regular and proper maintenance of the machinery as per the manufacturer's manual; by replacing rickety and noisy equipments and machineries. Screening locations with noise absorbing material; making changes in the process/equipment; controlling machine speeds; ensuring that two noise-generating machines are not running at the same time close to each other at same location; using cutting oils and hydraulic noise breakers; providing vibration and noise absorbing platform and firm embedding of equipments with fasteners.
- Appoint a competent person to: carryout a detailed noise assessment of the site; designate ear protection zone/s; give training/instructions on the necessary precautionary measures to be observed by site personnel including using suitable type of ear protection equipments.

M. Personal Protective Equipment

General

- Provision of personal protective equipment has to be made over and above all measures taken for removing or controlling safety hazards on a work site.
- Ensure that sufficient personal protective equipments are provided and that they are readily available for every person who may need to use them.
- The Contractor's Project Manager shall ensure that all persons make full and proper use of the personal protective equipment provided.
- Provide instruction/s and training for the proper use and care of personal protective equipment.

- Ensure that the personal protective equipments are in good condition.
- Train workers to report unintentional damages for replacement and to always keep the personal protective equipment clean.
- PPE includes, but may not be limited to, hard hats, goggles, ear plugs, gloves, air filters/masks, boots, ropes etc.

Head Protection

- Hard hats are compulsory for all workers, supervisors and managers/officials while working and/or inspecting a work site.
- Hard hat areas shall be demarcated clearly.

Hearing Protection

- Provide ear plugs or ear muffs to the workers and to those who need to get in and out of a high noise area frequently. Use re-usable earplugs when the reduction required (15-25 dBA) is not excessive. Use earmuffs where a large attenuation of upto 40 dBA is demanded.
- Do not use dry cotton wool for hearing protection because it doesn't provide any such protection.
- Provide disposable ear plugs for infrequent visitors and ensure that these are never re-used.
- Replenish ear plugs from time to time for those who need to work continuously for a long period in a high noise area/s.
- Use ear muffs with replaceable ear cushions because they deteriorate with age or may be damaged in use.
- Avoid wearing spectacles with ear muffs.
- Use soap and water or the recommended solvent for cleaning ear muffs.

Respiratory (Protective) Equipment

- Wear suitable mask for protection when there is a potential for small particles entering the lungs, e.g. emptying of cement bags, etc.
- Provide training to all persons using the masks/respirators for their correct fitting, use, limitations and symptoms of exposure.
- Clean and inspect all respirators before and after use.
- Store respirators properly when not in use.

Safety Footwear

- Wear suitable footwear for work
- Use safety footwear on site or in other dangerous areas.
- Wear suitable safety shoes or ankle boots when working anywhere where there is high risk of foot injuries from slippery or uneven ground, sharp objects, falling objects etc.
- All safety footwear, including safety shoes, ankle boots and rubber boots, should be fitted with steel toecaps.

- Avoid wearing flip flops, high heeled shoes, slippers, light sport shoes in situations where there is a risk of foot injury.
- Keep shoelace knots tight.

Hand Protection

- Wear suitable gloves for selected activities such as welding, bending steel bars, cutting and manual handling of materials and equipment.
- Do not wear gloves where there is a risk of them becoming entangled in moving parts of machinery.
- Wash hands properly with disinfectant soap and clean water before drinking or eating.
- Wash hands immediately after each operation on site when the situation warrants.

N. First Aid

- Provide first aid boxes at every work site in a cool and shaded place.
- Ensure that training on the use of the first aid box is provided to at least every supervisor on the site.
- Display the list of persons along with their contact numbers who are tBringid on providing first aid.
- Ensure that every first aid box is marked "First Aid" in English and in local language.
- Check for expiry dates and replace the contents, as necessary.
- Maintain a register on health records including injuries/accidents.

O. Reporting of Accident and Investigations

- Any accident at the site will be reported.
- Carryout the investigation as quickly as possible.
- Investigation should be carried out both internally as well as through third party.
- Conduct interviews with as many witnesses as necessary including the affected persons and supervising officials.
- Do not rely on any one/limited source of evidence.
- Check all the log books, stock registers, issue registers, movement registers on site
- After completion of the investigation/enquiry, a summary of the facts recorded, sequence of happenings, persons-in-charge, persons examined, equipments and machineries tested, follow-up of action as per legal requirements, copy of station diary entry, hospital entry, safety regulations etc. to be prepared with a comparative analysis for proper assessment.

ANNEXURE-VII: Reporting Format for Camp Site

	Project Details		**Date of reporting**	
1.	Name of project			
2.	Name and address of the Contractor			
3.	Contract date and duration			
B	**Site Details**			
1.	Place Name		Landmark	
2.	Area of site		Current land use	
3.	Ownership of the land	Owned / leased	Survey no.	
4.	If leased / rented, name, address and contact details of owner			
5.	Distance from construction site			
6.	Distance from Water Body, Forest (if any)			
7.	Distance from the Populated Area			
8.	No of trees with girth> 0.3m on the site			
9.	No of trees to be cut			
10.	Is top soil conservation required (Yes/ No)			
List of enclosures:	(a) Location map			
	(b) Layout plan			
	(c) Photographs of the site			
	(d) List of machinery, equipments and vehicles to be used			
	(e) List of schools and hospitals with in 200 m distance from the boundary of the camp			
C. Submission Details	Submitted by (Environment & Safety Officer of Contractor)		**Approved / Rejected by (Environmental Officer of PIU)**	
Signature & date				
Name				
Designation				
Remarks by Environmental Expert of PIU				

*** All distances are to be measured from the boundary of the site.**

Note: Contractor has to fill and submit this format to the Environmental Expert of PIU upon identification of labour camp site. Subsequently, the Environmental Expert of PIU has to visit the site and approve / reject the site with reasons. The Environmental Expert of PIU has to give a copy of this format to the contractor after his approval / rejection with remarks. On approval of a site, the Contractor has to prepare the Management and Redevelopment Plan for this site as per the Guidelines given in EMP and submit to Environmental Expert of PIU for approval

ANNEXURE VIII: Format For Register of Complaints (Grievance) and it's Reporting

A	Project Details	Information			
1.	Name of project				
2.	Name and address of the Contractor				
3.	Contract date and duration				
B	Details of Complaint Received		Site Name		
Sl. No.	Date of Complaint	Name and address of person with contact details	Complaint	Action taken with date	Signature of ESO of Contractor
1					
2					
3					

A register in this format shall be maintained at each site office of the contractor. This same format shall be used to compile and report the details of complaints received at all site to the Environmental Expert of PIU along with the Monthly Report of the Contractor. The Environmental Expert of PIU has to give instruction to the Contractor, if any further action has to be taken on any complaint.

ANNEXURE IX: Checklist For Monitoring of Labour Camp Management

A	Project Details		Date of Monitoring:	
1.	Name of project.			
2.	Name and address of the Contractor			
3.	Contract date and duration			
4.	Name of Labour Camp			
B	Monitoring Details			
Sl. No.	Environmental Management Measures	Environmental Expert's observation (Yes / No / Not Applicable)	Corrective Actions Proposed	Remarks
1.	Whether the camp are floored with concrete?			
2.	Are all the first aid facilities provided in the camp?			
3.	Whether the camp is located in such a way that there are no residences, public institutions or biosensitive area with in a radius of 500 m from the camp?			
4.	Whether the vehicle movement in and out of the camp is in a controlled manner?			
5.	Whether LPG for cooking is provided?			
6.	Whether safe drinking water is provided?			
7.	Whether all the drains and channels are covered?			
8.	Whether a green belt is provided along the periphery of camp?			
9.	Whether day care centres are provided with in the camp?			
10.	Whether sanitation facilities are provided separately for male and female?			
11.	Whether separate garbage bins are provided to collect the garbage?			
12.	Whether septic tanks with soak pits are provided?			
13.	Whether the location of soak pit is in such a away that it does not pollute the ground water?			
14.	Whether a qualified safety officer is appointed for			

	ensuring safety?			
15.	Whether proper fencing of the camp is done?			
16.	Whether the workers are well aware of cleanliness, hygiene, community livings, AIDS etc.?			
17.	Whether all applicable clearances are obtained and valid till date?			
Signature of Environment and Safety Officer (ESO) of the Contractor with date			**Signature of Environmental Expert of PIU with date**	
Note: The Environmental Expert of PIU has to use this format to monitor the implementation of Environmental Management Measures for each Labour Camp Quarterly. Corrective actions with specific timeframe should be proposed for each Environmental Management Measure, which is not implemented satisfactorily. A copy of the filled up format should be given to the ESO of the Contractor. Environmental Expert of PIU has to attach this format to the Quarterly Report, with details of corrective action taken by the Contractor.				

ANNEXURE X: Check List For Monitoring of Redevelopment of Labour Camp Site

A	Project Details	Date of Monitoring:		
1.	Name of project			
2.	Name and address of the Contractor			
3.	Contract date and duration			
4.	Name of Labour Camp			
B	Monitoring Details			
Sl. No.	Environmental Management Measures	Environmental Expert's observation (Yes / No / Not Applicable)	Corrective Actions Proposed	Remarks
1.	Are all the temporary structures cleared as per the list in the redevelopment plan?			
2.	Are all building debris, garbage, night soils and POL waste disposed off safely?			
3.	Are all disposal pits or trenches filled, disinfected and effectively sealed off?			
4.	Are the facilities that could be put to re-use maintained well?			
5.	Are all the spills within the camp site effectively disposed off from the site?			
6.	All the area within the camp site is leveled and spread over with stored top soil.			
7.	Has the residual top soil been utilized effectively?			
8.	Has the entire camp area been made clean and tidy without disturbing the adjacent lands?			
9.	Are the 'before' and 'after' scenarios of the site documented through photographs and submitted to PIU?			
10.	Are the conditions mentioned by the owner in the agreement adhered to?			
11	If not, mention the details of the conditions that are not adhered to and further steps to be taken.			

12.	Can 'works completion' certificate be issued to this site?			
Signature of Environment and Safety Officer (ESO) of the Contractor with date			**Signature of Environmental Expert of PIU with date**	
Note: The Environmental Expert of PIU has to use this format to monitor the implementation of Environmental Management Measures for the redevelopment of each Labour Camp Site as and when it is closed. Corrective actions with specific timeframe should be proposed for each Environmental Management Measure, which is not implemented satisfactorily. A copy of the filled up format should be given to the ESO of the Contractor. Environmental Expert of PIU has to attach this format to the Quarterly Report, with details of corrective action taken by the Contractor.				

ANNEXURE XI: Reporting Format for Occupational Health And Safety Measures

A	Project Details	Date of Reporting:	
1.	Name of project.		
2.	Name and address of the Contractor		
3.	Contract date and duration		
B	Implementation Status of Health and Safety Measures		
Sl. No.	**Health and Safety Measures**	**Implementation Status (Yes / No)**	**Remarks**
1	Appointment of qualified Environment and Safety Officer		
2	Approval for Construction Safety Management Plan by the Environmental Expert of PIU.		
3	Provision for flags and warning lights for potential hazards		
4	Provision of adequate staging, form work and access (ladders with handrail) for works at a height of more than 3.0 m		
5	Provision of adequate shoring / bracing / barricading / lighting for all deep excavations of more than 3.0 m depth.		
6	Provision for sufficient lighting especially for night time work		
7	Construction Workers safety – Provision of personnel protective equipment's		
	A. Helmets		
	B. Safety Shoe		
	C. Gumboot		
	D. Dust masks		
	E. Hand Gloves		
	F. Safety Belts		
	G. Reflective Jackets		
	H. Earplugs for labour		
8	Workers engaged in welding work shall be provided with welder protective shields		
9	All vehicles are provided with reverse horns.		
10	All scaffolds, ladders and other safety devices shall be maintained in as safe and sound condition		

11	Regular health checkup for labour/ Contractor's personnel		
12	Ensuring the sanitary conditions and all waste disposal procedures & methods in the camp.		
13	Provision for insurance coverage to the workers		
C.	Submission Details		

	Submitted by (Environment & Safety Officer of Contractor)	Approved by (Environmental Officer of PIU)
Signature & date		
Name		
Designation		

Remarks by Environmental Expert of PIU

Note: Contractor has to fill and submit this format to the Environmental Expert of PIU along with the Monthly Report. The Environmental Expert of PIU has to visit the site and verify the details. Further mitigation measures, if required, can be suggested by the Environmental Expert of PIU. The Environmental Expert of PIU has to give back a copy of this format to the contractor after his approval with remarks.

ANNEXURE-XII: Format For Register of Accidents and It's Reporting

A	Project Details			Date of Reporting:
1.	Name of project			
2.	Name and address of the Contractor			
3.	Contract date and duration			
B	**Details of Accident and People Involved in Accident**			
	Name of site where accident happened			
	Name and address of people involved in the accident			
	Whether Contractor's personnel or General public			
	Details of Injury			
	Details of treatment given			
	Details of compensation given			
C	**Type of Accident (√)**			
	Fall of person from a height			**Expl osion**
	Slip, trip or fall on same level			**Fire**
	Struck against fixed objects			**Contact with hot or corrosive substance**
	Struck by flying or falling objects			**Contact with poisonous gas or toxic substances.**
	Struck by moving objects			**Contact with poisonous gas or toxic substances**
	Struck / caught by cable			**Hand tool accident**
	Stepping on hail etc.			**Vehicle / Mobile plant accident**
	Handling without machinery			**Machinery operation accident**
	Crushing / burying			**Other (please specify)**
	Drowning or asphyxiation			
D	**Agent Involved in Accident (√)**			
	Machinery			**Stair edge**
	Portable power appliance			**Excavation**
	Vehicle or associated equipment /machinery			**Ladder**
	Material being handled, used or stored			**Scaffolding**
	Gas, vapor, dust, fume or oxygen			**Construction formwork, shuttering and false work.**
	Hand tools			**Electricity supply cable, wiring switchboard and associated equipment**
	Floor edge			**Nail or chipping**
	Floor opening			**Other (Please specify)**
	Left shaft			
E	**Unsafe Action Relevant to the Accident (√)**			
	Operating without authority			**Failure to use proper footwear**
	Failure to secure objects			**Failure to use eye protector**
	Making safety devices inoperative			**Failure to use respirator**

	Working on moving or dangerous equipment			**Failure to use proper clothing**
	Using un-safety equipment			**Failure to use warn others or given proper signals**
	Adopting unsafe position or posture			**Horseplay**
	Operating or working at unsafe speed			**No unsafe action**
	Unsafe loading, Placing, mixing et			**Others (please specify)**
	Failure to use helmet			
F	**Lack of Safety Measures Relevant to the Accident (√)**			
	No protective gear			**Unsafe layout of job, etc.**
	Defective protective gear			**Unsafe process of job methods**
	Improper dress / footwear			**Poor housekeeping**
	Improper guarding			**Lack of warning system**
	Improper ventilation			**Defective tool, machinery or materials**
	Improper illumination			**No unsafe condition**
	Improper procedure			**Others (please specify)**
G	**Personal Factor Relevant to the Accident (√)**			
	Incorrect attitude /motive			**No unsafe personal factor.**
	Unsafe act by another person			**Other (please specify)**
H	**Details of Corrective and Preventive action taken**			
1				
2				
3				
4				
I	**Submission Details**			

	Submitted by (Environment & Safety Officer of Contractor)	**Approved by (Environmental Officer of PIU)**
Signature & date		
Name		
Designation		
Remarks by Environmental Expert of PIU		

Note: Contractor has to fill this format as and when an accident happens and submit to the PIU along with the Monthly Report. The Environmental Expert of PIU has to visit the site and verify the details. Additional safety measures, if required, can be suggested by the PIU. The Environmental Expert of PIU has to give back a copy of this format to the contractor after his approval with remarks.

ANNEXURE-XIII: Reporting Format For Environmental Pollution Monitoring

A	Project Details			Date of Reporting:		
1.	Name of project					
2.	Name and address of the Contractor					
3.	Contract date and duration					
B	Environmental Monitoring Details					
Sl. No	Details of Monitoring Location	Period of Monitoring	Details of values exceeding the relevant standards	Reasons for pollution	Details of Corrective actions taken	Remarks
a.	Ambient Air Monitoring					
1.						
2.						
b.	Water Monitoring					
1.						
2.						
c.	Noise Monitoring*					
1.						
2.						
C	Submission Details					
	Submitted by (Environment & Safety Officer of Contractor)			Approved by (Environmental Officer of PIU)		
Signature & date						
Name						
Designation						
Remarks by PIU						

* Noise monitoring at the site will be done by the PIU (ERA), using the Noise Meter. The PIU has to give the monitoring results to the Contractor for corrective actions, if any, required and including in this report.

Note: The Contractor has to conduct Environmental Monitoring through a NABL approved Labouratory as per the Environmental Monitoring Plan given in the EMP, fill this format and submit to the PIU along with the Monthly Report, if monitoring was due in that month. A copy of the monitoring report given by the Labouratory has to be attached to this format. The PIU has to visit the site and verify the details. Additional mitigation measures, if required, can be suggested by the PIU. The Environmental Expert of PIU has to give back a copy of this format to the contractor after his approval with remarks.

ANNEXURE-XIV: Hydrological Data (Flood Discharge Data) of Bringi Nallah/ Stream.

Annexure-A

Flood Discharge Data I&FC Kashmir

Statement showing peak Flood discharges with corresponding gauges observed during the flood of September -2014 and Max.Flood discharge recorded till date of the below mentioned Nallahs

S.No	Name of Nallah G/D Site	Station Code	Peak Flood Discharge Observed During Sept-2014			Max. Flood Discharge Recorded till -date		
			Date	Gauge in Meter	Peak Flood Discharge in Cusecs	Date	Gauge in Meter	Max. Discharge in Cusecs
1a)	Brinji Head at Wayiloo	T-1(a)	6-9-14	3.70	5423.00	16-5-80	2.77	5894.00
b)	Bringi Tail at Danter	T-1(b)	6-9-14	9.00	17855.00	6-9-14	9.00	17855.00
2 a)	Aripath Head at Panchalthan	T-2(a)	6-9-14	2.00	1588.00	6-9-14	2.00	1588.00
b)	Aripath Tail at Mir –danter	T-2(b)	6-9-14	6.50	10540.00	14-8-73	G.U.W	14085.00
3 a)	Sandran head at Verinag	T-3(a)	6-9-14	4.00	4450.00	6-9-14	4.00	4450.00
b)	Sandran Tail at Munawar	T-3(b)	6-9-14	7.3	8523.00	6-9-14	7.30	8523.00
4	Aroo at Pahalgham	T-4	6-9-14	1.85	8636.00	6-9-14	1.85	8636.00
5	Sheshnag at Pahalgham	T-5	6-9-14	1.45	4924.00	6-9-14	1.45	4924.00
6 a)	Lidder at Batkoot	T-6	6-9-14	2.05	18601.00	6-9-14	2.05	18601.00
b)	Liddar at okura	T-6	6-9-14	2.35	26270.00	6-9-14	2.35	26270.00
c)	Lidder at Kir kadal	T-6 (c)	6-9-14	5.90	3816.00	17-7-75	G.U.W	5781.00
d)	Liddar At Gur	T-6(d)	6-9-14	8.62	5420.00	6-9-14	8.62	5420.00
e)	Lidder At Odur	T-6(e)	6-9-14	7.70	18004.00	6-9-14	7.70	18004.00
f)	Lidder At Khanabal	T-6(g)	6-9-14	7.40	5576.00	6-9-14	7.40	5576.00
7 a)	Vethvethroo at chowgam	T-7(a)	6-9-14	2.30	4197.00	6-9-14	2.30	4197.00

Note:

1) The peak flood discharges observed during the Sep 2014 floods do not contain the quantum of water that passed
   a) through the breaches, if any
   b) Over the embankments, if any.
2) G.U.W means "Gauge under water"

Note :- Sr. No. 1(b) Bringi Nallah at Danter =
- is found correct after checking with =
- Original records. =

Assistant Executive Engineer
(P&D) Data Collection
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ANNEXURE XV: GUIDELINES ON PREVENTIVE MEASURES TO CONTAIN SPREAD OF COVID-19 IN WORKPLACE SETTINGS (Ministry of Health & Family Welfare-MoHFW)

18th May, 2020

Government of India
Ministry of Health & Family Welfare
Directorate General of Health Services
(EMR Division)

Guidelines on preventive measures to contain spread of COVID-19 in workplace settings

1. Background

Offices and other workplaces are relatively close setting, with shared spaces like (corridors, elevators & stairs, parking places, cafeteria, meeting rooms and conference halls etc.) and thus COVID-19 infection can spread relatively fast among officials, staffs and visitors.

Thus there is a need to prevent importation of infection in workplace settings and to respond in a timely and effective manner in case suspect case of COVID-19 is detected in these settings, so as to limit the spread of infection.

2. Scope

This document outlines the preventive and response measures to be observed to contain the spread of COVID-19 in workplace settings. The document is divided into the following sub-sections

(i) basic preventive measures to be followed at all times
(ii) measures specific to offices
(iii) measures to be taken on occurrence of case(s)
(iv) disinfection procedures to be implemented in case of occurrence of suspect/confirmed case.

3. Basic preventive measures

The basic preventive measures include simple public health measures that are to be followed to reduce the risk of infection with COVID-19. These measures need to be observed by all (employees and visitors) at all times. These include:

i. Physical distancing of at least one meter to be followed at all times.
ii. Use of face covers/masks to be mandatory.
iii. Practice frequent hand washing (for at least 40-60 seconds) even when hands are not visibly dirty and use of alcohol based hand sanitizers (for at least 20 seconds).
iv. Respiratory etiquettes to be strictly followed. This involves strict practice of covering one's mouth and nose while coughing/sneezing with a tissue/handkerchief/flexed elbow and disposing off used tissues properly.
v. Self-monitoring of health by all and reporting any illness at the earliest

4. Preventive measures for offices:

Guidelines with respect to preventive measures specific to offices have been issued by DoPT. These guidelines are available at: https://www.mohfw.gov.in/pdf/PreventivemeasuresDOPT.pdf.

Any staff reportedly suffering from flu-like illness should not attend office and seek medical advice from local health authorities [e.g. CGHS wellness center, medical attendance under CS (MA) etc.]. Such persons, if diagnosed as a suspect/confirmed case of COVID-19 should immediately inform the office authorities.

Any staff requesting home quarantine based on the containment zone activities in their residential areas should be permitted to work from home.

DoPT guidelines with respect to organizing meetings, coordinating visitors shall be scrupulously followed.

5. Measures to be taken on occurrence of case(s):

Despite taking the above measures, the occurrence of cases among the employees working in the office cannot be ruled out. The following measures will be taken in such circumstances:

5.1. When one or few person(s) who share a room/close office space is/are found to be suffering from symptoms suggestive of COVID-19:

5.1.1. Place the ill person in a room or area where they are isolated from others at the workplace. Provide a mask/face cover till such time he/she is examined by a doctor.

5.1.2. Report to concerned central/state health authorities. Helpline 1075 will be immediately informed.

5.1.3. A risk assessment will be undertaken by the designated public health authority (district RRT/treating physician) and accordingly further advice shall be made regarding management of case, his/her contacts and need for disinfection.

5.1.4. The suspect case if reporting very mild / mild symptoms on assessment by the health authorities would be placed under home isolation, subject to fulfilment of criteria laid down in MoHFW guidelines (available at: https://www.mohfw.gov.in/pdf/RevisedguidelinesforHomeIsolationofverymildpresymptomaticCOVID19cases10May2020.pdf)

5.1.5. Suspect case, if assessed by health authorities as moderate to severe, he/she will follow guidelines at:

https://www.mohfw.gov.in/pdf/FinalGuidanceonMangaementofCovidcasesversion2.pdf.

5.1.6. The rapid response team of the concerned district shall be requisitioned and will undertake the listing of contacts.

5.1.7. The necessary actions for contact tracing and disinfection of work place will start once the report of the patient is received as positive. The report will be expedited for this purpose.

5.2. If there are large numbers of contacts from a pre-symptomatic/asymptomatic case, there could be a possibility of a cluster emerging in workplace setting. Due to the close environment in workplace settings this could even be a large cluster (>15 cases). The essential principles of risk assessment, isolation, and quarantine of contacts, case referral and management will remain the same. However, the scale of arrangements will be higher.

5.3. **Management of contacts**:

The contacts will be categorised into high and low risk contacts by the District RRT as detailed in the **Annexure I**.

The high risk exposure contacts shall be quarantined for 14 days. They will follow the guidelines on home quarantine (available on: https://www.mohfw.gov.in/pdf/Guidelinesforhomequarantine.pdf).
These persons shall undergo testing as per ICMR protocol (available at: https://www.mohfw.gov.in/pdf/Revisedtestingguidelines.pdf).

The low risk exposure contacts shall continue to work and closely monitor their health for next 14 days.

6. **Closure of workplace**

If there are one or two cases reported, the disinfection procedure will be limited to places/areas visited by the patient in past 48 hrs. **There is no need to close the entire office building/halt work in other areas of the office** and work can be resumed after disinfection as per laid down protocol (see para 7).

However, if there is a larger outbreak, the entire building will have to be closed for 48 hours after thorough disinfection. All the staff will work from home, till the building is adequately disinfected and is declared fit for re-occupation.

7. Disinfection Procedures in Offices

Detailed guidelines on the disinfection procedures in offices have already been issued by the MOHFW and are available on: https://www.mohfw.gov.in/pdf/Guidelinesondisinfectionofcommonpublicplacesincludingoffices.pdf.

Annexure I

Risk profiling of contacts

Contacts are persons who have been exposed to a confirmed case anytime between 2 days prior to onset of symptoms (in the positive case) and the date of isolation (or maximum 14 days after the symptom onset in the case).

High-risk contact

- Touched body fluids of the patient (respiratory tract secretions, blood, vomit, saliva, urine, faeces; e.g. being coughed on, touching used paper tissues with a bare hand)
- Had direct physical contact with the body of the patient including physical examination without PPE
- Touched or cleaned the linens, clothes, or dishes of the patient.
- Lives in the same household as the patient.
- Anyone in close proximity (within 1 meter) of the confirmed case without precautions.
- Passengers in close proximity (within 1 meter) in a conveyance with a symptomatic person who later tested positive for COVID-19 for more than 6 hours.

Low-risk contact

- Shared the same space (worked in same room/similar) but not having a high-risk exposure to confirmed case of COVID-19.
- Travelled in same environment (bus/train/flight/any mode of transit) but not having a high-risk exposure.

Figure 1: Management of the case(s) and contacts

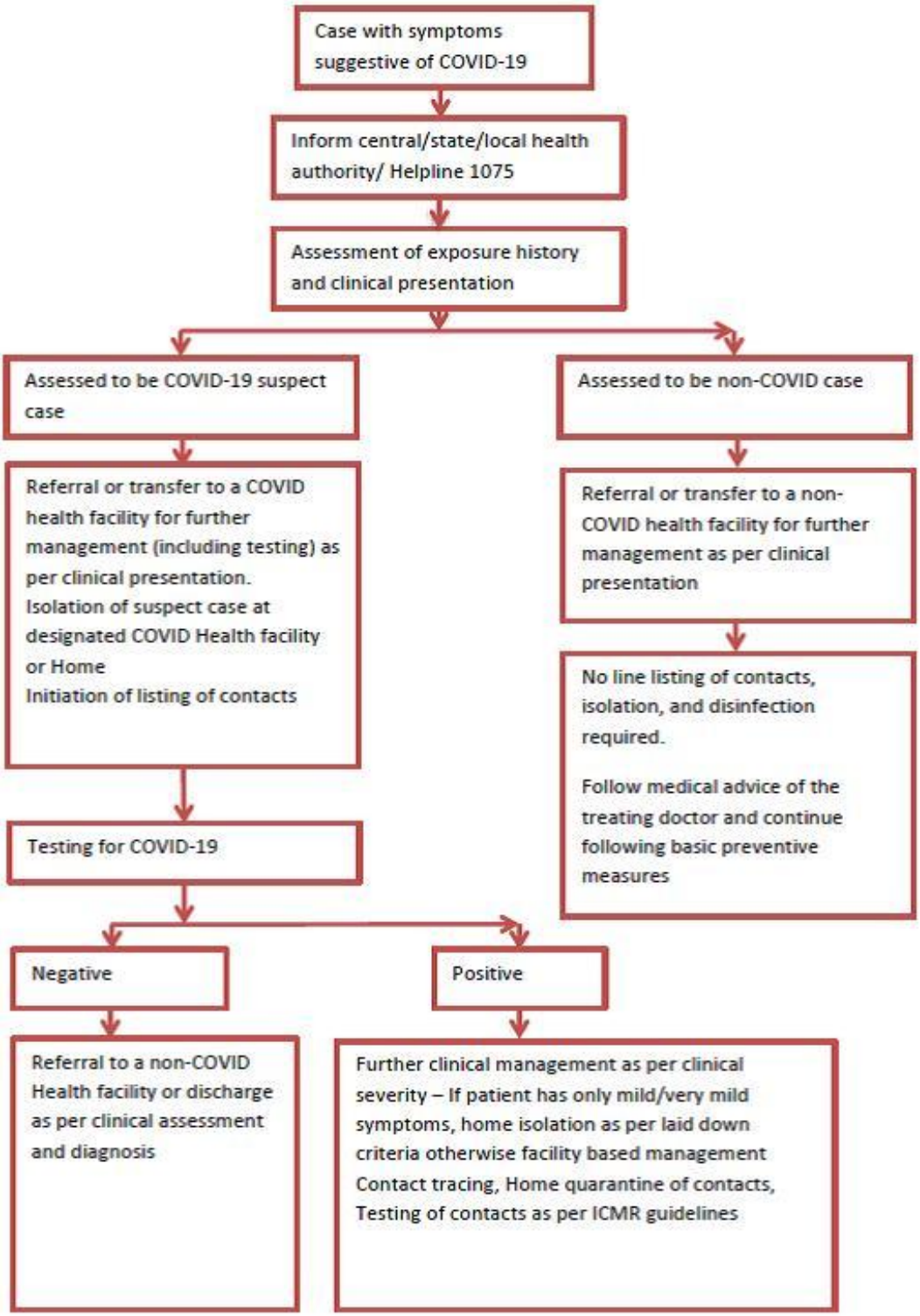
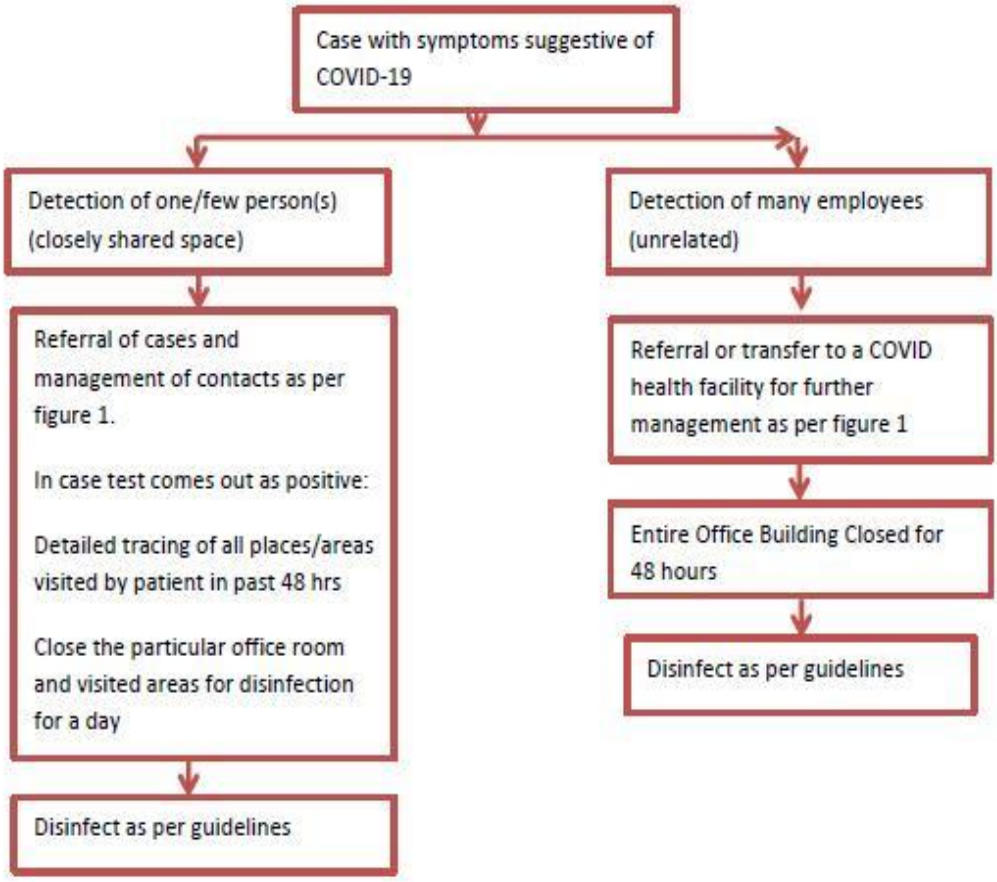


Fig-2: Disinfection of workplace



ANNEXURE XVI: COVID FAQs- Detail Question and Answers on COVID-19 for General Public -Workers, Staff, etc. (Issued through National Health Mission)

1. What is Coronavirus?

Coronaviruses are a large family of viruses which may cause illness in animals or humans. In humans, several coronaviruses are known to cause respiratory infections ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). The most recently discovered coronavirus causes coronavirus disease COVID-19.

2. What is COVID-19

COVID-19 is an infectious disease caused by the most recently discovered coronavirus. This new virus and disease were unknown before the outbreak began in Wuhan, China, in December 2019.

3. What are the symptoms of COVID-19

The most common symptoms of COVID-19 are fever, tiredness, and dry cough. Some patients may have aches and pains, nasal congestion, runny nose, sore throat or diarrhoea. These symptoms are
usually mild and begin gradually. Some people become infected but don't develop any symptoms and don't feel unwell. Most people (about 80%) recover from the disease without needing special treatment. Around 1 out of every 6 people who gets COVID-19 becomes seriously ill and develops difficulty breathing. Older people, and those with underlying medical problems like high blood pressure, heart problems or diabetes, are more likely to develop serious illness. People with fever, cough and difficulty breathing should seek medical attention.

4. How does COVID-19 spread

People can catch COVID-19 from others who have the virus. The disease can spread from person to person through small droplets from the nose or mouth which are spread when a person with COVID-19 coughs or exhales. These droplets land on objects and surfaces around the person. Other people then catch COVID-19 by touching these objects or surfaces, then touching their eyes, nose or mouth. People can also catch COVID-19 if they breathe in droplets from a person with COVID-19 who coughs out or exhales droplets. This is why it is important to stay more than 1 meter (3 feet) away from a person who is sick.

5. Can the virus that causes COVID-19 be transmitted through the air?

Studies to date suggest that the virus that causes COVID-19 is mainly transmitted through contact with respiratory droplets rather than through the air. See previous answer on “How does COVID-19 spread?”

6. **Can COVID-19 be caught from a person who has no symptoms?**

The main way the disease spreads is through respiratory droplets expelled by someone who is coughing. The risk of catching COVID-19 from someone with no symptoms at all is very low. However, many people with COVID-19 experience only mild symptoms. This is particularly true at the early stages of the disease. It is therefore possible to catch COVID-19 from someone who has, for example, just a mild cough and does not feel ill.

7. **Can I catch COVID-19 from the feces of someone with the disease?**

The risk of catching COVID-19 from the feces of an infected person appears to be low. While initial investigations suggest the virus may be present in feces in some cases, spread through this route is not a main feature of the outbreak. The ongoing research on the ways COVID-19 is spread and will continue to share new findings. Because this is a risk, however, it is another reason to clean hands regularly, after using the bathroom and before eating.

8. **What can I do to protect myself and prevent the spread of disease Protection measures for everyone**

Stay aware of the latest information on the COVID-19 outbreak, available on the national,state and local public health authority. Many countries around the world have seen cases of COVID-19 and several have seen outbreaks. Authorities in China and some other countries have succeeded in slowing or stopping their outbreaks. However, the situation is unpredictable so check regularly for the latest news. You can reduce your chances of being infected or spreading COVID- 19 by taking some simple precautions:

- Regularly and thoroughly clean your hands with an alcohol based hand rub or wash them with soap and water. Why? Washing your hands with soap and water or using alcohol-based hand rub kills viruses that may be on your hands.
- Maintain at least 1 metre (3 feet) distance between yourself and anyone who is coughing or sneezing. Why? When someone coughs or sneezes they spray small liquid droplets from their nose or mouth which may contain virus. If you are too close, you can breathe in the droplets, including the COVID-19 virus if the person coughing has the disease.
- Avoid touching eyes, nose and mouth. Why? Hands touch many surfaces and can pick up viruses. Once contaminated, hands can transfer the virus to your eyes, nose or mouth. From there, the virus can enter your body and can make you sick.
- Make sure you, and the people around you, follow good respiratory hygiene. This means covering your mouth and nose with your bent elbow or tissue when you cough or sneeze. Then dispose of the used tissue immediately. Why? Droplets spread virus. By following good respiratory hygiene you protect the people around you from viruses such as cold, flu and COVID-19.
- Stay home if you feel unwell. If you have a fever, cough and difficulty breathing, seek medical attention and call in advance. Follow the directions of your local health authority. Why? National and local authorities will have the most up to date information on the situation in your area. Calling in advance will allow your health care provider to quickly direct you to the

right health facility. This will also protect you and help prevent spread of viruses and other infections.

- Keep up to date on the latest COVID-19 hotspots (cities or local areas where COVID-19 is spreading widely). If possible, avoid traveling to places – especially if you are an older person or have diabetes, heart or lung disease. Why? You have a higher chance of catching COVID-19 in one of these areas.

Protection measures for persons who are in or have recently visited (past 14 days) areas where COVID-19 is spreading

- Follow the guidance outlined above (Protection measures for everyone)
- Self-isolate by staying at home if you begin to feel unwell, even with mild symptoms such as headache, low grade fever (37.3 C or above) and slight runny nose, until you recover. If it is essential for you to have someone bring you supplies or to go out, e.g. to buy food, then wear a mask to avoid infecting other people. Why? Avoiding contact with others and visits to medical facilities will allow these facilities to operate more effectively and help protect you and others from possible COVID-19 and other viruses.
- If you develop fever, cough and difficulty breathing, seek medical advice promptly as this may be due to a respiratory infection or other serious condition. Call in advance and tell your provider of any recent travel or contact with travellers. Why? Calling in advance will allow your health care provider to quickly direct you to the right health facility. This will also help to prevent the possible spread of COVID-19 and other viruses.

9. **How likely am I to catch COVID-19?**

The risk depends on where you are - and more specifically, whether there is a COVID-19 outbreak unfolding there. For most people in most locations, the risk of catching COVID-19 is still low. However, there are now places around the world (cities or areas) where the disease is spreading. For people living in, or visiting, these areas the risk of catching COVID-19 is higher. Governments and health authorities are taking vigorous action every time a new case of COVID-19 is identified. Be sure to comply with any local restrictions on travel, movement or large gatherings. Cooperating with disease control efforts will reduce your risk of catching or spreading COVID-19. COVID-19 outbreaks can be contained and transmission stopped, as has been shown in China and some other countries. Unfortunately, new outbreaks can emerge rapidly. It's important to be aware of the situation where you are or intend to go.

10. **Should I worry about COVID-19?**

Illness due to COVID-19 infection is generally mild, especially for children and young adults. However, it can cause serious illness: about 1 in every 5 people who catch it need hospital care. It is therefore quite normal for people to worry about how the COVID-19 outbreak will affect them and their loved ones. We can channel our concerns into actions to protect ourselves, our loved ones and our communities. First and foremost among these actions is regular and thorough hand-washing and good respiratory hygiene. Secondly, keep informed and follow the advice of the local health authorities including any restrictions put in place on travel, movement and gatherings.

11. **Who is at risk of developing severe illness?**

While we are still learning about how COVID-2019 affects people, older persons and persons with pre-existing medical conditions (such as high blood pressure, heart disease, lung disease, cancer or diabetes) appear to develop serious illness more often than others.

12. **Are antibiotics effective in preventing or treating the COVID-19?**

No. Antibiotics do not work against viruses, they only work on bacterial infections. COVID-19 is caused by a virus, so antibiotics do not work. Antibiotics should not be used as a means of prevention or treatment of COVID-19. They should only be used as directed by a physician to treat a bacterial infection.

13. **Are there any medicines or therapies that can prevent or cure COVID-19**

While some western, traditional or home remedies may provide comfort and alleviate symptoms of COVID-19, there is no evidence that current medicine can prevent or cure the disease. Doctores do not recommend self-medication with any medicines, including antibiotics, as a prevention or cure for COVID-19. However, several on-going clinical trials include both western and traditional medicines. We will continue to provide updated information as soon as clinical findings are available.

14. **Is there a vaccine drug or treatment for COVID-19**

Not yet. To date, there is no vaccine and no specific antiviral medicine to prevent or treat COVID-2019. However, those affected should receive care to relieve symptoms. People with serious illness should be hospitalized. Most patients recover thanks to supportive care. Possible vaccines and some specific drug treatments are under investigation. They are being tested through clinical trials. The most effective ways to protect yourself and others against COVID-19 are to frequently clean your hands, cover your cough with the bend of elbow or tissue, and maintain a distance of at least 1 meter (3 feet) from people who are coughing or sneezing

15. **Is COVID-19 the same as SARS?**

No. The virus that causes COVID-19 and the one that caused the outbreak of Severe Acute Respiratory Syndrome (SARS) in 2003 are related to each other genetically, but the diseases they cause are quite different. SARS was more deadly but much less infectious than COVID-19. There have been no outbreaks of SARS anywhere in the world since 2003.

16. **Should I wear mask to protect myself**

Only wear a mask if you are ill with COVID-19 symptoms (especially coughing) or looking after someone who may have COVID-19. Disposable face mask can only be used once. If you are not ill or looking after someone who is ill then you are wasting a mask. There is a world-wide shortage of masks, so We urge people to use masks wisely. We advises rational use of medical masks to

avoid unnecessary wastage of precious resources and mis-use of masks The most effective ways to protect yourself and others against COVID-19 are to frequently clean your hands, cover your cough with the bend of elbow or tissue and maintain a distance of at least 1 meter (3 feet) from people who are coughing or sneezing.

17. **How to put on use take off and dispose of a mask?**

(i) Remember, a mask should only be used by health workers, care takers, and individuals with respiratory symptoms, such as fever and cough.
(ii) Before touching the mask, clean hands with an alcohol-based hand rub or soap and water.
(iii) Take the mask and inspect it for tears or holes.
(iv) Orient which side is the top side (where the metal strip is).
(v) Ensure the proper side of the mask faces outwards (the coloured side).
(vi) Place the mask to your face. Pinch the metal strip or stiff edge of
(vii) the mask so it moulds to the shape of your nose.
(viii) Pull down the mask's bottom so it covers your mouth and your chin.
(ix) After use, take off the mask; remove the elastic loops from behind the ears while keeping the mask away from your face and clothes, to avoid touching potentially contaminated surfaces of the mask.
(x) Discard the mask in a closed bin immediately after use.
(xi) Perform hand hygiene after touching or discarding the mask – Use alcohol-based hand rub or, if visibly soiled, wash your hands with soap and water.

18. **How long is the incubation period for COVID-19?**

The "incubation period" means the time between catching the virus and beginning to have symptoms of the disease. Most estimates of the incubation period for COVID-19 range from 1-14 days, most commonly around five days. These estimates will be updated as more data become available.

19. **Can humans become infected with the COVID-19 from an animal source?**

Coronaviruses are a large family of viruses that are common in animals. Occasionally, people get infected with these viruses which may then spread to other people. For example, SARS-CoV was associated with civet cats and MERS-CoV is transmitted by dromedary camels. Possible animal sources of COVID-19 have not yet been confirmed. To protect yourself, such as when visiting live animal markets, avoid direct contact with animals and surfaces in contact with animals. Ensure good food safety practices at all times. Handle raw meat, milk or animal organs with care to avoid contamination of uncooked foods and avoid consuming raw or undercooked animal products.

20. **Can I catch COVID-19 from my pet?**

While there has been one instance of a dog being infected in Hong Kong, to date, there is no evidence that a dog, cat or any pet can transmit COVID-19. COVID-19 is mainly spread through droplets produced when an infected person coughs, sneezes, or speaks. To protect yourself,

clean your hands frequently and thoroughly. We continue to monitor the latest research on this and other COVID- 19 topics and will update as new findings are available.

21. **How long does the virus survive on surfaces?**

It is not certain how long the virus that causes COVID-19 survives on surfaces, but it seems to behave like other coronaviruses. Studies suggest that coronaviruses (including preliminary information on the COVID-19 virus) may persist on surfaces for a few hours or up to several days. This may vary under different conditions (e.g. type of surface, temperature or humidity of the environment). If you think a surface may be infected, clean it with simple disinfectant to kill the virus and protect yourself and others. Clean your hands with an alcohol-based hand rub or wash them with soap and water. Avoid touching your eyes, mouth, or nose.

22. **Is it safe to receive a package from any area where COVID-19 has been reported?**

Yes. The likelihood of an infected person contaminating commercial goods is low and the risk of catching the virus that causes COVID-19 from a package that has been moved, travelled, and exposed to different conditions and temperature is also low.

23. **Is there anything I should not do?**

The following measures **ARE NOT** effective against COVID-2019 and can be harmful:

- Smoking
- Wearing multiple masks
- Taking antibiotics (See question 10 "*Are there any medicines of therapies that can prevent or cure COVID-19?*")

24. **In any case, if you have fever, cough and difficulty breathing seek medical care early** to reduce the risk of developing a more severe infection and be sure to share your recent travel history with your health care provider.