Initial Environmental Examination

January 2012

IND: Jammu and Kashmir Urban Sector Development Investment Program—Construction of Elevated Expressway Corridor (Flyover) from Jehangir Chowk to Rambagh and Natipora in Srinagar City

Prepared by the Economic Reconstruction Agency, Government of Jammu and Kashmir
for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 02 February 2012)

Currency unit	–	rupee (INR)
INR1.00	=	$0.02037
$1.00	=	INR 49.100

ABBREVIATIONS

ADB	-	Asian Development Bank
ASI	-	Archeological Survey of India
BOD	-	biochemical oxygen demand
CBD	-	central business district
CTE	-	consent to establish
CTO	-	consent to operate
DSC	-	design and supervision consultancy
CPCB	-	Central Pollution Control Board
DO	-	dissolved oxygen
EA	-	executing agency
EAC	-	Expert Appraisal Committee
EARF	-	environment assessment and review framework
EC	-	environmental clearance
EIA	-	environmental impact assessment
EMP	-	environment management plan
ERA	-	Economic Reconstruction Agency
FI	-	financial intermediary
GoI	-	Government of India
GRM	-	grievance redress mechanism
IA	-	implementing agency
IEE	-	initial environmental examination
IRC	-	Indian Road Congress
IST	-	Indian Standard Time
J and K	-	Jammu and Kashmir
JKUSDIP	-	Jammu and Kashmir Urban Sector Development Investment Program
LCV	-	light commercial vehicle
LHS	-	left-hand side
MFF	-	multitranche financing facility
MLD	-	million liters per day
MoEF	-	Ministry of Environment and Forests
MRH	-	mean relative humidity
MSW	-	municipal solid waste
MT	-	metric ton
MTR	-	month's total rainfall
NAAQS	-	National Ambient Air Quality Standards
NH	-	national highway
NSL	-	natural soil level
OM	-	operations manual
PCU	-	passenger car unit
PIU	-	project implementation unit
PMU	-	project management unit
$PM_{2.5}$	-	particulate matter below 2.5 micron particle size
PM_{10}	-	particulate patter below 10 micron particle size
PSC	-	project support consultant
PUC	-	pollution under control

RCC	-	reinforced cement concrete
REA	-	rapid environmental assessment
RHS	-	right-hand side
RoW	-	right of way
RSPM	-	respirable suspended particulate matter
SMC	-	Srinagar Municipal Corporation
SPCB	-	State Pollution Control Board
SPM	-	suspended particulate matter
SPS	-	Safeguards Policy Statement
STP	-	sewage treatment plant
TDS	-	total dissolved solids
TMP		traffic management plan
ToR	-	terms of reference
TSS	-	total suspended solids
V/C ratio	-	volume to capacity ratio

WEIGHTS AND MEASURES

cm	-	centimeter
crore	–	100 lakhs = 10,000,000
lakh	–	100 thousand = 100,000
km	–	kilometer
kph	-	kilometer per hour
lpd	–	liters per day
m	–	meter
mg/l	–	milligrams per liter
mm	–	millimeter
MSL	-	mean sea level
µ	-	10^{-6} meter
$\mu g/m^3$	–	micrograms per cubic meter
µS/cm	-	micro Siemens per centimeter
NTU	-	Nephalo turbidity unit
ppm	–	parts per million

NOTES

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

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EXECUTIVE SUMMARY

1. The Economic Reconstruction Agency (ERA) has undertaken the Jammu and Kashmir Urban Sector Development Investment Program (JKUSDIP), financed by the Asian Development Bank (ADB) through a multitranche financing facility (MFF). The total estimated cost of the program is about $485 million, out of which $300 million will be financed by ADB.

2. The primary objective of JKUSDIP is to promote economic development in the State of Jammu and Kashmir (J and K) through expansion of basic services such as water supply, sewerage, sanitation, drainage, solid waste management, urban transport, and other municipal functions in Jammu, Srinagar, and other important urban centers of the state. JKUSDIP will also strengthen the service delivery capacity of the responsible state urban agencies and urban local bodies through management reform, capacity building, and training.

3. The program is to be implemented in 4–7 tranches over a period of 8 years. Each tranche constitutes a separate loan. Tranche I (project 1) of JKUSDIP (Loan 2331–IND) is under implementation. One of the subprojects identified under tranche 2 (project 2) of JKUSDIP is the construction of an elevated expressway corridor (flyover) from Jehangir Chowk to Rambagh-Natipora to improve the urban transportation system.

4. The major objectives of constructing the expressway corridor are: (i) decongestion of traffic on the road junctions from Jehangir Chowk to Rambagh-Natipora; (ii) quick access to the airport from the city center; and (iii) improved long-term traffic management in Srinagar City. The proposed flyover is expected to have the following benefits: (i) immediate positive impact on the area by significantly reducing the number of vehicles passing through the area by approximately 58% (as per traffic surveys) from the current number of 11,686 vehicles per 12-hour period; (ii) reduction of traffic, which is expected to reduce the number of accidents and potential conflicts that occur within the area, thus saving human life as well as the economy of the region; (iii) reduced traffic also resulting in land gains, which can be utilized to enhance the pedestrian space and increase pedestrian amenity; (iv) improvement and increase in size of pedestrian sidewalks and footpaths, as well as general urban design elements to create an environment that is conducive to pedestrian activity; (v) reduced traffic congestion, conflicts, and land gains resulting in a safer and more efficient circulation of traffic; and (vi) future development and events need will have better access to and from the city.

5. The legal framework and principles adopted for addressing environmental issues in the proposed subproject have been guided by the existing legislation and policies of the Government of India, Government of Jammu and Kashmir, ADB, and the revised environmental assessment and review framework (EARF)[1] adopted for tranche 2 of JKUSDIP.

6. Indian laws and the ADB Safeguard Policy Statement (SPS) require that environmental impacts of development projects are identified and assessed as part of the planning and design process, and that action is taken to reduce those impacts to acceptable levels.

7. The take-off point of the elevated expressway corridor (flyover) is Jehangir Chowk, and it terminates beyond Y intersection at Natipora and Airport Road crossing. The length of the

[1] The EARF has been revised to be aligned with ADB's Safeguard Policy Statement 2009. The original EARF was prepared for JKUSDIP in accordance with ADB's Environment Policy 2002. However, with implementation of SPS 2009, the EARF was required to be revised for tranche 2 and subsequent tranches of JKUSDIP.

corridor is about 2.41 km, and it is comprised of (i): a dual carriageway (inbound and outbound), each one 7.5 m in width; and (ii) two-lane split roads on either side of the flyover.

8. The subproject site is located in the built-up area of Srinagar City, the summer capital of Jammu and Kashmir. It is situated at an average altitude of 1,600 m above mean sea level, and located in the heart of the oval-shaped valley of Kashmir. The subproject site is characterized as fragmented with high volumes of traffic, pedestrians, and commercial activities competing for limited space. The high levels of traffic create an unsafe environment for residents, pedestrians, and commuters alike and are a barrier to redevelopment and growth of the area. The subproject site (i) is not located in areas prone to water-logging and flash flood; (ii) is not within or adjacent to environmentally sensitive areas such as cultural heritage sites, protected areas, wetlands, buffer zones of a protected area, and special areas for protecting biodiversity; (iii) has been noted to have increased dust levels compared to other parts of the city due to vehicular movement and congestion; and (iv) has no water courses occurring within the site.

9. The design of the expressway corridor has taken into consideration reduced traffic congestion, minimized road surface flooding, improved road surface storm water drainage, and maximized land gains due to lane configurations and layout. Planning principles and design considerations have been reviewed and incorporated into the site planning process whenever possible; thus, environmental impacts due to the subproject design or location were not significant. However, resettlement impacts are not avoidable, as the subproject site is amongst the busiest routes in the central business area, and the existing roads have been widened to the maximum possible extent. The proposed development will require land acquisition and demolishing of buildings and will thus impact businesses, traders, and public transport operators. A resettlement plan has been developed in accordance with ADB SPS and Indian laws and regulations.

10. Anticipated impacts during the construction period include (i) temporary disruption of services during realignment of existing utilities along the corridor; (ii) temporary closure of roads to allow the contractors to build the flyover; (iii) cutting of roadside trees; (iv) interference with access to properties and businesses due to road closures and rerouting of traffic; (v) risk of accidents associated with vehicular traffic and transport of materials; (vi) increased volume of construction vehicles on the roads that may lead to increased wear and tear of roads in the vicinity of the proposed site; and (vii) exposure to increased noise, dust, vibrations, hazardous chemicals (such as bitumen, old asphalt layers, oils, and lubricants), and waste materials. An environmental management plan (EMP) has been developed to provide specific actions deemed necessary to assist in mitigating the environmental impacts, guide the environmentally-sound construction of the proposed flyover, and ensure efficient lines of communication among the implementing agency, project management unit, and contractors. The EMP also provides a proactive, feasible, and practical working tool to enable the measurement and monitoring of performance on site.

11. Anticipated impacts during operation and maintenance include (i) increased air pollution and noise over time due to gradual increase in traffic volumes on the road; (ii) improved air quality for sensitive receptors in proximity as a result of separation of traffic through the area; (iii) reduced traffic resulting in reduced number of accidents and potential conflicts that occur with the area; (iv) reduced traffic resulting in land gains which can be utilized to enhance the pedestrian space and increase pedestrian amenity; and (v) better access to and from the city. The reduction of traffic through the area allows for the area to be redeveloped and revitalized in a coordinated and integrated manner, ensuring connectivity among the various land uses, greater pedestrian spaces, and general urban redesign of the appearance of the area to create

a better quality environment for the people. This will enhance the existing trading, transport, infrastructure, and associated facilities, as well as encouraging commercial, retail, and residential initiatives within the area, thus providing broader impetus for the redevelopment of the surrounding areas and the central business district.

12. The public participation process included (i) identifying interested and affected parties (stakeholders); (ii) informing and providing stakeholders with sufficient background and technical information regarding the proposed development; (iii) creating opportunities and mechanisms whereby they can participate and raise their viewpoints (issues, comments, and concerns) with regards to the proposed development; (iv) giving the stakeholders feedback on process findings and recommendations; and (v) ensuring compliance to process requirements with regards to the environmental and related legislation. The IEE includes the activities undertaken during project design to engage the stakeholders, and planned information disclosure measures and processes for carrying out consultation with affected people and facilitating their participation during project implementation.

13. The subproject's grievance redress mechanism provides the citizens with a platform, and describes the informal and formal channels, time frame, and mechanisms for resolving complaints about environmental performance.

14. Therefore, as per ADB SPS, the subproject is classified as environmental category B and does not require further environmental impact assessment. As per Indian laws, the proposed subproject does not require an environmental clearance.

I. INTRODUCTION

1. The Economic Reconstruction Agency (ERA) has undertaken the Jammu and Kashmir Urban Sector Development Investment Program (JKUSDIP), financed by the Asian Development Bank (ADB) through a multitranche financing facility (MFF). The total estimated cost of the program is about $485 million, out of which $300 million will be financed by ADB. The primary objective of JKUSDIP is to promote economic development in the State of Jammu and Kashmir (J and K) through expansion of basic services such as water supply, sewerage, sanitation, drainage, solid waste management, urban transport, and other municipal functions in Jammu, Srinagar, and other important urban centers of the state. JKUSDIP will also strengthen the service delivery capacity of the responsible state urban agencies and urban local bodies through management reform, capacity building, and training.

2. The program is to be implemented in 4–7 tranches over a period of 8 years. Each tranche constitutes a separate loan. Tranche I (project 1) of JKUSDIP (Loan 2331–IND) is under implementation. One of the subprojects identified under tranche 2 (project 2) of JKUSDIP is the construction of an elevated expressway corridor (flyover) from Jehangir Chowk to Rambagh-Natipora to improve the urban transportation system.

3. The major objectives of constructing the expressway corridor are: (i) decongestion of traffic on the road junctions from Jehangir Chowk to Rambagh-Natipora; (ii) quick access to the airport from the city center; and (iii) improved long-term traffic management in Srinagar City. The proposed flyover is expected to have the following benefits:

(i) immediate positive impact on the area by significantly reducing the number of vehicles passing through the area by approximately 58% (as per traffic surveys) from the current number of 11,686 vehicles per 12-hour period;
(ii) reduction of traffic, which is expected to reduce the number of accidents and potential conflicts that occur within the area, thus saving human life as well as the economy of the region;
(iii) reduced traffic also resulting in land gains which can be utilized to enhance the pedestrian space and increase pedestrian amenity;
(iv) improvement and increase in size of pedestrian sidewalks and footpaths, as well as general urban design elements to create an environment that is conducive to pedestrian activity;
(v) reduced traffic congestion, conflicts, and land gains resulting in a safer and more efficient circulation of traffic; and
(vi) future development and events will have better access to and from the city.

4. The legal framework and principles adopted for addressing environmental issues in the proposed subproject have been guided by the existing legislation and policies of the Government of India, Government of Jammu and Kashmir, ADB, and the environmental assessment review framework (EARF) adopted for tranche 2 of JKUSDIP. ADB requires the consideration of environmental issues in all aspects of its operations, and the requirements for environmental assessment are described in ADB's Safeguard Policy Statement (SPS), 2009. According to the SPS, environmental assessment is required for all subprojects under a MFF modality.

5. An environmental assessment using ADB's Rapid Environmental Assessment (REA) Checklist for Roads and Highways (Appendix 1) was conducted for the proposed construction of

an elevated expressway corridor (flyover) from Jehangir Chowk to Rambagh and Natipora, which covers about 2.41 km, comprised of (i) a dual carriageway (inbound and outbound), each of 7.5 m in width; and (ii) two-lane split roads on either side of the flyover. Results of the assessment show that the proposed development is unlikely to cause significant adverse impacts. Thus, this initial environmental examination (IEE) report has been prepared in accordance with ADB SPS's requirements for environment category B projects.

6. The IEE has been prepared to meet the following objectives:

(i) to provide critical facts, significant findings, and recommended actions;
(ii) to present the national and local legal and institutional framework within which the environmental assessment has been carried out;
(iii) to provide information on the existing geographic, ecological, social, and temporal context, including associated facilities within the subproject's area of influence;
(iv) to assess the subproject's likely positive and negative, direct and indirect impacts to physical, biological, socioeconomic, and physical cultural resources in the subproject's area of influence;
(v) to identify mitigation measures and any residual negative impacts that cannot be mitigated;
(vi) to describe the process undertaken during project design to engage stakeholders and the planned information disclosure measures, and the process for carrying out consultation with affected people and facilitating their participation during project implementation;
(vii) to describe the subproject's grievance redress mechanism for resolving complaints about environmental performance;
(viii) to present the set of mitigation measures to be undertaken to avoid, reduce, mitigate, or compensate for adverse environmental impacts;
(ix) to describe the monitoring measures and reporting procedures to ensure early detection of conditions that necessitate particular mitigation measures; and
(x) to identify who is responsible for carrying out the mitigation and monitoring measures.

II. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

A. ADB Policy

7. ADB requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for environmental assessment are described in ADB's SPS, 2009. This states that ADB requires environmental assessment of all project loans, program loans, sector loans, sector development program loans, loans involving financial intermediaries, and private sector loans.

8. **Screening and categorization.** The nature of the environmental assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project, the sensitivity, scale, nature, and magnitude of its potential impacts, and the availability of cost-effective mitigation measures. Projects are screened for their expected environmental impacts and are assigned to one of the following four categories:

(i) **Category A.** Projects could have significant adverse environmental impacts. An EIA is required to address significant impacts.
(ii) **Category B.** Projects could have some adverse environmental impacts, but of lesser degree or significance than those in category A. An IEE is required to

determine whether significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.

(iii) **Category C.** Projects are unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are reviewed.

(iv) **Category FI.** Projects involve a credit line through a financial intermediary or an equity investment in a financial intermediary. The financial intermediary must apply an environmental management system, unless all projects will result in insignificant impacts.

9. **Environmental management plan.** An EMP, which addresses the potential impacts and risks identified by the environmental assessment, shall be prepared. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the project's impact and risks.

10. **Public disclosure.** ADB will post the following safeguard documents on its website so affected people, other stakeholders, and the general public can provide meaningful inputs into the project design and implementation:

(i) For environmental category A projects, draft EIA report at least 120 days before Board consideration;
(ii) Final or updated EIA and/or IEE upon receipt; and
(iii) environmental monitoring reports submitted by PMU during project implementation upon receipt.

B. National and State Laws

11. The implementation of the subprojects will be governed by Government of India (GoI) and State of Jammu and Kashmir environmental acts, rules, regulations, and standards. These regulations impose restrictions on the activities to minimize and mitigate likely impacts on the environment. It is the responsibility of the project executing and implementing agencies to ensure subprojects are consistent with the legal framework, whether national, state, or municipal/local. Compliance is required in all stages of the subproject including design, construction, and operation and maintenance.

12. **EIA Notification.** The GoI EIA Notification of 2006 and 2009 (replacing the EIA Notification of 1994) sets out the requirement for environmental assessment in India. This states that environmental clearance (EC) is required for specified activities/projects, and this must be obtained before any construction work or land preparation (except land acquisition) may commence. Projects are categorized as A or B depending on the scale of the project and the nature of its impacts. Category A projects require environmental clearance from the National Ministry of Environment and Forests (MoEF). Category B projects require environmental clearance from the State Environment Impact Assessment Authority (SEIAA). The proposed subproject is not listed in the EIA Notification of 2006 "Schedule of Projects Requiring Prior Environmental Clearance"; thus, EC is not required.

13. **Water (Prevention and Control of Pollution) Act of 1974, Rules of 1975, and Amendments.** Control of water pollution is achieved through administering conditions imposed in consent issued under provision of the Water (Prevention and Control of Pollution) Act, 1974. These conditions regulate the quality and quantity of effluent, the location of discharge, and the frequency of monitoring of effluents. Any component of the project having potential to generate

sewage or trade effluent will come under the purview of this act, its rules, and amendments. Such projects have to obtain consent to establish (CTE) under section 25/26 of the act from the State Pollution Control Board (SPCB) before implementation, and consent to operate (CTO) before commissioning. The Water Act also requires the occupier of such subprojects to take measures for abating the possible pollution of receiving water bodies. The subproject is not included in the lists of activities requiring CTE and CTO under the Water Act. However, the following construction plants shall require CTE and CTO from SPCB for hot mix plants, wet mix plants, stone crushers, etc., if installed for construction. Emissions and discharges shall comply with standards notified by the Central Pollution Control Board.

14. **Air (Prevention and Control of Pollution) Act of 1981, as amended.** The subprojects having potential to emit air pollutants into the atmosphere have to obtain CTE under section 21 of the Air (Prevention and Control of Pollution) Act of 1981 from SPCB before implementation, and CTO before commissioning the project. The occupier of the project/facility has the responsibility to adopt necessary air pollution control measures for abating air pollution. The following require CFE and CFO from SPCB: (i) diesel generators; and (ii) hot mix plants, wet mix plants, stone crushers, etc., if installed for construction. Emissions and discharges shall comply with standards notified by the Central Pollution Control Board.

15. **Ancient Monuments and Archaeological Sites and Remains Rules of 1959 and J and K Ancient Monuments Preservation (Amendment) Act of 2010.** The act and rules designate areas within a radius of 100 m from the “protected property” as “prohibited area” and up to 200 m from the boundary of the protected area as “regulated area.” No development activity (including mining operations and construction) is permitted in the “prohibited area,” and all development activities likely to damage the protected property are not permitted in the “regulated area” without prior permission of the Archaeological Survey of India (ASI). Protected property includes the site, remains, and monuments protected by ASI or the State Department of Archaeology. Some archaeological, historical monuments and religious places like Burzhama archaeological site, historical Jamia Masjid, Pathar Masjid, Hazratbal Shrine, and Chati Padshahi Gurudwara are located in Srinagar City. However, the location of the subproject site is beyond the prohibited and regulated areas.

16. **Jammu and Kashmir Preservation of Specified Trees Act of 1969 and Rules of 1969.** If cutting of scheduled trees is required during preparation of sites, permission will be obtained by ERA from the sericulture/revenue department prior to commencement of construction works.

17. **Building and Other Construction Workers (Regulation of Employment and Conditions of service) Act of 1996 and Rules 1998.** The Government of India has enacted this act, which is also applicable to the state of J and K. This act applies to all the building and other construction activities to which the provisions of Factories Act, 1948 and Mines Act, 1952 do not apply. The state government, in pursuance of this act, has constituted a welfare board of building and other construction workers. This law aims to provide for regulation of employment and conditions of service of the building and other construction workers, as well as for safety, health, and welfare measures in every establishment which employs 10 or more workers. This act provides for registration of each establishment within a period of 60 days from the commencement of work and registration of building workers as beneficiaries under this act. Compliance to provisions of health and safety measures for the construction workers is in conformity with International Labour Organization (ILO) convention no.167 concerning safety and health in construction. The contractors engaged for execution of the subproject shall comply with the provisions of this act.

18. The summary of environmental regulations and mandatory requirements for the proposed subproject is shown in Table 1.

Table 1: Applicable Environmental Regulations

Applicability of Acts/Guidelines	Compliance Criteria
The EIA Notification, 2006 (and its subsequent amendments in 2009) provides for categorization of projects into category A and B, based on extent of impact.	The subproject is not covered in the ambit of the EIA notification as this is not covered either under category A or category B 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 Wildlife Conservation Act, 1972, as amended, and J and K Wildlife (Protection) Act 1978, as amended, provide for the protection and management of protected areas.	Clearance from state and national wildlife boards, Central Empowered Committee of Honorable Supreme Court of India, and the State Wildlife Department, as applicable. The Wildlife Protection Act is not applicable to the proposed subproject.
The Ancient Monuments and Archaeological Sites and Remains Act, 1958, and the rules, 1959 provide guidance for carrying out activities, including conservation, construction, and reuse in and around the protected monuments.	Permission from the Archeological Survey of India for carrying out any construction activities within the ancient monuments and archeologically protected sites. The subproject area does not fall within and is not situated close to any such site of archeological importance.
Water (Prevention and Control of Pollution) Act, 1974, as amended; Air (Prevention and Control of Pollution) Act, 1981, as amended	Consent to establish (CTE) and consent to operate (CTO) from the JK SPCB for setting up of hot mix plants, wet mix plants, stone crushers, and diesel generators to be obtained by the contractor, prior to construction
The Jammu And Kashmir Preservation of Specified Trees Act, 1969	Permission from sericulture/forest/revenue department/ concerned deputy commissioner for the scheduled species such as chinar *(Plantinus orientalis)* and mulberry *(Morus sp.)*
Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act of 1996 and Rules 1998 provide for regulation of employment and conditions of service of the building and other construction workers, as well as for safety, health, and welfare measures in every establishment which employs 10 or more workers.	Registration of each establishment within a period of 60 days from the commencement of work, and registration of building workers as beneficiaries under this act Compliance to provisions of health and safety measures for the construction workers is in conformity with ILO convention no.167 concerning safety and health in construction.

III. DESCRIPTION OF THE PROJECT

A. Existing Condition

19. The present system of transportation in Srinagar City is highly inadequate, with the area covered by transportation being only 3% against 10%–14% in metro cities. The length of roads above 12 m in width is approximately 233 km, but the conditions of these roads are below desirable standards. Traffic flows at different locations are observed beyond the capacity of the existing roads, thereby reducing the level of service on the road and causing congestion.

20. All major government, commercial and transport terminals are located in the central business district (CBD). The CBD extends from Dal Gate to Batamaloo and passes through Jehangir Chowk. Airport Road meets this road perpendicularly at Jehangir Chowk. The location of the High Court and the Secretariat on the west of Jehangir Chowk makes this intersection a very important hub. Apart from smaller bus stands scattered all over the city, the main bus terminal and several taxi and auto stands are located in the CDB. Several schools and colleges

are also located in the CBD and its vicinity. Even though the roads have been widened to their maximum possible extent (i.e., from four to six lanes at different locations), the number of conflicting usages and the high vehicular and pedestrian volumes still result in considerable congestion and delays to pedestrians and vehicles. The high levels of traffic and the lack of suitable pedestrian space result in congested pedestrian walkways and overflow onto the road.

21. The Srinagar-bound traffic from Jammu and the southern part of the valley enters the city from Sonwar side (the east) through Srinagar bypass, Natipora Road, or the Airport Road to reach the CBD area. Congestion at Airport Road is caused by traffic to and from the airport and other areas like Hyderpora, Sanat Nagar, Rawalpora, Hazratbal, and Nishat; and along Dal Gate, J.K Bank, Radio Kashmir, and Bakshi Stadium intersections.

22. The road corridor also has frequent VIP movement. To allow the VIP traffic to go through, civilian traffic movement is stopped for half an hour or so.

23. The number of conflicting usages and the high vehicular and pedestrian volumes act as barriers to the redevelopment and growth of the area. The fragmentation of activities, in particular the public transport ranks, is not an efficient, convenient, and safe operation. This has resulted in inefficient use of valuable land in a prime location within the city. This inefficient use of land also inhibits the development and growth of the area. Lack of defined and dedicated commercial space to cater to demand results in businesses operating in undesirable locations, exacerbating problems of congestion and urban degradation.

24. The proposed subproject is part of the long-term plan of the state government to improve urban transport facilities in the city. The BRT, widening of roads, and improved mobility plan would require more land acquisition, resulting in increased resettlement impacts. The existing road carriageway has been widened to the maximum possible limits at critical points on the road. Considering the existing traffic demand and future growth of traffic, there is need for a grade-separated facility on this road. Hence, a flyover has been proposed from Jehangir Chowk to Rambagh and Natipora along Airport Road.

B. Proposed Subproject and Components

25. The subproject area is located on the southern part of Srinagar City (Figure 1). The major objectives of constructing the expressway corridor are:

(i) decongestion of traffic on the road junctions from Jehangir Chowk to Rambagh-Natipora;
(ii) quick access to the airport from the city center; and
(iii) improved long-term traffic management in Srinagar City.

26. The proposed flyover is expected to have the following benefits:

(i) immediate positive impact on the area by significantly reducing the number of vehicles passing through the area by approximately 58% (as per traffic surveys), from the current number of 11,686 vehicles per 12-hour period;
(ii) reduction of traffic, which is expected to reduce the number of accidents and potential conflicts that occur with the area, thus saving human life as well as the economy of the region;
(iii) reduced traffic also resulting in land gains which can be utilized to enhance the pedestrian space and increase pedestrian amenity;

(iv) improvement and increase in size of pedestrian sidewalks and footpaths, as well as general urban design elements to create an environment that is conducive to pedestrian activity;
(v) reduced traffic congestion, conflicts, and land gains resulting in a safer and more efficient circulation of traffic; and
(vi) future development and events will have better access to and from the city.

27. The proposed flyover is planned to start from Jehangir Chowk and pass along Airport Road, passing landmark places like Iqra Masjid, Dr. Sir Mohammad Iqbal Park, Bakshi Stadium (none of these is an ASI or state-protected site/monument), and Rambagh Bridge over the flood channel, terminating at Rambagh after Natipora Y-junction on Airport Road. The proposed flyover will pass through congested commercial establishments on both sides of the road, which include shops, malls, industrial establishments, schools, religious places, parks, offices (government and private), and residences.

28. The construction of the expressway (flyover) will use a pile/well foundation, framed substructure and precast, and prestressed superstructure. It will have footpaths and crash barriers on both sides, and entry and exit ramps at appropriate intersections as well as both ends to integrate the merging and diverging traffic. Approach ramps are of reinforced earth (RE).

29. The construction is designed with a pile/well foundation, with a view to minimize the collateral damage to the existing buildings/bridge on both sides of the flyover, and a framed substructure to minimize use of concrete, as well as to minimize the seismic effect. Precast, prestressed superstructure will help in taking the construction activity to uninhabited areas, thus providing relief to inhabited areas on both sides of the flyover, while also reducing concrete quantity. For road safety, footpaths, crash barriers, and an adequate number of signposts have been provided as per codal provisions. Entry and exit ramps at appropriate locations help in integration of traffic along the sides and also at the ends of the flyover. Reinforced earth approach ramps are ecofriendly, and give substantial land gain advantages. Construction period is likely to be 36 months from the start of work, scheduled for 30 September 2012.

30. Table 2 shows the components of the subproject. The descriptions shown are based on the present proposals, which are expected to be substantially correct, although certain details may change as the subproject progresses.

Table 2: Description of the Proposed Elevated Expressway Corridor in Srinagar City

Component	Function	Description	Location
General	Reduction of traffic congestion over the existing road	Elevated expressway corridor (flyover) with dual carriageway, each 7.5 m in width and 2.41 km in length Two-lane split roads on either side of flyover	The length of the corridor is about 2.41 km. The take-off point is Jehangir Chowk, and it terminates beyond Y junction at Natipora-Airport Road crossing.
Four-lane divided elevated carriageway	To increase the carriageway width for traffic with least acquisition on either side of the existing road.	Elevated expressway corridor (flyover) with dual carriageway, each 7.5 m in width and 2.41 km in length. Two-lane split roads on either side of flyover	Jehangir Chowk to Rambagh Bridge
An upward ramp at Jehangir Chowk	For diverting traffic from Jehangir Chowk	Ramp is provided to lift the traffic towards Rambagh.	Jehangir Chowk

Component	Function	Description	Location
	via flyover to Rambagh		
A downward ramp at Jehangir Chowk	Leading traffic from flyover to other city centres like Batamaloo, Lal Chowk, etc.	To lead the traffic coming via flyover from Rambagh	Jehangir Chowk
A left turn upward ramp	For diverting traffic from Jawahar Nagar to Rambagh via flyover to avoid congestion at Tulsi Bagh crossing.	An extension is provided to flyover on the left side with an upward ramp so as to divert traffic towards Rambagh without any traffic congestion at the Tulsi Bagh crossing.	Bakshi Stadium Chowk
A left downward ramp	For traffic coming from Rambagh towards Jawahar Nagar via flyover to avoid congestion at Tulsi Bagh crossing.	An extension is provided to flyover on the left side so as to divert traffic towards Lal Chowk or to downtown area via Zero Bridge to avoid chaos in the Jehangir Chowk area.	Bakshi Stadium Chowk
Two major bridges, each of two-lane carriage way	For movement of vehicular traffic from both sides of the flyover and to reduce the load on the existing Rambagh Bridge.	Two bridges have been provided on either side of the existing Rambagh Bridge parallel to each other for to and fro movement of traffic on the flyover.	Over flood spill channel at Rambagh on either side of existing bridge
Upward ramp	For upward movement of traffic coming from Airport Road or from Chanapora	An upward ramp withR7.5m carriageway width starting at Y-Junction is provided to lift the traffic coming from Airport road or from Chanapora.	Right-hand side (RHS) starting from Natipora Y-Junction.
Downward ramp towards Natipora	For downward movement of the traffic coming from Jehangir Chowk	A downward ramp with 7.5 m carriageway width to lead the traffic coming from Jehangir Chowk	Left-hand side (LHS) from Natipora Y-Junction
Two-lane downward ramp towards Barzulla Airport Road	For downward movement of the traffic coming from Jehangir Chowk. An extension (downward ramp) has been provided towards Airport Road to avoid the congestion of traffic at the interception of Rambagh Chowk.	Extension of elevated expressway corridor (flyover) with dual carriageway, each about 7.5 m in width and 20 m length up to Barzulla Bridge, with ramp for downward movement of the traffic coming from Jehangir Chowk.	Rambagh Bridge to Barzulla Bridge on Airport Road
Provision of street lighting	To make movement of traffic possible during night hours also	Both sides	Jehangir Chowk to Rambagh Bridge
1.5 m wide drain-cum-footpath on both sides	For collection of storm water and path for pedestrian movement	1.5 m wide drain-cum-footpath	Both sides from Jehangir Chowk to Rambagh.

31. The design of the flyover is according to the Indian Road Congress IRC Codes, Ministry of Road Transport and Highways (MoRTH) specifications, and other relevant codes. The main design features are summarized in Table 3 below.

Table 3: Design Features of the Subproject

Design feature	Description
Total length	2,410 m
Carriageway width	7.5 m
Vertical clearance	5.5 m
Loading	Two lanes of IRC Class – A or single lane of 70R[2]
Seismic zone	Zone V
Cross-sections	Two carriageways with two lanes configuration
Span arrangement	One continuous module of four spans, with a length of 84.2 m
Superstructure	Precast prestressed concrete girders with monolithic reinforced cement concrete (RCC) deck slab over the girders for general sections, and for individual carriageways and ramp sections, prestressed concrete deck slabs have been proposed.
Foundation	Pile foundation of 1 m-diameter piles
Life span of subproject	50 years

IRC = Indian Road Congress; RCC = reinforced cement concrete

C. Implementation Schedule

32. The implementation schedule of the subproject is given in Table 4 below:

Table 4: Implementation Schedule of the Subproject

Procurement Activity	Tentative Time Schedule	Resettlement Activities
ADB approval of bid documents	31 January 2012	
Invitation to bid	10 February 2012	
Completion of EA's technical evaluation	30 April 2012	Relocation of about 40 shopkeepers
Completion of EA's financial evaluation	30 June 2012	Relocation of about 50 shopkeepers
Commencement of work	30 September 2012	Completion of relocation of all the remaining shopkeepers
Completion of work	30 September 2015	

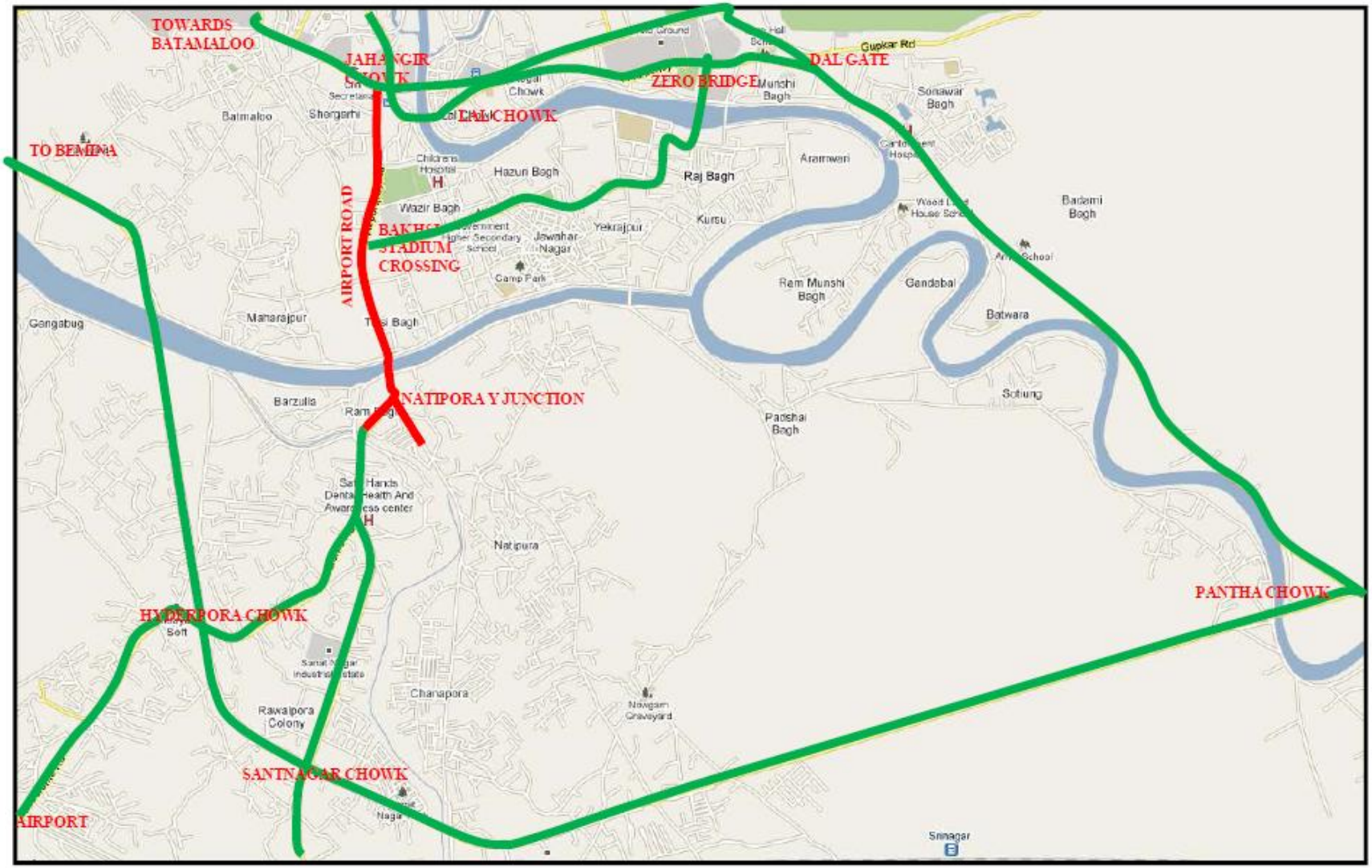
D. Alternatives of Proposed Subproject

[2] Indian Road Congress (IRC) has evolved standards for bridges commensurate with traffic needs on the Indian highway system. These loadings were introduced for the first time in India in 1939, and at that time, were of two types—IRC standard loading and other IRC heavy loading—both consisting of distributed load and knife-edge load. The IRC standard loading consisted of a uniformly distributed load of 1.13 tons per linear meter of each traffic lane, plus a knife-edge load of 6 tons for computing bending moment and 9 tons for computing sheer force. The IRC heavy loading was similar to the first, the only difference being that the uniformly distributed load was increased by 0.8 tons/m and the knife-edge loads were increased by 1 ton each. In 1958, these loadings were replaced by a set of wheel load trains known as the IRC Class AA, Class A, and Class B loading. In 1966, an additional loading known as class 70-R was introduced by making certain modifications to the already existing Class AA, hence the "R" added, meaning revised. Class 70 R and Class AA loading specify a 70-ton tracked vehicle with only slight differences in the length of the loaded area. Thus, although the vehicles are practically identical with the same total load, the minimum spacing between vehicles specified for the two load classes are very different: for class 70 R it is 30 m, and for class AA it is 90 m.

33. The following alternatives have been considered for the proposed subproject:

(i) Option 1 - Do nothing – This will not address the underlying problem of traffic congestion and conflicts between vehicles and pedestrians.
(ii) Option 2 - Do minimum – This option involves grade improvements to improve safety, but still does not address the underlying problem of traffic congestion.
(iii) Option 3 - Route alignment options. These were discounted, as the impacts on existing buildings and traffic flows at different locations were observed to be beyond the capacity of the existing roads.
(iv) Option 4 - Current preferred option. This offers the best, most balanced solution by providing the desired outcomes with least impacts on environment and minimum land acquisition.

Figure 1: Map Showing the Location of the Subproject (Marked Red) and Other Major Road Networks of Srinagar City (Marked Green)



IV. DESCRIPTION OF THE ENVIRONMENT

A. Physical Resources

1. Administrative Boundaries

34. The subproject sites are located in the built-up area of Srinagar City. Srinagar, the summer capital of Jammu and Kashmir, is situated at an average altitude of 1,600 m above mean sea level (MSL) and located in the heart of the oval-shaped valley of Kashmir. Srinagar City is situated around 34° 05' N latitude and 74° 56' E longitudes. It is well connected by air and road.

2. Topography, Drainage, and Natural Hazards

35. **Topography**. The subproject area stretches from southwest to northwest in the city of Srinagar. Physiographically, it constitutes a part of the flood plain of Jhelum, which is largely flat and featureless with subrecent alluvial deposits. The topography shows gentle terrain slope from east to west. General elevation of the subproject corridor varies between 1,585 m and 1, 590 m above msl.

36. **Drainage**. Srinagar City is located on flatter terrain. Therefore, the drainage system of the city relies on a lift system through drainage pumping stations, which lift storm water from wet wells and discharge it into the adjoining water bodies. Majority of the drains are covered with RCC slabs, with manholes provided at suitable intervals to facilitate maintenance of the drainage system. The city has about 65 drainage pumping stations.

37. As per the storm water drainage master plan, Srinagar City is divided into three drainage zones. The detai**l**s of the drainage zones are as follows:

(i) Zone I: This zone includes areas from Pampore to Gaw kadal, Dalgate to Nehru Park, civil line areas, Raj Bagh, Jawahar Nagar to Alochi Bagh, and areas across the flood spill channel, including Ram Bagh, Natipora, Barzulla, etc. The subproject location falls within this zone.

(ii) Zone II: The zone includes areas from Amira Kadal to Parimpora/Shallateng, including new and old sections of Batamalloo, Bemina, Nawa Kadal, Nawa Bazaar and Safa Kadal, etc.

(iii) Zone III: This zone includes areas from Dalgate to Noorbagh on one side and Dalgate to Naseem Bagh, and areas around Iddgah, Nowshera, Ali Jan Road, Soura, Buchpora, etc.

38. There are about 50 existing drainage schemes with about 119 km of primary and secondary storm water drains. In addition to such drains, there are substantial lengths of tertiary drains or deep drains. The list of existing drainage schemes is given in Table 5 below:

Table 5: Zonal List of Drainage Schemes in Srinagar City

Sr. no	Name of Drainage Scheme	Length of Drain (m)
Storm water drainage zone 1:		

Sr. no	Name of Drainage Scheme	Length of Drain (m)
1	Old Barzula	2,016
2	Rajbagh	8,889
3	Ikhrajpura, Lal Mandi, Jawahar Nagar, and Iqbal Park	5,414
4	Polytechnic	3,939
5	Saria Balla	966
6	Solina	998
7	Sonwar Bagh; dewatering station	1,180
8	Pandrathan; dewatering station	2,200
9	Rawal Pora; dewatering station	4,695
10	Nowgam, Methan, and Gulshan Nagar	582
11	Barzulla; dewatering station	10,367
12	Natipora; dewatering station	1,945
13	Budshah Nagar	1,617
14	Chanapora	7,116
15	NH Bypass	2,225
16	Rambagh area	563
17	Kacherpora	550
Storm water drainage zone II:		
18	Syed Hamidpura, Nawab Bazar, and Jamallatta	2,541
19	Chotta Bazar and Guru Bazar	1,198
20	Daresh Kadal, Zampa Kadal, Kaka Saria, and Karan Nagar	1,110
21	Batmaloo, Nursing Garh, Bal Garden, and Shutrashahi	4,678
22	Green sewer	1,960
Storm water drainage zone III:		
23	Bahao-u-deen Sahib	700
24	Imptts to Nallah Maar	4,538
25	Khanyar	3,670
26	Hawal, Alamgari Bazar, and Mureed Pura	3,335
27	Budoo Bagh	555
28	Bhagwanpora and Noor Bagh	1,647
29	Brari Nambal	1,190
30	Iddgah, Ganderpora, Laigar Doori, and Saidpaora	1,225

Sr. no	Name of Drainage Scheme	Length of Drain (m)
31	Rathpora	1,204
32	Interior Dana Mazar	390
33	Shaheen Colony Guzarbal Noorbagh	1,130
34	Zoonimar	885
35	Jamia Masjid	400
36	Soura, Buchpora,Vicharnag, and its adjoining schemes	6,709
37	Lal Bazar and Qurershi Mohalla/Bota Kadal	3,647
38	Zahidpora Hawal	1,095
39	Bishember Nagar	2,650
40	Mandir Bagh and adjoining drains	990
41	Rattan Rani	1,100
42	Dewatering station of Shora Khan	4,950
43	Dewatering station of Court Road	1,530
44	Dewatering station of Abi Guzer	1,085
45	Golf Course Dewatering Station	1,805
46	Dewatering station of Khidmat Press	840
47	Barber Shah; dewatering station	738
48	Sonwar; dewatering station of Davis	2,790
49	Shah Mohalla and Awanta Bhawan	769
50	Bilal Colony	347
Total		**118,663**

39. **Storm water drainage pumping stations**. Three types of drainage schemes using lift, gravity, and lift-cum-gravity systems exist in the city. There are approximately 89 drainage pumping stations in Srinagar City, with 69 permanent and temporary dewatering stations and a few mobile units which are being utilized during flash floods in various areas. Zonal details of the drainage pumping stations are given in Table 6 below.

Table 6: Existing Storm Water Drainage Pumping Stations in Srinagar City

Area	Number of Pumping Stations			
	Lift	Gravity	Lift/Gravity	Total
Zone I	17	2	4	23
Zone II	14	3	16	33
Zone III	5	13	7	25

Area	Number of Pumping Stations			
	Lift	**Gravity**	**Lift/Gravity**	**Total**
S&D-I	2	3	3	8
Total	**38**	**21**	**30**	**89**

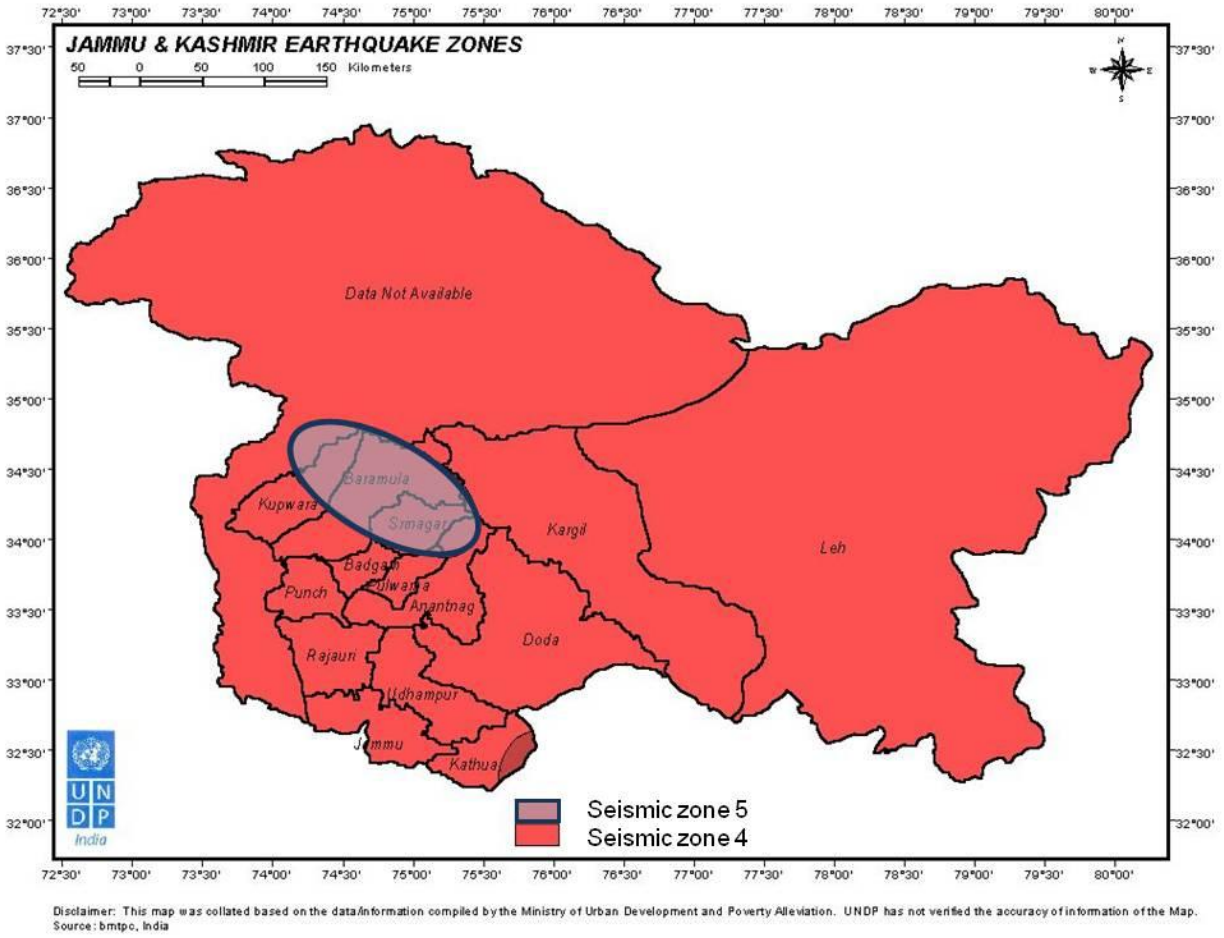
40. **Natural hazards**. The Indian subcontinent has a history of devastating earthquakes. The major reason for the high frequency and intensity of the earthquakes is that India is driving into Asia at a rate of approximately 47 mm/year. Geographical statistics of India show that almost 54% of the land is vulnerable to earthquakes. The latest version of the 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 other words, the earthquake zoning map of India divides India into four 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 has the lowest level of seismicity.

41. The state of Jammu and Kashmir is the western most extension of the Himalayan mountain range in India. Here it is comprised 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 and Kashmir are heavily faulted. Along the Zanskar and Ladakh ranges runs a northwest (NW) to southeast (SE) trending strike-slip fault, the longest in the Jammu and Kashmir area. Apart from 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 building codes.

42. The project is located in a seismically active part of Kashmir Valley**.** Keeping in view the maximum credible earthquake magnitudes in the region, the site area is classified as 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 regional geotectonics.

43. The earthquake zonation map of Jammu and Kashmir is shown in Figure 2 below:

Figure 2: Jammu and Kashmir Earthquake Zones



44. **Floods.** The subproject area is located in the central business district, Srinagar, where floods are not a regular phenomenon, owing to its topography and the presence of natural drainage in the form of the river Jehlum and numerous water channels. The construction of the Doodganga flood spill channel in 1904 by the then Maharaja relieved the strain on the Jhelum in the city of Srinagar, thereby making the city safer from floods. This flood channel takes two-thirds of the total flow from the river, thus helping the Jhelum regulate its water level while passing through the city, and thus saving it from flooding

45. Besides natural drainage, the subproject area is well knitted with a system of drains and pumping stations which lift storm water from the drains and discharge it into the adjoining water bodies. There are approximately 89 drainage pumping stations in Srinagar City, with 69 permanent or temporary dewatering stations and a few mobile units which are being utilized during flash floods in various areas. Majority of the drains are covered with RCC slabs, with manholes provided at suitable intervals to facilitate maintenance of the drainage system. As per the storm water drainage master plan, Srinagar is divided into three drainage zones, with the subproject area located in Zone I comprising areas from from Pampore to Gaw kadal, Dalgate to Nehru Park, civil line areas, Raj Bagh, Jawahar Nagar to Alochi Bagh, and areas across the

flood spill channel, including Ram Bagh, Natipora, Barzulla, etc. In order to make the drainage more efficient, different drainage projects have been proposed under Tranche 2 of JKUSDIP.

3. Geology, Geomorphology, and Soils

46. **Geology and geomorphology**. The geology of the territories of Jammu, Kashmir, and Ladakh have been divided into three different structural zones: the Panjal, the Zanskar, and the Tertiary Groups.

47. These three geological divisions form the basis of the four physical divisions of the state. The Panjal forms the outer plain, the outer hills, and the middle mountains. The Zankar includes the whole of the eastern region, from Spiti and Lahol (32.17^0N. latitude) to the lofty Karakoram mountains in the north. The Tertiary Groups include the valley of Kashmir and other river valleys.

48. The oval valley of Kashmir is longitudinal. There is a high wall of mountains around the valley that rise to a height of 5,500 m above sea level. The only outlet of the valley is Baramulla, where the Jehlum flows out through a narrow gorge. The entire drainage of the valley of Kashmir and its surrounding areas has only this outlet. In the north, Kashmir has many volcanic rock formations. These are mostly stratified and several thousand meters thick. There are many layers of sedimentary rock which found in Liddar Valley, Baramulla District, and the Banihal Verinag section of the Pir Panjal range. Limestone and shale are common. The rock layers have many fossils. Near Yarkand to the extreme north, shale has been found, showing that the region was under the sea in the geological past.

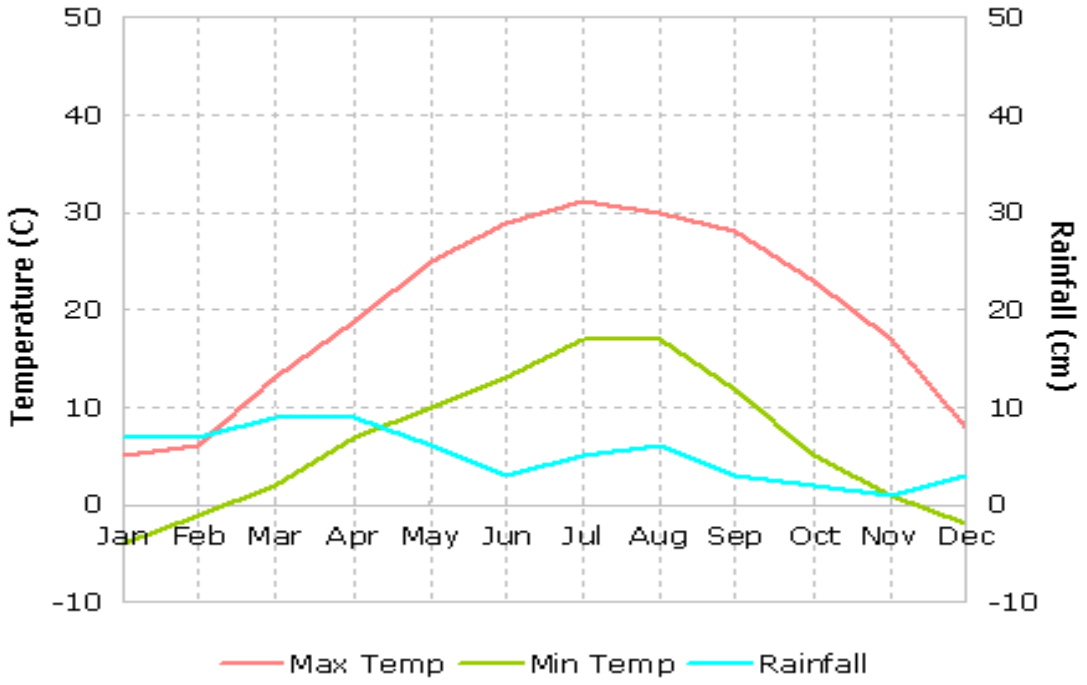
49. **Soils**. In the regions of Jammu and Kashmir, the soils are loamy, and there is little clay content. Poor in lime but with a high content of magnesia, the soil is treated with chemical fertilizers and enriched with green manure and legume before cultivation. There is sufficient organic matter and nitrogen content in the alluvium of the Kashmir Valley as a result of plant residue, crop stubble, natural vegetation, and animal excretion. The valley of Kashmir has many types of soils like *gurti* (clay), *bahil* (loam), *sekil* (sandy), *nambaal* (peat), *surzamin, lemb*, floating garden soils, and Karewa soils. No wonder then that in Kashmir, soil is virtually worshipped as a miracle of divinity, as it is a source of the wealth of the land.

50. The proposed alignment of the corridor is located within Srinagar District, which is primarily comprised of old alluvium, down to great depths. These valley floor deposits along the entire alignment came under a more recent period of geological formation. As such, the strata at the proposed bridge location can broadly be categorized under natural alluvium/ water laid deposits (alluvial deposits), which generally include silty-clay or clayey-silt types of soil in intermixed layers with potential seams of fine to coarse sand. Such alluvial deposits are also sometimes associated with a matrix of highly decomposed organic silt/peat in Kashmir Valley; however, the subproject area has not been reported to have any such deposits.

4. Climate

51. The climate of Srinagar City, in general, is characterized by a temperate summer and cold/mild winters. Annual rainfall in the city is less than 26 in, most of it in winter and spring. A weather graph for Srinagar is shown in Figure 3 below.

Figure 3: Weather Graph of Srinagar



Note: These are average maximum and average minimum temperatures for Srinagar. The highest temperature in Srinagar for the month is usually higher than the average maximum temperature. Similarly, the lowest temperature in Srinagar for the month is usually lower than the average minimum temperature.
Source: Indian Meteorological Department.

52. **Temperature**. June, July, and August are the hottest months, while December and January are the coldest. The temperature varies from cold in winter, with minimum temperature touching -3.7 °C, to mild hot in summers when the temperature shoots up to 30 °C. The mean maximum and minimum temperatures (°C) recorded at the meteorological observatory (Rambagh, Srinagar) in 2005–2010 are summarized in Table 7.

Table 7: Mean Maximum and Minimum Temperatures of Srinagar City

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year 2005												
Max. temp. (°C)	7.5	6.5	14.7	20.7	21.8	29.3	28.9	30.4	29.3	22.7	15.8	9.9
Min. temp. (°C)	-0.3	0.7	5.3	7.1	9.9	14.4	18	16.9	13.7	5.8	-0.2	-3.3
Year 2006												
Max. temp. (°C)	4.3	13.4	16	21.1	28.2	27.6	30.9	28.7	25.9	22.9	15	8.4
Min. temp. (°C)	-1.3	3.3	4.7	7.2	13.3	14.7	19.3	18.3	12.3	8	3.5	0
Year 2007												
Max. temp. (°C)	10	12	14.7	25.6	25.5	27.8	29.8	30.1	27.3	24.1	17.1	9.9
Min. temp. (°C)	-2.5	2.9	3	8.9	11.9	16	17.8	17.8	13.3	3.9	-1.1	-2
Year 2008												
Max. temp. (°C)	5.5	8.7	20	20.1	25.6	29.6	29.9	29.5	26.5			
Min. temp. (°C)	-2.5	-1.4	5.3	7.7	11.5	18.3	19.1	17.8	11.3			
Year 2010												
Max. temp. (°C)	10.9	9.8	20.7	21.3	22.7	25.7	28.9	28.5	26.6	23.8	18.6	11.3
Min. temp. (°C)	-1.5	0.4	6.5	9.0	11.1	13.5	17.7	18.8	13.3	7.3	2.2	-3.7

Source: Indian Meteorological Department, Srinagar.

53. **Rainfall**. The area experiences rainfall during winter and early summer from western disturbances. The month's total rainfall (MTR in mm) recorded at the meteorological observatory at Rambagh, Srinagar in 2001–2010 is shown in Table 8.

Table 8: Rainfall Data of Srinagar (Month's Total Rainfall in MM)

Months/ Years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2001	21.3	46.1	56	57	37	52.8	80.8	67.8	33.5	15.9	36	18
2002	35.5	105.8	105.1	77.7	47.3	82.2	16.8	75.3	54.5	8.2	0	8.9
2003	28.7	180	173.4	127.6	91.4	20.4	97.9	19.8	62.4	8.7	14.6	59.4
2004	79.2	38.1	9.6	145.4	86.6	36.7	58.3	62.3	12	61.3	33.2	12.5
2005	86.6	188.5	104.8	48.1	63.6	8.3	115.5	15.6	16.8	18.6	14.4	0
2006	134	63.3	48.2	52.7	26.3	33.9	103.3	171.3	93.3	15.3	73.5	72.2
2007	8.1	52.6	210.3	1.5	46.2	50.9	54.9	47.4	14	0	0	15.9
2008	76.3	105	9.4	81.5	52.3	24.7	33.1	65.3	22.5	--	--	--
2010	24.1	88.9	61.0	126.8	186.4	45.3	69.8	132.1	16.9	51.4	2.0	43.0

Source: Indian Meteorological Department, Srinagar.

54. **Humidity**. The humidity levels in the area are observed as being at a maximum of 95% in the months of July and August and at a minimum of between 30% and 40% during December and January. The mean relative humidity (MRH) recorded at the meteorological observatory at Rambagh, Srinagar in 2006–2008 at 8:30 a.m. and 5:30 p.m., Indian Standard Time (IST), are presented in Table 9 below.

Table 9: Monthly Relative Humidity of Srinagar City

Months	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
MRH 2006 (max and min)	91	88	80	66	66	70	77	82	81	82	89	80
	79	61	52	42	44	46	54	61	60	61	68	74
2007 (max and min)	90	87	77	60	71	77	75	77	77	68	81	87
	54	60	52	34	47	50	55	52	52	42	53	65
2008 (max and min)	89	87	69	73	70	73	75	76	76	NA	NA	NA
	70	63	40	52	53	51	53	51	49	NA	NA	NA
2010 * (max), 8:30 a.m.	88	87	71	77	78	74	75	85	78	77	85	90

* In 2010, only mean data at 8:30 a.m. available, Source: Indian Meteorological Department, Srinagar.

5. Air Quality

55. In the area along the proposed subproject, vehicular traffic is a major contributor to air pollution. In order to establish ambient air quality in the subproject corridor, baseline data was generated by the environmental monitoring laboratory of the Economic Reconstruction Agency (ERA) in May-June 2011. The air quality data with respect to RSPM (PM_{10}), SO_2, and NO_2 was measured at specified sites along the subproject corridor, and the results are presented in Table 10 below.

Table 10: Ambient Air Quality Data at Various Locations in Subproject Area

S.No.	Location	Parameters		
		RSPM (PM_{10}[3]) ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)

[3] $PM_{2.5}$ will be provided later, as the equipment to measure it is not yet available. The requisite equipment shall be procured by ERA and the baseline data shall be again generated for all parameters before start of work on the proposed subproject.

S.No.	Location	Parameters		
		RSPM (PM_{10}) ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)
1.	Jehangir Chowk	141.73	8.01	47.41
2.	Junction at Bakshi Stadium	235.45	9.31	47.29
3.	Rambagh (Tulsi Bagh) adjacent to school for the blind	189.36	8.23	41.87
4.	Natipora, adjacent to Zam Zam hotel complex	376.94	6.93	39.78
	NAAQ Standards[4]	**PM_{10}= 100**	**80**	**80**

PM_{10}= particulate matter below 10µ particle size; RSPM = respirable suspended particulate matter; SO_2= sulfur dioxide; NO_2= nitrogen dioxide; NAAQS: National Ambient Air Quality Standards of Government of India.

56. The results of the tests conclude that the values for Respirable Suspended Particulate Matter (RSPM) are above the National Ambient Air Quality Standards (NAAQS) set by the CPCB India. The primary reason for this is the heavy traffic in the vicinity of all the selected sites.

57. The NAAQS were revised by Ministry of Environment and Forests, Government of India on 16 September 2009, while the RSPM has been further divided into PM_{10} and $PM_{2.5}$. The air quality monitoring equipment presently available with J and K ERA can measure the total particulate matter below 10µ particle size. However, separate values for PM_{10} and $PM_{2.5}$ cannot be determined. The requisite equipment shall be procured by ERA for separate measurement of these parameters, and baseline data shall be generated before start of work on the proposed subproject. Procurement of equipment for environmental monitoring laboratories of ERA shall be an independent exercise, and shall not be a part of this subproject.

6. Ambient Noise Levels

58. The proposed flyover will pass through a heavily built-up area with a mixed land use pattern and a large number of commercial and residential establishments. Ambient noise levels during daytime were measured by the environmental monitoring laboratory of ERA in May-June 2011, in the subproject area, and the results are shown in Table 11.

Table 11: Ambient Noise Quality

S. No.	Location	Site type	Day time noise level dB(A) L_{eq}	Daytime Noise Quality Standards[5] (MoEF/CPCB) (dB(A) L_{eq})
1.	Jehangir Chowk	Commercial area	81.85	65
2.	Junction at Bakshi Stadium	Commercial area	78.63	65
3.	Rambagh (Tulsi Bagh) adjacent to school for blind	Silence zone	76.46	50
4.	Natipora, adjacent to Zam Zam hotel complex	Commercial area	66.55	65

dB(A) L_{eq} = the time-weighted average of the level of sound in decibels on scale A, which is relatable to human hearing.

[4] National Ambient Air Quality Standards (NAAQS), Government of India, published in Gazette of India, Extraordinary, part II, section 3, subsection i vide no. G.S.R. 826(E), dated 16 September 2009.

[5] Standards specified in the schedule of *Noise Pollution (Regulation And Control) Rules*, 2000 of Government of India. The principal rules were published in the Gazette of India, vide S.O. 123(E), dated 14 February 2000 and subsequently amended vide S.O. 1046(E), dated 22 November 2000, S.O. 1088(E), dated 11 October 2002, S.O. 1569 (E), dated 19 September 2006 and S.O. 50 (E) dated 11 January 2010 under the Environment (Protection) Act, 1986.

59. The ambient noise levels along these sections are observed to be higher than the permissible limits, and may be attributed to frequent traffic jams and blowing of horns. At these locations, traffic volume is quite high and the areas are crowded with commercial and other activities.

60. The nighttime noise level data could not be generated owing to security reasons. Further, the execution of the proposed subproject shall be done during daytime only, ruling out the possibility of any noise generation at night. In case any work has to be carried out during nighttime, then baseline data shall be generated prior to the start of any such work.

7. Water Resources

i. Surface Water

61. No water body is located in the vicinity of the subproject area, though the subproject crosses the flood spill channel at Rambagh, which carries water during rainy season. The Doodganga stream flowing through Barzulla is almost 150 m away from the terminating point of the proposed flyover. However, Srinagar City in general has many water bodies, including Dal Lake, which is a tourist attraction situated in the middle of the city away from the subproject site. River Jhelum flows through the city, dividing it into two parts. Other important water bodies in and around the city include Nagin Lake, Anchar Lake, Khushalsar, Gilsar, Hokersar (wetland), Telbal Nallah, Dachigam Nallah, and Doodganga Nallah. The subproject is not expected to have any impact on the surface water quality of the flood spill channel and Doodganga stream; however, this surface water quality was analyzed in May-June 2011 by the environmental monitoring laboratory of ERA, and is presented in Table 12.

Table 12: Surface Water Quality Baseline Data

Sampling Site		Temperature ^{o}C	pH	Conduct-ivity µS/cm	DO mg/l	BOD mg/l	TDS mg/l	TSS mg/l	Turbidity (NTU)
Rambagh flood spill channel	Upstream	20.3	7.6	409	8.13	25.0	307	132	9.8
	Downstream	20.5	7.4	502	3.06	30.0	336	312	14.6
Doodganga stream at Natipora and Barzulla	Upstream a t Natipora	10.4	7.5	140	8.4	1.8	120	188	22.3
	Downstream at Barzulla	10.6	7.6	142	8.0	1.6	132	180	24.2
Surface water standards (As per IS:2296)									
Category A		-	8.5	-	6	2	500	-	-
Category B		-	8.5	-	5	3	-	-	-
Category C		-	8.5	-	4	3	1500	-	-
Category D		-	8.5	1000	4	-	-	-	-
Category E		-	8.5	2250	-	-	2100	-	-

DO = dissolved oxygen; BOD = biochemical oxygen demand; TDS = total dissolved solids; TSS = total suspended solids; ^{o}C = degree Celsius; µs/cm = micro Siemens per centimeter; mg/l = milligram per liter; NTU = Nephalo turbidity units.

62. It is clear that the water quality of the channel and the Doodganga stream is not fit for drinking without treatment. Total suspended matter (TSS) and total dissolved solids (TDS) are moderately high in the flood spill channel.

63. As per water quality standards for various water classes based on use (i.e. class A, B, C, D, and E), the water of Rambagh flood spill channel falls under category E and is suitable for

irrigation purposes only, while the water of Doodganga stream falls under category A/B/C and is suitable for drinking purposes after conventional treatment, followed by disinfection.

ii. Geohydrology and Groundwater

64. The depth of the water table along the expressway corridor/flyover is reported to be between 5 and 10 m. Public water supply is the major source of potable water for the settlements throughout the subproject area. No tube wells fall in the corridor of impact of the subproject.

65. The water table was measured inside the borehole with reference to the natural soil level (NSL) on the day of field investigations, and was encountered at a relatively shallow depth at all boring locations. A potential seasonal variation of ± 0.5 m may be expected. In view of this, there is a prospect for seepage water to intrude on working areas during any open excavation below NSL.

B. Ecological Resources

66. **Terrestrial ecology and biodiversity**. Since the subproject stretch is located within a heavily built-up area of Srinagar City, no sensitive ecological areas are located along the stretches of the subproject flyover/expressway.

67. **Forest areas and trees**. The subproject is located within Srinagar City, and there is no forest within or adjacent to the subproject corridor. However, a total of 497 trees are required to be removed for the construction of the subproject. These trees mainly include chinar, poplar, mulberry, ailanthus, robinia, ficus, and other ornamental plants. Both chinar and mulberry are scheduled trees of the state, and shall require prior permission from the concerned authorities before cutting. All possible efforts shall be made to avoid unnecessary cutting of these trees. Permission has been taken up with the concerned authority. These trees are owned by state government. Compensatory plantation at the ratio of 1:2 will be carried out after completion of the subproject by any concerned state department, such as social forestry, horticulture, or floriculture.

68. **Wild fauna**. No wild animals are reported, as there is no forest close to the subproject site.

69. **Rare or endangered species**. No rare or endangered animal or plant species are reported in the subproject impact zone. Only chinar and mulberry, which are in the impact zone, are scheduled trees of the state and are not endangered.

70. **Protected area**. There is no protected area within or adjacent to the proposed subproject area.

71. **Fisheries**. The common fish species found in River Jhelum and other water bodies of the city include mirror carp, scale carp, schizothorax, and trout. Commercial fishing is carried out in Dal Lake and in some stretches of River Jhelum. No fishing activity has been observed in Doodganga Nallah, located about 150 m away from the terminating point of the proposed flyover at Barzulla. Therefore, no interference with fishery activities is envisaged.

C. Economic Development

72. Jammu and Kashmir's economy is predominantly dependent on agriculture and allied activities. The Kashmir Valley is also known for its sericulture and cold-water fisheries. Wood from Kashmir, popularly known as Kashmir willow, is used to make high-quality cricket bats. Kashmiri saffron is also very famous and brings the state a handsome amount of foreign exchange. Agricultural exports from Jammu and Kashmir include apples, barley, cherries, corn, millet, oranges, rice, peaches, pears, saffron, sorghum, vegetables, and wheat, while manufactured exports include handicrafts, rugs, and shawls.

73. Horticulture plays a vital role in the economic development of the state. With an annual turnover of over Rs. 300 crore, apart from foreign exchange of over Rs. 80 crore, this sector is the next biggest source of income in the state's economy. The region of Kashmir is known for its horticulture industry and is the wealthiest region in the state. Horticultural produce from the state includes apples, apricots, cherries, pears, plums, almonds, and walnuts.

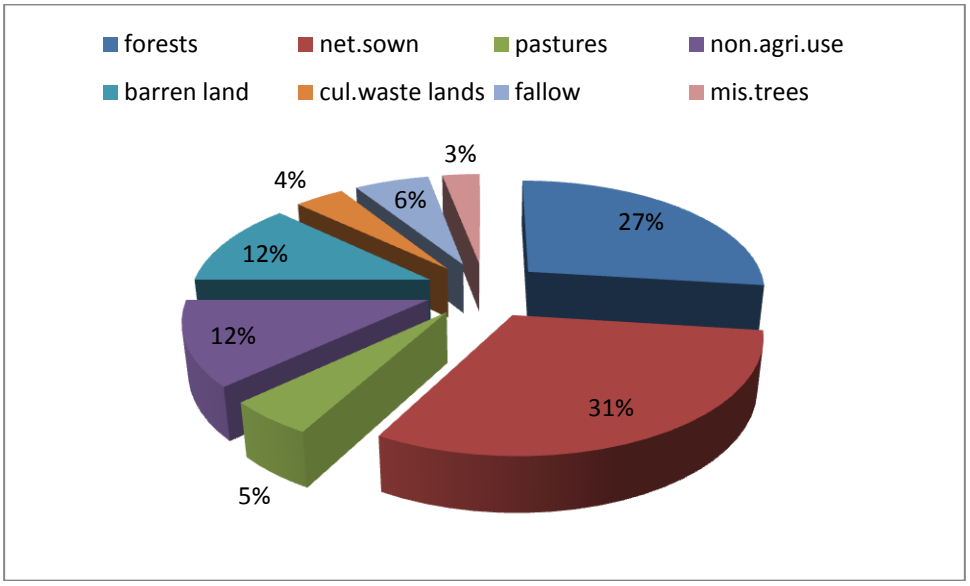
74. **Land use pattern**. As per the Master Plan for Srinagar (2001-2021), 27.70% of the area of Srinagar City is developed (various types of construction), 5.4% is for defense use, 55.10% is under agriculture, horticulture, and rocky land, and 11.66% is covered by water bodies and floating gardens. The proposed subproject will be located within the urban city areas, and its implementation will not require any change in the existing land use pattern, as the flyover will be in the same area as an existing road network. The broad land uses of local areas in Srinagar are summarized in Table 13 below.

Table 13: Broad Land Uses of Srinagar Local Area

Sl.No.	Type of Land Use	Percentage
1	Developed areas including public and semi-public, utilities and services, graveyards and cremation grounds, etc.	27.70
2	Defense use	5.54
3	Agriculture, plantation, cultivation of trees, orchards, farms, and rocky land	55.10
4	Water bodies, river, mullahs, and floating gardens	11.66
	Total	**100**

75. Overall land use pattern of Jammu and Kashmir is shown in Figure 4.

Fig. 4: Land Use Pattern of Jammu and Kashmir



Source: Land use pattern of Jammu and Kashmir as per Digest of Statistics(1999-2000),Government of Jammu and Kashmir.

76. **Commercial activities**. The land use along the subproject alignment is mainly commercial and residential. Varied types of commercial activities in the form of wholesale, retail, or small-scale services are carried out in this area. About 1 km away from the subproject starting point (Jehangir Chowk junction) at Batamaloo, a wholesale fruit market, *mandi*, and garages for heavy vehicles, including bodybuilding units of trucks and buses, are situated.

77. The subproject will impact 285 commercial establishments, which include 124 shops, 56 godowns, 4 office spaces, and 2 shops in sheds in both government and private structures, along with 99 shops of Kabaddi/Cheap Market. In addition to the commercial establishments, the subproject will also impact four squatters carrying out their commercial activities. Two squatters are carrying out their business at the entrance of the municipal building, while two other run kiosks. They will be compensated in accordance with the provisions of the resettlement plan.

78. The impact of the livelihood would be on the households (HH) losing their shops. There will be no direct impacts on source of income for households losing godowns, as these are used only to support businesses; hence, losing them will just result in a reduction in space and temporary inconvenience in storing goods. During surveys and consultations, it was also noted that some of the godowns are not in use. Thus, the loss of livelihood will be limited to 124 shops (belonging to 110 HH), 2 HH running their own their offices (a computer institute), and 2 HH running their shops in sheds, aside from the aforementioned squatters for whom loss of income may occur. However, during the survey it was discovered that 12 shops (belonging to 12 HH) out of the 124 were closed or not in use, and as such, closure would not have any impact on their income. Hence, only 112 shops (belonging to 98 HH), 2 offices/computer institutes (belonging to 2 HH), 2 shops in sheds (belonging to 2 HH), and 4 squatters (belonging to 4 HH), for a total of 106 HH, will experience impacts on their source of livelihood. In addition, only 39 out of 99 shopkeepers of the Kabaddi Market/Cheap Market will be affected; 60 shopkeepers of the cheap market have already been relocated to the shopping complexes constructed by Srinagar

Municipal Corporation (SMC). Thus, in total 145 HH (106 HH of Sector A and B and 39 HH of Sector C or Kabaddi Market will experience impacts on their income.

79. Based on the business catchment area, the subproject has been divided into two sectors: Sector A, Jehangir Chowk Crossing to Iqbal Park, and Sector B, Bakshi Stadium Crossing to Rambagh-Natipora. Sector C refers only to shops of the Kabaddi/Cheap Market, which are located in Sector A. In Sector A (Jehangir Chowk to Iqbal Park), 118 commercial establishments are affected. Of the 118, there are 60 shops, 55 godowns, 1 office space, and 2 shops in sheds. In addition to above, 2 squatters are also carrying out their commercial activities in this sector. In Sector B (Bakshi Stadium to Natipora), 68 commercial establishments are affected, which contain 64 shops, 1 godown, and 3 office spaces. In addition to above, 2 squatters are also operating in this sector. Sector C comprises two markets housed in kiosks, commonly known as Cheap Market (60 shopkeepers) and Kabaddi Market (39 shopkeepers), located on municipal land.

80. ERA will be constructing two rehabilitation complexes, one at Jehangir Chowk and the other at Rambagh, for relocation of the shopkeepers of Sector A and B respectively. As for sector C shopkeepers, the Srinagar Municipal Corporation has built two shopping complexes for their relocation. Detailed information has been provided in the resettlement plan of the subproject.

81. **Industrial development**. Kashmir region in general is poor in industrialization. However, as per the Master Plan for Srinagar 2001-2021, about 295 ha land is under industrial use, of which 155 ha are used by service industries. Major but small-scale industrial units in the city include silk factories, woolen mills, *khadi* and village industries, spinning mills, a telephone factory, carpet making, food processing units, a brick and tile factory, cottage industries, etc. However, such units have not been recorded in the immediate vicinity of the subproject site.

82. **Agriculture**. There are no agricultural activities carried out in the subproject impact zone. About 21,488 ha of land are presently under agricultural use in the Srinagar local area. Due to the spread of urbanization, agricultural activities are decreasing. The net area proposed for agricultural activities by the Master Plan 2001-2021 is 23.27% of the Srinagar local area.

83. **Infrastructure facilities**. Since the subproject sectors are situated in Srinagar City, infrastructure facilities like schools, hospitals, colleges, drinking water supply system, electricity, and communication in the subproject area are satisfactory.

84. **Water supply**. Broadly, the existing water supply system in Srinagar City consists of five subsystems. These subsystems are based on five intake works and water treatment plants of the existing water supply system. They are the water supply systems based on the Nishat water treatment plant (19 MLD), the Alusteng plant (6.8 MLD), the Doodganga plant (7.75 MLD), the Rangil plant (20 MLD), and the Pokhribal plant (4 MLD). Total installed capacity is 57.55 MLD, but actual operating capacity is 40.28 MLD. The five water treatment plants serve the entire population of Srinagar City.

85. **Sewerage system**. Srinagar City is properly managed through its elaborate network of sewer lines in the form of trunk sewers, lateral sewers, and house connections spread over more than 10 zones that collect millions of liters of raw domestic sewage on a daily basis for treatment through STPs (sewage treatment plants). These are augmented by intermediate pumping stations (IPS) at various locations. The combined capacity of the treatment plants can treat 36.7 MLD of raw sewage. At the moment, no user charges are levied by the authorities, but in the

long run, some charges will be levied on every serviced household to ensure operational efficiency of this vital public system.

86. **Drainage**. As per the storm water drainage master plan, Srinagar is divided into three drainage zones. There are about 50 existing drainage schemes with about 119 km of primary and secondary storm water drains. In addition to such drains, there are substantial lengths of tertiary drains or deep drains.

87. **Solid waste**. The estimated quantity of solid waste generation in Srinagar is 450 grams per capita per day. Based on the March 2006 population of 1.03 million, the total quantity of municipal solid waste (MSW) generated in Srinagar in 2006 was 467 million tons. During peak tourist season of summer, these figures increase by 3%–4% due to garbage generated by tourists. It is estimated that less than 50% of waste is collected and disposed of at the dumping site at Achan. The total solid waste generated in 2009 in Srinagar City, including those from the fruit and vegetable market, was 680 tons/day, about 0.5 kg/head/day. In 2020, it is estimated to reach about 880 tons/day.

88. **Transportation**. Srinagar City is connected to Jammu and rest of India. National Highway 1A connects Ambala to Srinagar via Jammu. Srinagar is also well connected by air, and the laying of a railway track is in progress. The transportation system of Srinagar City is characterized by a radial form of development, with east-west and north-south corridors forming major radials, and the National Highway Bypass as the only bypass. About 43% of the arterial and sub-arterial road network within the town has a carriageway width of less than 7 m, 32% has a width of 7 m, and 25% has a width of more than 7 m. Srinagar City, like any other historical city, has a very complex road network. Pedestrian pathways at Lal Chowk, the CBD, are insufficient and encroached upon by vendors.

89. **Traffic flow characteristics from Jehangir Chowk to Rambagh flyover area.** In the subproject area, which is mostly from Jehangir Chowk to Rambagh, a traffic survey and a pedestrian count by a traffic survey team were carried out on 22–27 June 2009 and on 18–23 July 2009. Surveys were carried out at selected intersections, and traffic survey data was been analyzed.

90. The existing road from Jehangir Chowk to Natipora Y intersection on Airport Road has varying carriageway configurations based on the existing space or right of way (RoW) available. The road widening at most of the places has been done up to extreme ends of the RoW. The road carriageway varies from a two-lane undivided road to a four, five, and six lane divided road at different locations. Roadside and on-street parking reduces the capacity of roads at different locations. The major problems observed are:

(i) mixing of local traffic with through traffic;
(ii) mixing of slow moving traffic with fast moving traffic;
(iii) parking of vehicles on road; and
(iv) frequent traffic jams during peak hours.

91. The capacity of Rambagh Bridge, which is a four-lane divided carriageway, is nearing saturation at peak hours, and this location is likely to become a bottleneck with further growth of traffic.

92. Traffic surveys over 24 and 36 hours were conducted at four locations on the road to assess the traffic flow characteristics. In context of the travel corridor from Jehangir Chowk to Airport, heavy traffic flows are observed from 8 a.m. to 8 p.m. and diminishing flows thereafter. Distinct peaking of traffic is observed in the morning and evening. The summary of the survey is presented in Table 14 below:

Table 14: Total Peak Hour Traffic at Intersections

Name of the Intersection	Total Peak Hour (PCUs)
Jahangir Chowk	12084
Bakshi Stadium	5573
Rambagh Bridge	4044
Natipora	7172

PCU= passenger car unit.

93. Percentage of goods vehicles and slow-moving vehicles is low, while the fast-moving passenger vehicles including cars, vans, taxis, auto rickshaws, mini buses, and two-wheelers are predominant modes of transport. Fast passenger vehicles constitute more than 90% of the traffic on the road, while cars and taxis constitute more than 50%. In the goods vehicle category, there are no heavy vehicles, and they are mostly light commercial vehicles (LCV) plying this corridor. In the slow-moving vehicles category, cycles are predominant, and other categories are almost negligible.

94. An average speed of 10-20 kph is observed on the corridor during peak hours. Intersection delays are observed at Jehangir Chowk, Bakshi Stadium, and Rambagh at peak hours primarily due to the parking of mini buses and loading/unloading of passengers near the intersection.

95. Peak hour traffic flows at four locations on the corridor are presented in Table 15. It can be observed from the table that peaking of traffic starts at 9.30 a.m. and continues up to 11:45 a.m. In the evening, peaking of traffic starts at 5:30 p.m. and continues up to 7:15 p.m. Traffic in the morning peak hours is more than during evening peak hours. This may be due to the reduction of airport-bound traffic in the evening.

96. Peak traffic flows with turning movements are analyzed. From Dal Gate side at Jehangir Chowk, peak hour traffic of 500–650 passenger car units (PCU) is observed. From Shaheed Gunj, left-turning traffic is predominant, and right-turning traffic varies at 800–950 PCUs. Right-turning traffic from Batmaloo to Airport Road at peak hours varies from 600 to 750 PCU. At Jehangir Chowk, traffic from Rambagh Bridge during the morning peak is 2,360 PCU and traffic to Rambagh Bridge during the morning peak is 2,165 PCU. The existing volume to capacity (V/C) ratio on the roads varies from 0.52 to 0.64. The V/C ratio of traffic on the existing Jehangir Chowk flyover is 0.66.

Table 15: Morning and Evening Peak Hour Traffic at Intersections

Sl. No.	Location	Morning Peak			Evening Peak		
		Duration	Vehicle	Passenger Cart Unit (PCU)	Duration	Vehicle	Passenger Cart Unit (PCU)
1	Jehangir Chowk	10:45-11:45	10,897	11,269	5:30-6:30	9,487	9,691
2	Bakshi Stadium	9:30-10:30	5,585	5,830	6:00-7:00	4,620	4,682

3	Rambagh Bridge	9:15-10:15	6,231	6,817	6:15-7:15	4,784	4,850
4	Y– Intersection	10:45-11:45	6,925	7,136	5:30-6:30	5,740	5,855

PCU = passenger car unit.

97. At Bakshi Stadium Chowk, traffic to and from Jawahar Nagar road varies between 500 and 725 PCU at peak hours, while on Airport Road, traffic from Rambagh Bridge at peak hours varies from 2,320 to 3,800 PCU. Traffic from Jehangir Chowk to Rambagh Bridge at peak hours varies from 1,200 to 1,460 PCU. The existing V/C ratio on the roads varies from 0.30 to 0.82.

98. At Rambagh Bridge, traffic from Airport Road varies between 2,230 and 2,400 PCU at peak hours, while traffic from Rambagh Bridge varies between 1,690 and 2150 PCU. The existing V/C ratio on the roads is between 0.89 and 0.99. Width of the bridge is already a bottleneck in the corridor.

99. At Y intersection on Airport Road (Natipora Chowk), traffic from the airport is between 2,630 and 2,850 PCU at peak hours, while traffic to the airport is between 1,500 and 1,930 PCU. The existing V/C ratio on the roads is between 0.61 and 0.82.

100. For a period of 12 hours, from 8 a.m. to 8 p.m., pedestrian count surveys for pedestrians moving along the road and across the road at intersections was also done to assess pedestrian movements. A summary of peak hour pedestrian flows at five locations is given in Table 16.

Table 16: Peak Hour Pedestrian Flows at Intersections

Sl. No.	Location	Morning Peak			Evening Peak		
		Duration	Across	Along	Duration	Across	Along
1	Jehangir Chowk	10:45-11:45	612	976	5:15-6:15	610	937
2	Bakshi Stadium	9:00-10:00	378	313	5:15-6:15	354	185
3	Rambagh Bridge	10:30-11:30	203	303	5:30-6:30	312	321
4	Y – Intersection	10:45-11:45	427	446	5:00-6:00	553	270

101. From the traffic survey, it has been found that at different locations on the corridor, the traffic flows are beyond the capacity of the roads, resulting in reduction of level of service and traffic congestion. The situation warrants enhancing the capacity of the road. The existing road carriageway has been widened to the maximum possible limits at critical points. Considering the existing traffic demand and future growth of traffic, there is need for a grade-separated facility on the road corridor.

D. Social and Cultural Resources

102. **Demography**. Jammu and Kashmir has a mainly Muslim population. It is not the only Muslim majority state or territory in India, but it shares this characteristic with the tiny union territory of Lakshadweep (total area being 17.7 km^2). Though Islam is practiced by about 67% of the population and by 97% of the population of the Kashmir Valley, the state has large communities of Buddhists, Hindus (inclusive of Megh Bhagats), and Sikhs. In totality, the Muslims constitute 67% of the population, the Hindus about 30%, the Buddhists 1%, and the Sikhs 2%. The demographic profile of Jammu and Kashmir state is presented in Table 17 below:

Table 17: Demographic Profile of Jammu and Kashmir

Division	Population	% Muslim	% Hindu	% Sikh	% Buddhist and other
Kashmir (53.9%)	5,476,970	97.16%	1.84%	0.88%	0.11%
Jammu (43.7%)	4,430,191	30.69%	65.23%	3.57%	0.51%
Ladakh (2.3%)	236,539	47.40%	6.22%	–	45.87%
Jammu and Kashmir	**10,143,700**	**66.97%**	**29.63%**	**2.03%**	**1.36%**
Statistics calculated from the 2001 Census India District Profiles					

There are roughly 1.5 million refugees from Indian Administered Kashmir in Azad Kashmir and Pakistan. An estimated 50,000–100,000 Kashmiri Muslims and 150,000–300,000 Kashmiri Pandits have been internally displaced due to militancy.

Census 2001, records a population of 971,357 for Srinagar urban agglomeration.

103. In Jammu and Kashmir, the principal spoken languages are Kashmiri, Urdu, Dogri, Pahari, Balti, Ladakhi, Gojri, Shina, and Pashto. However, Urdu written in the Persian script is the official language of the state. Many speakers of these languages use Hindi or English as a second language.

104. **Health and educational facilities**. Since the subproject sectors are situated in Srinagar City, infrastructure facilities like schools, hospitals, colleges, drinking water supply system, electricity, and communication in the area are satisfactory.

105. Notable higher education or research institutes in Jammu and Kashmir include Sher-e-Kashmir Institute of Medical Sciences Soura Srinagar, National Institute of Technology Srinagar, Government College of Engineering and Technology, Jammu, and the Government Medical College of Jammu. University-level education is provided by the University of Jammu, the University of Kashmir, Sher-e-Kashmir University of Agricultural Sciences and Technology Jammu, Sher-e-Kashmir University of Agricultural Sciences and Technology Kashmir, Shri Mata Vaishno Devi University Jammu, Islamic University of Science and Technology Kashmir, Baba Ghulam Shah Badhshah University Jammu, SSM College of Engineering and Technology Kashmir, and various government degree colleges.

106. **History, culture, and tourism**. The Constitution of India does not allow people from regions other than Jammu and Kashmir to purchase land in the state. As a consequence, houseboats became popular among those who were unable to purchase land in the valley, and have now become an integral part of the Kashmiri lifestyle.

107. The Dumhal is a famous dance in the Kashmir Valley, performed by men of the Wattal region. The women perform the Rouff, another traditional folk dance. Kashmir has been noted for its fine arts for centuries, including poetry and handicrafts. *Shikaras*, traditional small wooden boats, and houseboats are common features in various lakes and rivers across the valley.

108. *Kahwa*, traditional green tea with spices and almond, is consumed all through the day in the chilled winter climate of Kashmir. Most of the buildings in the valley and Ladakh are made from softwood and are influenced by Indian, Tibetan, and Islamic architecture.

109. Jammu's Dogra culture and tradition is similar to that of neighboring Punjab and Himachal Pradesh. Traditional Punjabi festivals such as Lohri and Baisakhi are celebrated with great zeal and enthusiasm throughout the region, along with Accession Day, which commemorates the accession of Jammu and Kashmir to the Dominion of India. After Dogras, Gujjars form the second-largest ethnic group in Jammu. Known for their semi-nomadic lifestyle, Gujjars are also found in large numbers in the Kashmir Valley. Similar to Gujjars, Gaddis are primarily herdsmen who hail from the Chamba region in Himachal Pradesh. Gaddis are generally associated with emotive music played on the flute. The Bakkarwals, found both in Jammu and Kashmir Valley, are wholly nomadic pastoral people who move along the Himalayan slopes in search of pastures for their huge flocks of goat and sheep.

110. Some archaeological and historical monuments and religious places like Burzhama archaeological site, historical Jamia Masjid, Pathar Masjid, Hazratbal Shrine, and Chati Padshahi Gurudwara, etc. are located in Srinagar City. However, these sites are located far away from the proposed subproject, which will have no impact on any of such places, and therefore no adverse impact is anticipated.

111. The Kashmir division of J and K State has ideal tourist spots with scenic beauty, adventure tourism, ecotourism, and pilgrimage tourism, and other historical places and monuments, which attract large numbers of tourists. Major tourist places in Srinagar City include Dal Lake, Mughal Gardens, Hazratbal Shrine, Shankar Achariya Temple, and others. Dal Lake is 4 km from the subproject area, Mughal Gardens 11-17 km, Hazratbal Shrine 11 km, and Shankar Achariya Temple 11 km. Hence no such impact on these sites is anticipated.

112. **Sensitive environmental receptors**. The sensitive environmental receptors existing along the alignment of proposed subproject include religious places, educational institutions, health care centers, community property resources, and others. The details of the existing sensitive environmental receptors are given in Table 18. During finalization of design, all the sensitive receptors are saved judiciously. The impact may be temporary, only during construction phase, due to air and noise pollution.

Table 18: Sensitive Environmental Receptors Along the Subproject Alignment

S. No.	Name of Sensitive Receptor	Chainage of Alignment (meter)	Distance from Central Line of Proposed Alignment (meter)	
			LHS	RHS
1.	Khalsa High School	120		93.5
2.	Iqra Mosque	360	13	
3.	Khanams Hospital	409		76
4.	Iqbal Park	520	16.75	
5.	Girls High School	620		21.6
6.	Bakshi Stadium	800	55	
7.	Mosque Hanifia Chinar	840	13.5	
8.	School for the Blind	1,720	16.2	
9.	Park at Rambagh	1,820	4.86	
10.	Mosque Hanifia Rambagh bala	2,086	28	

LHS-Left-hand side RHS-Right-hand side.

V. ANTICIPATED IMPACTS AND MITIGATION MEASURES

113. This report assesses the impacts of the proposed activities on various environmental attributes of the subproject site.

114. **Methodology.** Issues for consideration have been raised by the following means: (i) input from interested and affected parties; (ii) desktop research of information relevant to the proposed subproject; (iii) site visit and professional assessment by the environment specialist engaged by the implementing agency; and (iv) evaluation of proposed design scope and potential impacts based on the environment specialist's past experience.

115. The methodology used to rate the impacts was qualitative. Each category was divided into a number of different levels. These levels were then assigned various criteria as indicated in Table 19.

Table 19: Summary of Quantifiers and Qualifiers Used for Assessment Purposes

Duration (time-scale)	Short-term	Impact restricted to construction (0-3 years)
	Medium-term	Impact will continue throughout operation (4-50 years).
	Long-term	Impacts will exist beyond the life of the road (>50 years)
	Permanent	Impacts will have permanent potential
Geographic spatial scale	Site	The impact will be limited to within the site boundaries.
	Local	The impact will affect surrounding areas.
	Regional	The impact will affect areas far beyond the site boundary, but limited to the State of Jammu and Kashmir.
Significance rating pre/post-mitigation (positive/negative)	Low	The impact will have a minimal effect on the environment.
	Medium	The impact will result in a measurable deterioration in the environment.
	High	The impact will cause a significant deterioration in the environment.
Mitigation	n/a	No mitigation necessary.
	Full	Full mitigation/reversal of the impact is possible.
	Partial	Only partial mitigation/reversal of the impact is possible
	None	No mitigation or reversal of the impact is possible
Degree of certainty	Definite	(>90%)
	Probable	(>70%)
	Possible	(40%)
	Unsure	(<40%)

116. Categorization of the subproject has been undertaken using ADB's REA Checklist for Roads and Highways.

A. Planning and Design Phase

117. Planning principles and design considerations have been reviewed and incorporated into the site planning process whenever possible. The concepts considered in design of the proposed elevated expressway are: (i) minimum land acquisition; (ii) improvement on intersections; (iii) adequate vertical clearance; (iv) sufficient carriageway width and lanes; (v) conformity to Indian Road Congress (IRC) and Ministry of Road Transport and Highways (MORTH) transport provisions and specifications; (vi) most suitable construction methodology; and (vii) site constraints.

118. Salient design features are presented in Table 20.

Table 20: Salient Design Features of the Subproject

Parameter	Design Consideration
Carriageway width	Keeping in mind the longer period use of structure, a four-lane divided carriageway is considered better option.
Vertical clearance	Vertical clearance of 5.5 m as per provisions of Indian Road Congress (IRC): 5 and IRC: 54 have been provided at most of the places except at the location of integration of the proposed elevated expressway with the existing flyover, where vertical clearance available is about 4.5 m.
Alignment of elevated expressway	Alignment of proposed elevated expressway is guided by the existing road alignment.
Cross-sections	Four-lane carriageways over frame-type pier arrangement for main elevated expressway have been considered the best option to keep the requirement of land acquisition to a minimum.
Span arrangement	Keeping in view the construction methodology and alignment, an approximately 21 m simply supported span arrangement has been proposed. Wherever there are restrictions like over-intersecting roads and integration with other structures, span arrangements have been adjusted according to the requirement.
Superstructure	Precast prestressed concrete girders with monolithic reinforced cement concrete (RCC) deck slab over the girders have been proposed for general section of elevated expressway. The girders are monolithic with end cross diaphragms to transfer the loads to

Parameter	Design Consideration
	substructure. For individual carriageways and ramp sections, a prestressed concrete deck slab has been proposed.
Substructure	Superstructure shall be supported over the RCC pier cap and frame-type pier. Dimension of pier cap in transverse direction has been restricted by projecting the superstructure as cantilever to provide the required vertical clearance over service road for minimum land acquisition. Architectural shape for pier cap and frame-type pier has been proposed for better aesthetic look. As Srinagar falls in seismic Zone V, seismic restrainers in longitudinal as well as in transverse directions over the pier cap have been proposed. Frame-type pier is chosen to provide better stability/load distribution, easy molding, uses less concrete, is economical, and provides more safety in high seismic zones. As a result, this design has been selected for main corridor. Circular type piers have been chosen for link roads because these comprise two lanes with less available space. These types of piles have less surface area, thus requiring less area for construction. Hence this design was selected for link roads of the subproject.
Foundation	On the basis of information collected for structures constructed and being constructed in Srinagar, pile foundation has been proposed for all foundations.
Location	An expressway corridor (flyover) has been proposed from Jehangir Chowk to Rambagh and Natipora along Airport Road. The take-off point of the corridor is Jehangir Chowk, and it terminates beyond Y junction at Natipora-Airport Road crossing. The length of the corridor is about 2.41 km. Flyover is located in the southern part of the main city.
Climatic conditions	Rainfall intensity and run-off may have implications on road safety, affecting the visibility and the condition of the road. Furthermore, climatic conditions play an important role during dispersion of noise and air pollutants. Seasonal climatic conditions have been considered for scheduling of construction activities. The proposed flyover has been designed to minimize incidence of road surface flooding and improve road surface storm water drainage. Warning signs and suggested speed limits during dangerous conditions have been included.
Air quality[6]	The subproject site is located within the CBD and is characterized by high volumes of traffic that cut through the area. The project is expected to result in an improvement of road capacity, in addition to minimizing congestion. The proposed geometric design will minimize steep gradients and sharp turns and encourage vehicles to travel at a constant, efficient cruising speed.
Drainage and hydrology	The subproject has been designed to drain freely in order to prevent the collection of standing water on the road carriageway. Pollutants settling on the road surface and litter will be washed away during rain. Runoff from the subproject will produce a highly variable discharge in terms of volume and quality, and in most instances will have no discernable environmental impact.
Ecological diversity	The subproject is situated within an existing built-up area where road infrastructure already exists. No areas of ecological diversity occur within the subproject location. Due to the nature and locality of the subproject, it is unlikely to have any impacts on biodiversity within the area. However, the subproject may affect existing roadside trees. Permission will be obtained from the sericulture/forest/floriculture/revenue department or concerned deputy commissioner for the scheduled species such as chinar *(Plantinus orientalis)* and mulberry *(Morus sp.)* prior to start of civil works. Any landscaping to be undertaken will be done with locally indigenous species and low maintenance requirements.
Land use and livelihoods	The key efforts undertaken to minimize impacts are: (i) before the preparation of engineering design, a detailed survey of the properties was conducted with regard to their ownership, with the objective that minimum proprietary land is utilized for the subproject;

[6] Roadside pollution is often localized and generally only affects a narrow band of roads along the sides of the road. The major source of roadside pollutants is vehicle exhaust emissions. Other pollution sources emanate from combustion of hydrocarbon fuels in air, producing carbon dioxide (CO_2) and secondary pollutants such as hydrocarbons (HC), nitrogen oxides (NOx), carbon monoxide (CO), and sulfur dioxide (SO_2). Emissions depend on the volume of traffic, the type of vehicle (including age, technology, and maintenance levels of the vehicle), fuel consumption and quality, engine temperature, and road geometry. The highest emission rates are encountered in congested, slow-moving traffic, and whenever vehicles shift gear, decelerate, accelerate, or travel over steep gradients. There is also a tendency for emission rates to increase at high speeds.

Parameter	Design Consideration
	(ii) diverting the alignment towards the available government land to minimize impact on private property, such as the Iqbal Park Crossing and Bakshi Stadium Crossing; (iii) avoiding land acquisition in the commercial area wherever possible to minimize the large scale physical displacement; and (iv) use of frame-type pier design[7] with proper geometrics adopted so as to minimize requirement of additional ROW. The subproject will still require acquisition of 36.19 *kanals* (18,293.75 m^2 or 1.829 ha) of land, out of which 7,635.54 m^2 are state land (with government departments), 2,555.66 m^2 are with the central government departments, 2,434.79 m^2 are with government institutions and autonomous bodies, and 5,667.76 m^2 are in the possession of 28 households. The subproject will affect 60 structures of different categories (commercial, residential, shops, godowns, offices, boundary walls, and sheds). In total, the subproject will impact 250 households comprising 1,625 displaced persons. A resettlement plan has been prepared to address involuntary resettlement impacts.
Traffic flow and access	Due to the location and nature of the subproject, there will be interference with accesses. A traffic management plan (Appendix 2) has been developed to provide vehicle and pedestrian access and maintain community linkages. A communications strategy is of vital importance in terms of accommodating traffic during road closure. Local communities will be continuously consulted regarding location of construction camps, access, and hauling routes and other likely disturbances during construction. The road closure, together with the proposed detours, will be communicated via advertising, pamphlets, radio broadcasts, road signages, etc. The implementation of the road detours will also be dependent on advance road signages indicating the road detour and alternative routes. ERA will coordinate with the traffic police for the implementation of the traffic management plan.
Infrastructure and services	There are a number of existing infrastructure and services (roads, telecommunication lines, power lines, and various pipelines) within the vicinity of the subproject. To mitigate the adverse impacts due to relocation of the utilities, DSC will (i) identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction phase; and (ii) require construction contractors to prepare a contingency plan.
Noise and vibrations	The noise levels affecting sensitive receptors in proximity of the subproject site may improve, since there will be a separation of traffic through the area. Vibrations are much less likely to be a cause of disturbance than noise levels, but may become a problem when vehicles, especially heavy vehicles, travel over irregular road surfaces in close proximity to sensitive roadside receptors. The proposed geometric design will minimize steep gradients and sharp turns and encourage vehicles to travel at a constant, efficient cruising speed. The proposed road surface design will minimize frictional road noise and vibrations.
Aesthetics, landscape character, and sense of place[8]	The subproject is considered to be compatible with the surrounding landscape and is not likely to impact negatively the existing visual quality or landscape character of the area; rather, it is expected to improve the general environment through improved use of the area. The subproject will be similar in construction and design to existing roads and

[7] Frame-type pier design is chosen to provide better stability/load distribution, easy molding, uses less concrete, is economical, and provides more safety in high seismic zones (subproject area falls in Seismic Zone 5). As a result, this design has been selected for main corridor. Circular type piers have been chosen for link roads because these comprise two lanes with less available space. These types of piles have less surface area, thus requiring less area for construction. Hence, this design was selected for link roads of the subproject.

[8] Aesthetics refer to the visual quality of an area as imparted by the physical properties of an area, such as scale, color, texture, landform, level of enclosure, and in particular, the land use occurring within an area. Landscape character refers to an area's intrinsic appeal and is not dependent on its visual quality, but rather on its specific situation as determined by the following: its level of accessibility or remoteness, level of naturalness, lack of disturbance, current and potential use, rarity, cultural or historic importance, and potential value to people. The landscape character determines the extent of visual compatibility of the road development with its immediate surroundings. Impacts are not restricted to the road reserve, but the entire viewshed (area from where the road development will be visible). The spirit, or sense of place (*genius loci*), can be defined as the extent to which a person can recognize or recall a place as being distinct from other places and as having a vivid, unique, or at least a recognizable character. It is indicates the intrinsic value that a community places on the aesthetic, therapeutic, or emotional qualities and character of an area. Aesthetics, landscape character, and sense of place are all subjective concepts that are often influenced by individuals' perceptions.

Parameter	Design Consideration
	bridges in the area. There will be some additional urban design features (e.g. lighting) to enhance the aesthetics of the structure and its placement in the area. In any areas where visual lines into shops, residences, etc. are deemed to encroach on privacy, the design team will consider appropriate design measures to ensure privacy is maintained (e.g., erecting fiber or steel sheets along the guard railing of the flyover) in consultation with the public.

119. The following table (Table 21) outlines potential impacts gleaned from a process that included a review of available documentation, ground-verified during the site visit, i.e. how, where, and when the proposed development could interact and affect the environment significantly, and details what mitigation measures may be taken to counteract these impacts.

Table 21: Summary of Anticipated Potential Environmental Impacts During Planning and Design Stage

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	Mitigation	Significance Before Mitigation	Geographic Spatial Scale	Duration	Mitigation	Significance After Mitigation
Existing situation	• The number of conflicting usages and the high vehicular and pedestrian volumes result in the city having considerable congestion and delays to pedestrians and vehicles. • The high levels of traffic and the lack of suitable pedestrian space as a result of businesses, result in congested pedestrian walkways and overflow onto the road. • This, together with a lack of adequate enforcement, creates an unsafe environment for residents, pedestrians, and commuters. The number of conflicting usages and the high vehicular and pedestrian volumes act as a barrier to redevelopment and growth of the area. • In addition, the area serves as a gateway into the city, and detracts from the many positives that the real city has to offer. This is important in view of the growing number of tourists.	• The subproject will improve traffic flow through the area in a safe and efficient manner. • Relocation of displaced persons to suitable location prior to construction commencing as included in the resettlement plan	High (-)	Local/ regional	Medium-term	Full mitigation definite	High (+)
Planning initiatives	Planning initiatives have been identified as: • decongestion of traffic on the road junctions from Jehangir Chowk to Rambagh-Natipora; • quick access to the airport	• The subproject will improve the traffic flow through the area in a safe and efficient manner. This will allow for the planning initiatives to be	High (-)	Local/ regional	Medium-term	Full mitigation definite	High (+)

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	Mitigation	Significance Before Mitigation	Geographic Spatial Scale	Duration	Mitigation	Significance After Mitigation
	from the city center; and • improved long-term traffic management in Srinagar City.	realized.					
Identification of transport needs and demands	The ERA vision is to provide safe, reliable, effective, and efficient transport operations which will best meet the needs of the people at improving levels of service and cost, in a way which supports government strategies for economic and social development, while being environmentally and economically sustainable.	• The subproject will significantly reduce the number of vehicles passing the road by providing additional space in terms of flyover/expressway corridor. • The reduction of traffic is expected to reduce the number of accidents and potential conflicts that occur within the area, thus saving human life, as well as the economy of the city. • Reduced traffic also results in land gains, which can be utilized to enhance the pedestrian space and increase pedestrian amenity. • It is envisaged that pedestrian sidewalks and footpaths will be improved and increased in size together with general urban design elements to create an environment that is conducive to pedestrian activity.	High (-)	Local	Medium-term	Full mitigation definite	High (+)

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	**Mitigation**	**Significance Before Mitigation**	**Geographic Spatial Scale**	**Duration**	**Mitigation**	**Significance After Mitigation**
		• The reduced traffic congestion , conflicts, and land gains result in a safer and more efficient circulation of traffic, which is expected to facilitate the reorganization and rationalization of the public transport system and commercial activities. • Future developmental and event needs (tourism) will have better access to and from the city.					
Alternatives	The following alternatives have been considered: • Option 1 - Do nothing – This will not address the underlying problem of traffic congestion and conflicts between vehicles and pedestrians. • Option 2 - Do minimum – This option involves grade improvements to improve safety but still does not address the underlying problem. • Option 3 - Route alignment options. These were discounted, as impacts on existing buildings and traffic flows at different locations are observed beyond the capacity of the existing roads.	Approval of the IEE and environmental management plan to ensure proposed mitigation measures are complied with	High (-)	Site	Short- to medium-term	Partial mitigation definite	Medium (-)

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	Mitigation	Significance Before Mitigation	Geographic Spatial Scale	Duration	Mitigation	Significance After Mitigation
	• Option 4 - Current preferred option. This offers the best and most balanced solution.						

B. Construction Phase

120. Table 22 presents an indication of what activities and facilities are likely to be undertaken during construction of the subproject, including the associated inputs and outputs.

Table 22: Summary of Activities and Facilities, Resource Use, and Produced Outputs During Construction Phase

Activities and Facilities	Inputs/Resource Use	Outputs/Waste Production

• Construction camp and its associated facilities (including lay-down areas)
• Storage camps and lay-down areas
  − Materials and equipment stockpiles
  − Handling and storage of hazardous materials including chemicals additives, gravel, cement, concrete, and lubricants
• Source of water
• Vegetation clearance
• Bulk earthworks, grading, and contouring
• Drilling and blasting
• Movement of construction staff, equipment, and materials
• Importation of selected materials/base layer construction
  − Construction of a surfaced layout
  − Sub-base and base layers (excavations, grading, importation of fill materials and selected gravel materials for sub-base and base layers, application of water, compaction and disposal of spoil material (excess excavated soil)
  − Construction of wearing course (asphalt layer, bitumen seal, concrete and paving block)
• Temporary detours
• Noise and vibrations
• Dust suppression
	• Bitumen
	• Cement
	• Chemical additives used in concrete / asphalt (i.e. retarders)
	• Paving blocks/bricks
	• Aggregate (sand and stone)
	• Gravel (fill material for embankments/selected material for sub-base and base layers)
	• Water
	  − Drinking, cooking, and sanitation at construction camps
	  − Water for dust suppression
	  − Water applied to base and sub-base layers during compaction
	  − Water for application to sub-base and base layers prior to compaction
	• Petrochemicals
	• Other chemicals/lubricants/paints
	• Construction vehicles, machinery, and equipment
	• Temporary energy supply to construction camps
	• Topsoil used during revegetation and rehabilitation
	• Plant material for revegetation (seeds, sods, plant specimens)
	• Materials for slope stabilization
	  − Fabric
	• Labor
	  − Recruitment of construction workforce
	  − Skills training
	• Public movement control
	  − need barriers (not just danger tape) to protect
		• Old asphalt (removed from road carriageway during road upgrade)[9]
		• Waste concrete and other construction rubble
		• Waste bitumen[10]
		• Used fuels, lubricants, solvents, and other hazardous waste
		• General waste
		• Contaminated soil
		  − Soil contaminated with bitumen
		  − Soil contaminated with petrochemicals (i.e. oils and lubricants) and other chemicals
		• Sewage and grey water (temporary construction camp sanitation)
		• Spoil material (excess soil removed during excavations)
		• Noise and vibrations (construction vehicles and machinery)
		• Lighting at construction camps, equipment yards, and lay-down areas
		• Plant material removed from servitude/RoW during vegetation clearance
		• Smoke and fumes
		  − Burning of waste
		  − Burning of vegetation cover
		  − Fires used for cooking and space heating (construction camps)
		  − Vehicle exhaust emissions

[9] The upgrading of roads may involve the stripping and demolition of old asphalt layers. Ideally, old asphalt shall be reused during construction of the new road in order to avoid large quantities of waste being produced. However, depending on the availability and cost of virgin aggregate in the area through which the road is aligned, reusing the old asphalt may be more costly than using virgin aggregate.

[10] Bitumen has relatively low levels of polycyclic aromatic hydrocarbons (PAHs) and is largely inert. However, certain other potentially hazardous chemical may be added to the bitumen or to the aggregate during the construction process in order to render the compound more workable. The objective is to use the least hazardous chemicals available and to locate asphalt plants, aggregate stockpiles, and mixing areas where they do not pose a significant environmental risk.

Activities and Facilities	Inputs/Resource Use	Outputs/Waste Production
• Waste production and temporary storage/disposal, i.e. used fuels, waste concrete and bitumen, spoil materials, and general waste • Stabilization of slopes and erosion prevention • Use of asphalt/bitumen (and associated storage and mixing areas, chemicals) • Concrete batching plan (and associated storage and mixing areas, chemicals) • Rehabilitation of disturbed areas • Interaction between construction workforce and local communities • Management of passing pedestrians and points of congestion • Implementation of the resettlement plan prior to start of construction • Reminders to affected people of construction with timeframes	people from trenches during construction	

121. The following table (Table 23) outlines potential impacts during the construction phase, gathered from a process that included a review of available documentation verified during the site visit, i.e. how, where, and when the proposed development can interact and affect the environment significantly, and details what mitigation measures may be taken to counteract these impacts.

Table 23: Summary of Anticipated Potential Environmental Impacts During Construction Phase

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	Mitigation	Significance Before Mitigation	Geographic Spatial Scale	Duration	Mitigation	Significance After Mitigation
Climate	• The nature and intensity of rainfall events in an area have implications for storm water management. • Smoke from burning activities could be wider spread on windy days, especially when dust could be blown offsite.	• Seasonal climatic variations will be considered during scheduling of construction activities in the area. • Excavations and other clearing activities will only be done during agreed working times and permitted weather conditions. • Storm water control during construction phase as per the method approved by the engineer • Seeding of topsoil and subsoil to prevent wind and water erosion of soil surfaces • No open fires permitted on site	Low (-)	Site	Short-term	Full mitigation probable	Low (-)
Air quality	• Sensitive receptors (e.g. hospitals, schools, religious places) may be affected temporarily by increased traffic and related impacts during the construction phase. • Fugitive dust can also impact roadside air quality during construction. Exhaust fumes from construction machinery, and potential smoke from cooking fires • Burning of waste and cleared vegetation • Odors from use of toilet “facilities” other than provided facilities	• Ensure compliance with the Air Act. • Ensure compliance with emission standards. • Guidelines that deal with the control of air pollution on site have been outlined in the environmental management plan (EMP). • Monitoring of air pollution levels in potential problem areas will be undertaken. • Management (including storage, transport, handling, and disposal) of hazardous substances used during construction • Dust control measures have been included in the EMP. • Dust generating construction activities will be avoided	High (-)	Local	Short-term	Partial mitigation probable	Medium (-)

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	**Mitigation**	**Significance Before Mitigation**	**Geographic Spatial Scale**	**Duration**	**Mitigation**	**Significance After Mitigation**
		during strong winds. • Soil loads in transit will be kept covered. • Stockpiles of soil will be kept covered or have suitable dust palliative applied, such as water. • A suitable dust palliative (water) will be applied if dust levels rise above acceptable levels. • Regular servicing of vehicles offsite in order to limit gaseous emissions • No open fires permitted on site. • Temporary toilet facilities will be provided on site and will be maintained on a daily basis.					
Geology	• Strong water flows into open excavations may occur, causing sidewall collapse. • Layers of mixed fill cover natural ground surface in many places. • Contamination from spillage of petroleum products, spent engine oil, and oil leaks from construction vehicle maintenance taking place on site • Contamination through use of toilet “facilities” other than provided facilities	• The design of the site drainage system is adequate to control runoff from the subproject site in line with topographical features of the site. • Rehabilitate all sites during construction, including construction camps, stockpile area, and temporary access and hauling routes as soon as possible after the disturbance has ceased. • Contractor to exercise strict care in the disposal of construction waste, with proof of disposal at an approved site provided after offloading each waste load, and this is to be logged/registered. • Contaminated water will be	Medium (-)	Site	Short-term	Full mitigation probable	Low (-)

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	**Mitigation**	**Significance Before Mitigation**	**Geographic Spatial Scale**	**Duration**	**Mitigation**	**Significance After Mitigation**
		contained and disposed of offsite at an approved disposal site at Achan Landfill in Srinagar. • The contractor will dispose of waste from the oil interceptors at Achan Landfill in Srinagar. • Cement, concrete, and chemicals will be mixed on a concrete plinth, and provisions will be made to contain spillages or overflows into the soil. • No vehicle maintenance to be allowed on site • If oil spills occur, the contaminated soil will be disposed of at the landfill site at Achan in Srinagar. • Temporary toilet facilities will be provided by contractor on site and maintained on a daily basis. • Topsoil and subsoil will be protected from contamination. • Subsoil and overburden in all construction and lay-down areas to be stockpiled separately and returned for backfilling in the correct soil horizon order					
Drainage and hydrology	• The proposed development is situated within an existing built-up area where road infrastructure already exists. No water courses, wetlands, or estuaries occur within the subproject location. Due to the nature and locality of the subproject, there is unlikely	• The site surface has been engineered and shaped in such a way that rapid and efficient evacuation of runoff is achieved. • Improve existing alignments and drainage systems. • Provide containment areas for potential pollutants at	Low (-)	Site	Short-term	Full mitigation probable	Low (+)

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	Mitigation	Significance Before Mitigation	Geographic Spatial Scale	Duration	Mitigation	Significance After Mitigation
	to any significant impacts on water resources within the immediate area.	construction camps, refueling depots, asphalt plants, and concrete batching plants. • Waste management practices will be implemented. • The transport, storage, handling, and disposal of hazardous substances will be controlled and managed.					
Biodiversity, fauna and flora	• The proposed development is situated within an existing built-up area where road infrastructure already exists. No areas of ecological diversity occur within the subproject location. Due to the nature and locality of the subproject, there is unlikely to any significant impacts on biodiversity within the area. • The proposed construction of the flyover may, however, affect existing roadside trees.	• Permission will be obtained from the sericulture/ forest/floriculture/revenue department or concerned deputy commissioner for the scheduled species such as chinar (*Plantanus orientalis*) and mulberry (*Morus* sp.) prior to start of civil works. • Any landscaping to be undertaken will be done with locally indigenous species and low maintenance requirements.	Low (-)	Site	Short-term	Full mitigation probable	Low (+)
Land uses	• Due to the location and nature of the subproject, there will be interference with access. • Existing public transport facilities and operations will be affected by the road closure and detours. • Transport operations, commercial establishments, and various department offices are located within the area of construction and will therefore need to be relocated during construction. This may	• ERA has consulted with various organizations, departments, etc. within the area, and this will continue during the construction phase. • Critical roads (e.g. in front of fire and police stations and hospitals) will have a “Keep Clear” sign. • ERA will make provisions for vehicle and pedestrian access to maintain community linkages. • Consult with local departments, organizations, etc. regarding location of	High (-)	Local	Short-term	Partial mitigation probable	Medium (-)

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	Mitigation	Significance Before Mitigation	Geographic Spatial Scale	Duration	Mitigation	Significance After Mitigation
	impact livelihoods. • There will be disruptions to health services, education services, local businesses, transport services, and pedestrian movements due to traffic and construction-related noise, visual, and air pollution.	construction camps, access and hauling routes, and other likely disturbances during construction. • Provide clear and realistic information regarding detours and alternative accesses for local communities and businesses in order to prevent unrealistic expectations. • Provide clear and realistic information regarding employment opportunities and other benefits for local communities in order to prevent unrealistic expectations. • Make use of local labor, materials, goods, and services as much as possible. • Provide walkways and metal sheets where required to maintain access for people and vehicles. • Increase workforce in front of critical areas such as institutions, places of worship, business establishments, hospitals, and schools. • Consult businesses and institutions regarding operating hours, and factor this in work schedules. • Provide signboards for pedestrians to inform them of nature and duration of construction works and contact numbers for concerns/complaints.					
Infrastructure	• There is likely to have	• Utility shifting will be	Medium (-)	Local	Short-	Full	Low (-)

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	Mitigation	Significance Before Mitigation	Geographic Spatial Scale	Duration	Mitigation	Significance After Mitigation
and services	temporary disruption of infrastructure and services during the construction of the proposed flyover. • There are a number of existing infrastructure and services (roads, telecommunication lines, power lines, and various pipelines) within the vicinity of the subproject.	undertaken prior to commencing construction of the flyover. • Keep construction-related disturbances to a minimum. • Consult with affected service providers regarding impacts on access to infrastructure and services and alternatives. • Consult with affected communities or businesses prior to foreseeable disruptions, for example notifying residents of a temporary interruption of water supply. • Provide backup or alternative services during construction-related disruptions, for example by providing generators for power supply. • Provide access points to infrastructure and services. • Monitor complaints by the public.			term	mitigation probable	
Traffic	• Increased volume of construction vehicles on the roads may lead to increased wear and tear of roads in the vicinity of the subproject site. • Road safety concerns due to slow-moving construction vehicles • Traffic flow within the vicinity will be affected. • The temporary road closure will result in a decrease in overall network performance in terms of queuing delay and travel times/speeds.	• Traffic will be rerouted and roads will be closed according to the traffic management plan (TMP). The objective of the TMP is to ensure safety of all the road users along the work zone and to address: (i) protection of work crews from hazards associated with moving traffic; (ii) mitigation of the adverse impacts on the road capacity and delays to the road users; (iii) maintenance of access to adjoining properties; and (iv)	High (-)	Regional	Short-term	Partial mitigation probable	Medium (-)

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	Mitigation	Significance Before Mitigation	Geographic Spatial Scale	Duration	Mitigation	Significance After Mitigation
	• The road closure will impact on public transport operations and routing. • On-street parking and loading bays will be affected by the proposed road closure. • Pedestrian movements will be affected by the road closure.	issues that may delay the subproject works. • Negotiations with privately owned public transport operators regarding the affected public transport facilities and routing • Negotiations with business owners and social service operations regarding the loss of parking and loading bays • Clear roads signs will be erected for the full length of the construction period. Provide sign boards for pedestrians to inform them of the nature and duration of construction works and contact numbers for concerns/complaints. • The city traffic police will be available onsite for the monitoring of traffic in the early stages of the operations during road closure. • A traffic monitoring strategy will be implemented. This would include carrying out of traffic counts and onsite visits. Traffic monitoring during early stages of the road closure will be necessary to address: − Adjustments to traffic signal settings, signs, and markings − Adjustments to accommodation of pedestrians − Adjustments necessary to public transport operators					

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	**Mitigation**	**Significance Before Mitigation**	**Geographic Spatial Scale**	**Duration**	**Mitigation**	**Significance After Mitigation**
		• A communications strategy is of vital importance in terms of accommodating traffic during road closure. The road closure, together with the proposed detour, will be communicated via advertising, pamphlets, radio broadcasts, road signage, etc. The implementation of the road detour is also dependent on advance road signage indicating the road detour and alternative routes. • Construction routes clearly defined • Access of all construction and material delivery vehicles will be strictly controlled. • Enforcement of speed limits • Deliveries will not be allowed during peak traffic hours.					
Health and safety	• Danger of construction-related injuries • Open fires in construction camp can result in accidents. • Safety of workers and general public must be ensured. • Poor waste management practices and unhygienic conditions at temporary ablution facilities can breed diseases. • Standing water due to inadequate storm water drainage systems and inadequate waste management practices poses a health hazard by	• Implement good housekeeping practices at the construction camp. • Strict health and safety measures to be implemented and audited on a regular basis • Secure enclosed construction site. • Use reputable contractors. • Provide warning signs of hazardous working areas. • Excavations to be clearly demarcated and barriers (not just danger tape) erected to protect pedestrians from open trenches • Workers will be thoroughly trained in using dangerous	High (-)	Site and local	Short-term	Partial mitigation possible	Low (-)

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	**Mitigation**	**Significance Before Mitigation**	**Geographic Spatial Scale**	**Duration**	**Mitigation**	**Significance After Mitigation**
	providing breeding grounds for disease vectors such as mosquitoes, flies, and snails. • The use of hazardous chemicals in the construction of a road can pose potential environmental, health, and safety risks. • The upgrading of roads may involve the stripping and demolition of old asphalt layers. • Road safety may be affected during construction, especially when traffic is detoured.	equipment. • Workers have the right to refuse work in unsafe conditions. • Undertake waste management practices. • Control speed and movement of construction vehicles. • Improved signage, speed control, walkways, and crossings will reduce health and safety risks due to construction. • Exclude public from the site. • Ensure all workers are provided with and use personal protective equipment. Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas. • Ensure that qualified first aid can be provided at all times. Equipped first aid stations shall be easily accessible throughout the site. • Provide medical insurance coverage for workers. • Provide clean eating areas where workers are not exposed to hazardous or noxious substances. • Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitors do					

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	Mitigation	Significance Before Mitigation	Geographic Spatial Scale	Duration	Mitigation	Significance After Mitigation
		not enter hazard areas unescorted. • Ensure moving equipment is outfitted with audible backup alarms; • Mark and provide signboards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to and easily understood by workers, visitors, and the general public as appropriate.					
Noise and vibrations	• Sensitive receptors (hospitals, schools, religious places) may be affected temporarily by increased traffic and related impacts. • Use of heavy vehicles and equipment may generate high levels of noise. • Vibrations resulting from bulk earthworks and compaction of base layers may create significant disturbances to nearby people and businesses. • Disturbance from afterhours work	• Locate concrete batching, asphalt, crushing plants, lay-down areas, and construction camps away from sensitive receptors. • Restrict construction activities to reasonable working hours where near sensitive receptors. • Keep adjacent landowners informed of unusually noisy activities planned. • Regulate roadworthiness of vehicles. • Ensure that machinery is in a good state of maintenance. • Silencers must be fitted and maintained on all machinery on site. • Monitor noise levels in potential problem areas.	High (-)	Local	Short-term	Partial mitigation probable	Medium (-)
Aesthetics,	The presence of heavy-duty	• Storage areas will be properly	Medium (-)	Local	Short-	Partial	Low (-)

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	Mitigation	Significance Before Mitigation	Geographic Spatial Scale	Duration	Mitigation	Significance After Mitigation
landscape character, and sense of place	vehicles and equipment, temporary structures at construction camps, stockpiles, and asphalt may result in impacts on aesthetics and landscape character.	fenced off. • All domestic solid waste will be collected from a central point of disposal and fed into the city waste collection system. • Contractor to exercise strict care in disposing of construction waste, with proof of disposal at the approved site provided after offloading each waste load, and this is to be logged/registered. • Identification of suitable waste disposal site with enough capacity to hold additional waste to be produced by the proposed road construction activities • Use of recycled material is encouraged especially in the upgrading of existing road. • Guidelines regarding management of waste on site have been outlined in the EMP. • Retain mature trees in and around the site where possible. • Cluster construction activities on site in a specific area to avoid “sprawl.” • Unwanted material and litter will be removed on a frequent basis.			term	mitigation definite	
Workers’ conduct	• Construction workers on site disrupting adjacent land uses by creating noise, generating litter, and possible loitering	• Ensure strict control of laborers, minimizing working hours to normal working times, control littering, and ensure no overnight	Low (-)	Local	Short-term	Full mitigation definite	Low (-)

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	Mitigation	Significance Before Mitigation	Geographic Spatial Scale	Duration	Mitigation	Significance After Mitigation
		accommodation is provided.					
Employment generation	• The subproject will provide employment opportunities for local people during construction. • Expectations regarding new employment will be high, especially among the unemployed individuals in the area. • Labor gathering at the site for work can be a safety and security issue, and must be avoided. • The training of unskilled or previously unemployed persons will add to the skills base of the area.	• The use of labor-intensive construction measures will be used where appropriate. • Employ local (unskilled) labor if possible. • Training of labor to benefit individuals beyond completion of the subproject • Recruitment of labors will take place offsite. • The contractual documentation will ensure that at least 50% of all labor is from surrounding communities.	Medium (+)	Local	Short-term	Partial mitigation probable	High (+)
Archaeological and cultural characteristics	• The proposed development will not require demolition of ASI- or state-protected monuments and buildings.	• Ensure that construction staff members are aware of the likelihood of heritage resources being unearthed and of the scientific importance of such discoveries. • ASI or the State Department of Archaeology will be contacted if any graves are discovered, and all activities will be ceased until further notice. • ASI or the State Department of Archaeology will be contacted if any heritage resources or objects, defined in the act, be discovered, and all activities will be ceased until further notice. • Any heritage object found will not be moved without prior					

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	**Mitigation**	**Significance Before Mitigation**	**Geographic Spatial Scale**	**Duration**	**Mitigation**	**Significance After Mitigation**
		consultation with ASI or the State Department of Archaeology, and all activities will be ceased immediately. • No structures older than 100 years will be allowed to be demolished, altered, or destroyed without a permit from ASI or the State Department of Archaeology.					

C. Operation and Maintenance Phase

122. Table 24 presents an indication of what activities and facilities are likely to be undertaken during operation and maintenance of the subproject, including the associated inputs and outputs.

Table 24: Summary of Activities and Facilities, Resource Use, and Produced Outputs During Operation and Maintenance Phase

Activities and Facilities	Inputs/Resource Use	Outputs/Waste Production

• Signage
• Safety barriers
• Lighting
• Storm water drainage system
• Roadside vegetation
• Cut-and-fill embankments
• Vehicles and pedestrians along the road
• Road accidents and breakdowns
• Vehicle exhaust emissions
• Noise and vibrations
• Litter collection
• Maintenance activities
  − Road reserve vegetation maintenance (pruning/cutting)
  − Repainting of road markings
  − Pothole repair, crack sealing, and road shoulder repair
  − Resealing/resurfacing
  − Safety barriers repairs
  − Upkeep and repair of storm water drainage system
• Eradication and control of invasive vegetation species
• Auxiliary activities and Infrastructure
  − Service stations
  − Roadside markets and shops
  − Taxi stops and ranks
  − Bus stops and terminals
• Special event management required during operational phase, to manage pedestrian flow (e.g. festivals and holidays)
	• Manual deweeding for eradication and control of invasive vegetation species
	• Labor
	• Vehicles and equipment used for inspection and maintenance
	• Bitumen and aggregate used during resurfacing/repair of potholes
	• Special event management of pedestrian movement through use of barriers, etc.
		• Vehicle exhaust emissions
		• Dust
		• Particulates from tires, brakes, and road wear
		• Petrochemical products leaking from vehicles and entering storm water
		• Potential for water resource contamination
		• Hazardous spills during road accidents and breakdowns
		• Illegal dumping, mainly in open spaces along the roadside
		• Litter, also entering storm water system and causing blockages
		• General waste at roadside stopovers
		• Visual exposure of road infrastructure
		• Plant material (removed during maintenance of vegetation cover)
		• Noise and vibrations
		• Lighting

123. The following table (Table 25) outlines potential impacts during the operation and maintenance phase, gathered from a process that included a review of available documentation verified during the site visit, i.e. how, where, and when the proposed development can interact and affect the environment significantly, and details what mitigation measures may be taken to counteract these impacts

Table 25: Summary of Anticipated Potential Environmental Impacts During Operation and Maintenance Phase

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	Mitigation	Significance Before Mitigation	Geographic Spatial Scale	Duration	Mitigation	Significance After Mitigation
Climate	• The nature and intensity of rainfall events in an area have implications for storm water management. • The corrosive nature of climatic conditions may impact on road infrastructure, including roadside signage and safety barriers.	• The designed storm water drainage system will control runoff from site. • Provide warning signs and suggested speed limits during dangerous conditions. • Regular roadside maintenance	Low (-)	Site	Medium-term	Partial mitigation probable	Low (+)
Air quality	• Air pollutants can be inhaled directly from the air, or ingested from touching surfaces or objects where pollutants have settled. • Air pollution may increase over time due to gradual increases in traffic volumes on the road. • The impacts of air quality on sensitive receptors may improve as a result of the subproject, since there will be a separation of traffic through the area.	• Ensure compliance with emission standards applicable to the area through which the road is aligned. • Enforce speed limits and regulate roadworthiness of vehicles during operation of the road. • Monitoring of air pollution levels in potential problem areas will be undertaken.	Medium (-)	Local	Medium-term	Partial mitigation unsure	Low (-)
Geology	• Roadside soils may be affected by airborne pollutants emitted by vehicle exhausts and leaking petrochemicals during accidents and breakdowns.	• Develop emergency response procedures to deal with the containment and clean-up of hazardous spills. • Design of site drainage system in line with topographical features of the site will control runoff.	Medium (-)	Site	Long-term	Full mitigation possible	Low (-)
Drainage and hydrology	• Pollutants settling on the road surface may be washed off during rain as runoff. • Runoff from roads produces a highly variable discharge in terms of volume and quality.	• Design of site drainage system in line with topographical features of the site will control runoff. • Waste management practices will be implemented during operation of the road.	Low (-)	Local	Long-term	Partial mitigation definite	Low (+)

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	Mitigation	Significance Before Mitigation	Geographic Spatial Scale	Duration	Mitigation	Significance After Mitigation
Land uses	• The flyover will have positive impacts both on a local and regional context in terms of road improvement and an improved transportation regime. • Reduced traffic results in land gains, which can be utilized to enhance the pedestrian space and increase pedestrian amenity. • The proposed project is expected to facilitate closer interaction between the various land parcels, and allow an integrated development approach to the area, thereby improving the overall quality of life. • The proposed development is expected to bring about positive economic benefits in the medium to long term. • Local roadside businesses, public transport, education and health facilities, etc. are likely to benefit from the subproject. • It is envisaged that as a result of this project, pedestrian sidewalks and footpaths will be improved and increased in size together with general urban design elements to create an environment that is conducive to pedestrian activity. This will improve the safety of pedestrians while making markets more	• Special events management such as during festivals and holidays will require extra policing and barriers to control movement of pedestrians during peak traffic flows.	High (+)	Local	Long-term	No mitigation required	High (+)

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	Mitigation	Significance Before Mitigation	Geographic Spatial Scale	Duration	Mitigation	Significance After Mitigation
	accessible. • Access into and through the area will be improved. • The future developmental and event needs (festivals and holidays) will have better access to and from the city. • The proposed development is likely to impact positively on commercial activities within the subproject area and surroundings through improved access and rationalization of the area available for commercial activities.						
Traffic	• Significant reduction in the number of vehicles passing through the area by approximately 58% (as per traffic surveys) from the current number of 11,686 vehicles per 12-hour period • The reduction in traffic is expected to reduce the number of accidents and potential conflicts that occur within the area, thus saving human life. • Reduced traffic also results in land gains, which can be utilized to enhance the pedestrian space and increase pedestrian amenity. • The reduced traffic congestion, conflicts, and land gains result in a safer and more efficient circulation of traffic, which is expected to facilitate the	• No mitigation required	High (+)	Regional	Long-term	No mitigation required	High (+)

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	Mitigation	Significance Before Mitigation	Geographic Spatial Scale	Duration	Mitigation	Significance After Mitigation
	reorganization and rationalization of the public transport system and commercial activities. • Traffic increase relate to impacts such as noise and air pollution (refer to discussion below).						
Health and safety	• The reduction of traffic is expected to reduce the number of accidents and potential conflicts that occur within the area, thus improving public safety of road users. • The reduced traffic congestion, conflicts and land gains will result in a safer and more efficient circulation of traffic.	• Undertake regular road maintenance to avoid unacceptable degradation of carriageways and road shoulders that may create dangerous road conditions. • Impose speed limits through urban areas. • Provide pedestrian walkways and crossings. • Provide roadside safety signage. • Monitor road accident statistics, state of fencing, and roadside vegetation.	High (+)	Local	Long-term	Partial mitigation probable	High (+)
Noise and vibration	• Noise pollution caused by existing road traffic, and additional traffic with the new flyover • Expected increase in noise due to increased traffic is not expected to impact significantly on the current ambient noise levels. • Vibrations are much less likely to be a cause of disturbance than noise levels, but they may become a problem when vehicles, especially heavy vehicles, travel over irregular road surfaces in close proximity to	• Encourage vehicles to travel at a constant, efficient cruising speed. • Ensure appropriate road surface design and regular maintenance to minimize frictional road noise and vibrations, especially for heavily used roads near sensitive receptors. • Regulate roadworthiness of vehicles. • Monitor noise levels in potential problem areas.	Medium (-)	Local	Long-term	Partial mitigation possible	Low to Medium (-)

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	**Mitigation**	**Significance Before Mitigation**	**Geographic Spatial Scale**	**Duration**	**Mitigation**	**Significance After Mitigation**
	sensitive roadside receptors.						
Aesthetics, landscape character, and sense of place	• The subproject is considered to be compatible with the surrounding landscape and is not likely to impact negatively on the existing visual quality or landscape character of the area; rather, it is expected to improve the general environment through better use of the area. • The flyover will increase the quality of the tourism experience being offered, by enhancing the sense of place of the subproject area that originally attracted tourists. It is anticipated that the subproject will result in improved safety and aesthetics.	• The proposed flyover will be similar in construction and design to existing bridges in the area. There will be some additional urban design features (e.g. lighting) to enhance the aesthetics of the structure and its placement in the area. • Provide waste disposal facilities and enforce anti-littering campaigns. • Provide assistance with cleaning and maintenance of roadside buildings soiled or stained by air pollutants. • Monitor housekeeping, littering, and illegal dumping.	Low (+)	Local	Long-term	Partial mitigation probable	Medium (+)

D. Cumulative Environmental Impacts

124. Table 26 presents the cumulative impacts that result from the incremental impacts of subproject activity on a common resource when added to the impacts of other past, present, or reasonably foreseeable future activities. Cumulative impacts are identified and predicted in the same level of detail as the impacts discussed above.

E. Assessment of No-Go (No-Build) Option

125. Table 27 outlines potential impacts associated with the “No-Go” option. The “No-Go” option involves no additional commitment of resources. Choosing the “No-Go” option has the same effect as if the decision was never made.

Table 26: Summary of Anticipated Potential Cumulative Environmental Impacts

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	Mitigation	Significance Before Mitigation	Geographic Spatial Scale	Duration	Mitigation	Significance After Mitigation
The removal of extraneous traffic and increasing pedestrian amenity	• The reduction of traffic from current number of 11,686 vehicles per 12-hour period by approximately 58% (as per traffic surveys) would result in reduced number of accidents and potential conflicts, thus saving human life as well as the economy of the region. • In addition, the barriers that the sea of traffic currently creates is removed, thus allowing closer interaction among the various land parcels and allowing an integrated development approach to the area and improving the overall quality of life.	• Refer to tables above	High (-)	Site/local	Long-term	Full mitigation definite	High (+)
The rationalization and reorganization of public transport and commercial activities	• In order to promote the national imperative of promoting public transport, it is essential to provide a safe, efficient, reliable, accessible, convenient, and coordinated public transport system. • The proposal for construction of an expressway corridor (flyover) goes a long way in achieving some of the goals of a good public transport system. • The direct integration of different modes of road transport like buses, taxis, auto rickshaws, etc. results in coordination and integration of the various modes being achievable, as well as ensuring that the public transport system is commuter-oriented and friendly in view of the high number of transfer trips.	• Refer to tables above	High (-)	Site/local	Long-term	Full mitigation definite	High (+)
The rationalization and revitalization of land uses	• The expected land gains as well as the reduction of traffic through the area allows for the area to be redeveloped and revitalized in a coordinated and integrated manner, ensuring connectivity among the various land uses, greater pedestrian/open spaces, and general urban redesign of the appearance of the	• Refer to tables above	High (-)	Site/local	Long-term	Full mitigation definite	High (+)

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	Mitigation	Significance Before Mitigation	Geographic Spatial Scale	Duration	Mitigation	Significance After Mitigation
	area to create a better quality environment for people. • Improved gateway to the city						

Table 27: Summary of Anticipated Potential Environmental Impacts of the No-Build Option

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	Mitigation	Significance Before Mitigation	Geographic Spatial Scale	Duration	Mitigation	Significance After Mitigation
Climate	• No obvious impacts	• n/a					
Air quality	• Will remain the same • No impacts on sensitive receptors during construction	• None	Medium (-)	Local			Medium (-)
Geology	• No obvious impacts	• n/a					
Drainage and hydrology	• No obvious impacts	• n/a					
Land use	• The subproject area will remain fragmented with high volumes of traffic, pedestrians, and commercial activities competing for limited space. • The number of conflicting usages and the high vehicular and pedestrian volumes will continue to act as a barrier to redevelopment and growth of the area. • The fragmentation of activities, in particular the public transport ranks, will remain inefficient, inconvenient, and unsafe. • Lack of defined and dedicated trading space to cater to demand will continue to result in trading operating at undesirable locations, exacerbating problems of congestion and urban degradation. • Private sector participation and investment will continue to be inhibited, which in turn inhibits the possible	• None	High (-)	Local	Long-term		High (-)

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	Mitigation	Significance Before Mitigation	Geographic Spatial Scale	Duration	Mitigation	Significance After Mitigation
	redevelopment of the area to be able to realize its full potential, including tourism.						
Traffic	• The number of conflicting usages and the high vehicular and pedestrian volumes will continue to result in considerable congestion and delays to pedestrians and vehicles. • The high risk of accidents to traffic users and pedestrians will remain. • Access to future developmental and event needs to and from the city will continue to be a problem.	• None	High (-)	Local	Long-term		High (-)
Health and safety	• The high levels of traffic and the lack of suitable pedestrian space will continue to result in congested pedestrian walkways and overflow onto the road. • This, together with a lack of adequate enforcement, will continue to create an unsafe environment for residents, pedestrians, and commuters, resulting in accidents.	• None	High (-)	Local	Long-term		High (-)
Noise pollution	• Noise pollution will remain the same. • No impacts on sensitive receptors during construction	• None	Medium (-)	Local	Long-term		Medium (-)
Aesthetics, landscape character, and sense of place	• Likely to deteriorate, as more land uses compete for limited space leading to visual degradation in terms of congestion, litter, and lack of pedestrian space	• None	Medium (-)	Local	Long-term		Medium (-)

VI. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

A. Public Participation During the Preparation of the IEE

126. The public participation process included identifying interested and affected parties (stakeholders); informing and providing the stakeholders with sufficient background and technical information regarding the proposed development; creating opportunities and mechanisms whereby they can participate and raise their viewpoints (issues, comments, and concerns) on the proposed development; giving the stakeholders feedback on process findings and recommendations; and ensuring compliance to process requirements with regards to the environmental and related legislation.

127. The following methodologies have been used for carrying out public consultation:

(i) Local communities, individuals, traders, and local shopkeepers who are directly affected were given priority while conducting public consultation.
(ii) Walk-through informal group consultations were held along the proposed flyover stretch.
(iii) The local communities were informed through public consultation with briefing on project interventions, including its benefits.
(iv) The environmental concerns and suggestions made by the participants were listed out and discussed, and suggestions incorporated in the EMP.

128. Different techniques of consultation with stakeholders were used during project preparation (interviews, public meetings, group discussions, etc.). A questionnaire was designed and environmental information collected. Apart from this, a series of public consultation meetings were conducted during the subproject preparation. Various forms of public consultations (consultation through ad hoc discussions on site) were used to discuss the subproject and involve the community in planning the subproject design and mitigation measures.

B. Notification of Potential Interested and Affected Parties

129. Since the project corridor spans over 2.41 km only, mass information dissemination about the consultations were not necessary. However, the interested and affected parties were identified during the course of the initial environmental examination. Key methods employed included individual interviews, field level observations, community consultations and discussions, and interviews through a pre-drafted interview schedule. Key respondents included project-affected persons, shopkeepers/businessmen from the project area, and associations of shop owners, in addition to daily commuters consulted randomly. In addition to a number of informal consultations conducted regularly in the project corridor, a total of 47 interested and affected people, selected on a stratified basis to ensure diversified representation, were formally interviewed with the help of an interview schedule on 19–20 May 2011. Issues discussed and feedback received along with details of date, time, location, and list of participants are given in Appendix 3. To ensure that people directly impacted by the subproject are taken on board on issues relating to their compensation entitlements and rehabilitation, a number of one-on-one formal meetings were organized by ERA with Kashmir Manufacturers and Traders Federation (KMTF), shopkeepers presently housed in buildings likely to be impacted at Magarmal Bagh and Hari Singh High Street. Minutes of meetings conducted on 14 May 2011, 23 May 2011, and 6 June 2011 with lists of participants are given in Appendix 3. Communication with interested and affected parties (I&APs) was by telephone and direct discussion, in order to obtain the

necessary background information to compile this report. The records of public consultations are annexed as Appendix 3.

C. Future Consultation and Disclosure

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

D. Consultation During Detailed Design

131. Focus group discussions (FGD) will be held with affected persons and other stakeholders to hear their views and concerns, so that these can be addressed in subproject design wherever necessary. Regular updates on the environmental component of the subproject will be kept available at the PMU office of ERA.

132. ERA will conduct information dissemination sessions at major intersections and solicit the help of the local community leaders and prominent citizens to encourage the participation of the people to discuss various environmental issues.

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

E. Consultation During Construction

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

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

F. Project Disclosure

136. A communications strategy is of vital importance in terms of accommodating traffic during road closure. Local communities will be continuously consulted regarding location of construction camps, access and hauling routes, and other likely disturbances during construction. The road closure, together with the proposed detours, will be communicated via advertising, pamphlets, radio broadcasts, road signages, etc.

137. Public information campaigns via newspaper, radio, and TV will explain the subproject details to a wider population. Public disclosure meetings at key project stages will inform the public of progress and future plans.

138. For the benefit of the community, the summary of the IEE will be translated into the local language and made available at: (i) ERA office; (ii) district magistrate office; and (iii) PMU/PIU. It will be ensured that hard copies of the IEE are kept at places which are conveniently accessible to citizens, as a means to disclose the document and at the same time create wider public awareness. Electronic versions of the IEE will be on the official websites of the ERA and

of ADB, after approval of the IEE by ADB. The PIU will issue notification on the starting date of the subproject in the locality. The notice will be issued by the PIU in local newspapers one month ahead of the implementation work. Copies of the IEE will be kept in the PMU/PIU office, and will be distributed to any person willing to consult the IEE.

VII. GRIEVANCE REDRESS MECHANISM

139. Redressal of grievances shall be the responsibility of ERA. In this regard, an efficient grievance redress mechanism will be kept in place to assist the affected persons in resolving queries and complaints. The grievance redress mechanism will follow the following approach:

(i) If the affected person has any complaint or grievance, he/she is free to lodge his/her complaint with the project manager, PIU, JKUSDIP, ERA, who will make efforts to address the complaint on the ground level. The project manager will make efforts to redress the grievance within 1 week from the receipt of the grievance.
(ii) In case the affected person is not satisfied or his/her grievance is not redressed, he can take the matter to the Director Safeguards, who will ensure that the grievance is redressed within 2 weeks.
(iii) If the Director Safeguards cannot resolve the complaint or the affected person is not satisfied with the resolution/decision, he/she can take the matter to the chief executive officer of ERA.
(iv) Affected persons, at any moment in time, are free to approach the court of law at their own will and expense.

140. Besides the grievance redress mechanism of the subproject, the state has an online grievance monitoring system known as Awaz-e-Awam, through which affected persons can also lodge their complaints. The affected persons can lodge their complaints online at http://www.jkgrievance.nic.in.

141. Apart from the above detailed mechanism for grievances received at the level of ERA, the provision shall be kept in the EMP of the subproject wherein the contractor will deputize one environmental safeguard officer who shall be responsible for implementation of EMP, reporting and grievance redressal on a day-to-day basis. The grievances/complaints received at the level of the contractor shall be recorded in the complaints register, and shall be forwarded to the DSC (engineer of the contract) within 48 hours along with the details of action taken to redress the grievance. The team leader of the DSC shall immediately try to resolve the issues and forward the details to the project manager of the PIU. If the action taken by the contractor and DSC is found to be inadequate, then necessary instructions shall be issued by the project manager, PIU for implementation of rectification measures. Project manager, PIU shall report the matter to the director safeguards, along with the details on action taken. In order to make it easy for the public in general to approach the authorities in case of grievances/complaints, information boards with contact details of the contractor, team leader of DSC, assistant project manager of PIU, deputy project manager of PIU, and project manager of PIU shall be displayed at all the subproject sites.

VIII. ENVIRONMENTAL MANAGEMENT PLAN

142. The EMP will guide the environmentally sound construction of the subproject and ensure efficient lines of communication between the DSC (engineer), contractors, and PMU/PSC. The EMP identifies the three phases of development as: (i) site establishment and preliminary activities; (ii) construction phase; and (iii) post-construction/operational phase.

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

144. A copy of the EMP must be kept onsite during the construction period at all times. The EMP will be made binding on all contractors operating on the site and will be included in the contractual clauses. Noncompliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance. It shall be noted that the Supreme Court of India[11] mandates that those responsible for environmental damage must pay the repair costs both to the environment and human health and the preventive measures to reduce or prevent further pollution and/or environmental damage (the "polluter pays principle").

145. The contractor is deemed not to have complied with the EMP if:

(i) within the boundaries of the site, site extensions, and haul/ access roads, there is evidence of contravention of clauses;
(ii) if environmental damage ensues due to negligence;
(iii) the contractor fails to comply with corrective or other instructions issued by the engineer/PMU/PIU within a specified time; and
(iv) the contractor fails to respond adequately to complaints from the public.

A. Institutional Arrangement

146. The subproject will be implemented and monitored by the project implementation unit (PIU) of ERA, which will be supported by the design and supervision consultant (engineer), and overall management support shall be provided to ERA by project support consultants (PSC). ERA will be the executing agency (EA).

147. The safeguard unit of ERA in PMU will monitor the implementation of environmental covenants with the assistance of the engineer (DSC) and PSC.

148. ERA shall be responsible for ensuring compliance to environmental requirements of the ADB as well as central/state governments, and reporting the same to ADB. An environmental management plan (EMP) will be part of the contract with the civil works contractors engaged for execution of the works. The supervision and implementation of the EMP shall be the responsibility of the DSC with ERA as monitoring agency (with the assistance of PSC). All the statutory environmental clearances (at national, state, and local levels) if required (by ERA or by the civil works contractor) for the implementation of the subproject would be obtained in compliance with the national, state, and local laws and regulations and in accordance with ADB's environmental policy and guidelines.

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

149. **ERA (PMU and PIU)**
This agency:

(i) complies with all applicable legislation and is conversant with the requirements of the EMP;
(ii) assesses all activities requiring special attention as specified and/or requested by the engineer (DSC) and/or safeguards unit of ERA for the duration of the contract;
(iii) ensures that the contractor conducts all activities in a manner that minimizes disturbance to directly affected residents and the public in general, as advised by the engineer and/or safeguards unit of ERA; and
(iv) may, on the recommendation of the engineer and/or safeguards unit of ERA, through the executing agency, order the contractor to suspend any or all works onsite if the contractor or his subcontractor/supplier fails to comply with the said environmental specifications.

150. **Project Support Consultants (PSC)**
This agency:
(i) is conversant with the requirements of the EMP and all applicable legislation;
(ii) monitors the implementation of EMP on site and recommends requisite measures in case of noncompliances with ERA; and
(iii) conducts monitoring through environmental monitoring laboratory in consultation with the safeguards unit of ERA and the engineer.

151. **The Engineer (DSC)**
This agency:
(i) complies with all applicable legislation and is conversant with the requirements of the EMP;
(ii) arranges information meetings for and consults with interested and affected parties about the impending construction activities;
(iii) maintains a register of complaints and queries by members of the public at the site office. This register is forwarded to the project manager of the PIU on a weekly basis;
(iv) enforces and monitors compliance with the requirements of the EMP onsite;
(v) assesses the contractor's environmental performance in consultation with the environmental expert (of DSC); and
(vi) documents, in conjunction with the contractor, the state of the site prior to commencing construction activities.

152. **Environmental Expert of Engineer (DSC)**
This individual:

(i) briefs the contractor on the requirements of the environmental specification and/or EMP, as applicable;
(ii) advises the engineer on the interpretation, implementation, and enforcement of the environmental specification and other related environmental matters;
(iii) monitors and reports on the performance of the contractor/project in terms of environmental compliance with the EMP to the engineer and ERA; and
(iv) provides technical advice relating to environmental issues to the Engineer.

153. **The Contractor**

This individual/agency:

(i) complies with all applicable legislation, is conversant with the requirements of the EMP, and briefs staff about the requirements of same;
(ii) ensures any subcontractors/suppliers who are utilized within the context of the contract comply with the environmental requirements of the EMP. The contractor will be held responsible for noncompliance on their behalf;
(iii) supplies method statements for all activities requiring special attention as specified and/or requested by the engineer or environmental expert (of engineer) for the duration of the contract;
(iv) provides environmental awareness training to staff;
(v) bears the costs of any damages/compensation resulting from non-adherence to the EMP or written site instructions;
(vi) conducts all activities in a manner that minimizes disturbance to directly affected residents and the public in general, and foreseeable impacts on the environment;
(vii) ensures that the engineer is informed in a timely manner of any foreseeable activities that will require input from the environmental expert (of engineer);
(viii) appoints one full-time environmental safeguard officer for implementation of EMP, community liaison, reporting, and grievance redressal on a day-to-day basis.
(ix) receives complaints/grievances from the public, immediately implements the remedial measures, and reports to the engineer (DSC) within 48 hours.

B. Capacity Building

154. Training and orientation programs shall be organized by the environmental experts of engineer (DSC), PSC, and ERA for the contractors, laborers, and technical and office staff of the contractors, site engineers of DSC, and the relevant staff of the PIU for building their capacity with regards to principles and procedures of environmental management, pollution abatement measures, public consultation and participation, health and safety measures, grievance redress mechanism, and implementation of EMP.

155. Table 28 outlines the site establishment and preliminary activities.

Table 28: Site Establishment and Preliminary Activities

	Activity	Management/Mitigation	Responsible for Monitoring	Frequency
1.	Legislation, permits, and agreements	In all instances, ERA, service providers, contractors, and consultants must remain in compliance with relevant local and national legislation.	All	Prior to moving onto site and during construction
		Proof of compliance to Air Act must be forwarded by the contractor to PMU/PIU (in relation to hot mixing, stone crushers, diesel generators, etc.).	Engineer	Prior to moving onto site and during construction
		A copy of the EMP must be kept on site during the construction period.	Environmental expert of engineer (EE)	At all times
2.	Access to site	Access to site will be via existing roads. The contractor will need to ascertain the existing condition of the roads and repair damage due to construction.	Engineer	Prior to moving onto site and during construction
		The local traffic police department shall be involved in the planning stages of the road closure and detour, and shall be available onsite for the monitoring of	Engineer	Prior to moving onto site

	Activity	Management/Mitigation	Responsible for Monitoring	Frequency
		traffic in the early stages of the operations during road closure.		
		The local traffic department must be informed at least a week in advance if the traffic in the area will be affected.	Engineer	Prior to moving onto site
		The contractors must comply with the recommendations from the traffic study. Layout design shall accommodate the impact on existing traffic flow patterns (e.g., access points).	Engineer	Prior to moving onto site
		The location of all affected services and servitudes must be identified and confirmed.	Engineer	Prior to moving onto site
		All roads for construction access must be planned and approved by the engineer and its environmental expert ahead of construction activities. They shall not be created on an ad hoc basis.	Engineer	Prior to moving onto site and during construction
		No trees, shrubs, or groundcover may be removed or vegetation stripped without the prior permission of the engineer/environmental expert.	Engineer/EE	Before and during construction
		Agreed turning areas for haulage vehicles are to be formalized and used by the contractor. No turning maneuvers other than at the designated places shall be permitted.	Engineer	Prior to moving onto site
		Contractors shall construct formal drainage for all temporary haulage roads in the form of side drains and miter drains to prevent erosion and discharge of runoff.	Engineer	Prior to moving onto site
3.	Setting up of construction camp[12]	Choice of site for the contractor's camp requires the engineer's permission and must take into account location of local residents, businesses, and existing land uses, including flood zones and slip/ unstable zones. A site plan must be submitted to the engineer for approval.	Engineer and EE	During surveys and preliminary investigations, and prior to moving onto the site
		The construction camp may not be situated on a floodplain or on slopes greater than 1:3.	Engineer and EE	During surveys and preliminary investigations and prior to moving onto the site
		If the contractor chooses to locate the campsite on private land, he must get prior permission from both the engineer and the landowner.	Engineer	During site establishment and ongoing weekly inspections
		In most cases, onsite accommodation will not be required. The construction camp can thus be comprised of: • site office • ablution facilities	Engineer	During set-up

[12] Careful planning of the construction camp can ensure that time and costs associated with environmental management and rehabilitation are reduced.

	Activity	Management/Mitigation	Responsible for Monitoring	Frequency
		• designated first aid area • eating areas • staff lockers and showers (where water and waterborne sewers are available) • storage areas • batching plant (if required) • refueling areas (if required) • maintenance areas (if required) • crushers (if required)		
		Cut-and-fill must be avoided where possible during the set-up of the construction camp.	Engineer	During site set-up
		The camp must be properly fenced off and secured.	Engineer	During site establishment and ongoing weekly inspections
		The contractor shall make adequate provision for temporary toilets for the use of their employees during the construction phase. Such facilities, which shall comply with local authority regulations, shall be maintained in a clean and hygienic condition. Their use shall be strictly enforced.	Engineer	During site establishment and ongoing – weekly inspections
		Under no circumstances may open areas or the surrounding bush be used as a toilet facility.	Engineer	Ongoing
		Bins and/or skips shall be provided at convenient intervals for disposal of waste within the construction camp.	Engineer	During site set-up and ongoing
		Bins shall have liner bags for efficient control and safe disposal of waste.	EE	Ongoing
		Recycling and the provision of separate waste receptacles for different types of waste shall be encouraged.	EE	During site set-up and ongoing
4.	Establishing equipment lay-down and storage area[13]	Choice of location for equipment lay-down and storage areas must take into account prevailing winds, distances to adjacent land uses, general on-site topography, and water erosion potential of the soil. Impervious surfaces must be provided where necessary.	EE	During site set-up
		Storage areas shall be secure so as to minimize the risk of crime. They shall also be safe from access by children, animals, etc.	EE	During site set-up
		It is very important that the proximity of residents, businesses, schools, etc. is taken into account when deciding on storage areas for hazardous substances or materials. Residents living adjacent to the construction site must be notified of the existence of the hazardous storage	EE	During site set-up

[13] Storage areas can be hazardous and unsightly and can cause environmental pollution if not designed and managed carefully

	Activity	Management/Mitigation	Responsible for Monitoring	Frequency
		area.		
		Equipment lay-down and storage areas must be designated, demarcated, and fenced if necessary.	EE	During site set-up
		Fire prevention facilities must be present at all storage facilities.	EE	During site set-up
		Proper storage facilities for the storage of oils, paints, grease, fuels, chemicals, and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater regime around the temporary storage areas. These pollution prevention measures for storage shall include a bund wall high enough to contain at least 110% of any stored volume. The contractor shall submit a method statement to the engineer for approval.	EE	During site set-up and ongoing
		These storage facilities (including any tanks) must be on an impermeable surface that is protected from the ingress of storm water from surrounding areas in order to ensure that accidental spillage does not pollute local soil or water resources.	EE	During site set-up and ongoing
		Fuel tanks must meet relevant specifications and be elevated so that leaks may be easily detected.	Engineer and contractor	During site set-up and monitored
		Material safety data sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible and available, MSDSs shall additionally include information on ecological impacts and measures to minimize negative environmental impacts during accidental releases or escapes.	Engineer and contractor	Ongoing
		Staff dealing with these materials/ substances must be aware of their potential impacts and follow the appropriate safety measures. The contractor must ensure that its staff are made aware of the health risks associated with any hazardous substances used, have been provided with the appropriate protective clothing/equipment in case of spillages or accidents, and have received the necessary training.	EE and contractor	Ongoing
		Contractors shall submit a method statement and plans for the storage of hazardous materials and emergency procedures.	Engineer and EE	Prior to establishment of storage area
5.	Materials management – sourcing[14]	Contractors shall prepare a source statement indicating the sources of all materials (including topsoil, sands,	Engineer and EE	On award of contract

[14] Materials must be sourced in a legal and sustainable way to prevent offsite environmental degradation.

	Activity	Management/Mitigation	Responsible for Monitoring	Frequency
		natural gravels, crushed stone, asphalt, clay liners, etc.), and submit these to the engineer for approval prior to commencement of any work.		
		Where possible, a signed document from the supplier of natural materials shall be obtained, confirming that they have been obtained in a sustainable manner and in compliance with relevant legislation.	EE	On receipt of natural materials
		Where materials are borrowed (mined), proof must be provided of authorization to utilize these materials from the landowner/material rights owner and the Department of Geology and Mining.	EE	On receipt of borrowed (mined) materials
6.	Education of site staff on general and environmental conduct[15]	Ensure that all site personnel have a basic level of environmental awareness training.	EE	During staff induction and ongoing
		Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with their task.	EE and contractor	During staff induction, followed by ongoing monitoring
		No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the contractor.	EE and contractor	During staff induction, followed by ongoing monitoring
		All employees must undergo safety training and wear the necessary protective clothing.	EE and contractor	During staff induction, followed by ongoing monitoring
		A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: • no alcohol/drugs onsite; • prevent excessive noise; • construction staff are to make use of the facilities provided for them, as opposed to ad hoc alternatives (e.g. fires for cooking, the use of surrounding bushes as toilet facility); • no fires permitted onsite; • trespassing on private/commercial properties adjoining the site is forbidden; • other than pre-approved security staff, no workers shall be permitted to live on the construction site; and • no worker may be forced to do work that is potentially dangerous or that	EE	During staff induction, followed by ongoing monitoring

[15] These points need to be made clear to all staff onsite before the subproject begins.

	Activity	Management/Mitigation	Responsible for Monitoring	Frequency
		he/she is not trained to do.		
6.	Social impacts[16]	Open liaison channels shall be established between the site owner, the developer, operator, contractors, and interested and affected parties such that any queries, complaints, or suggestions can be dealt with quickly and by the appropriate persons.	EE	Prior to moving onto site and ongoing
		A communications strategy is of vital importance in terms of accommodating traffic during road closure. The road closure, together with the proposed detour, needs to be communicated via advertising, pamphlets, radio broadcasts, road signage, etc.	EE	Prior to moving onto site and ongoing
		Advance road signage must indicate the road detour and alternative routes. Provide signboards for pedestrians to inform them of nature and duration of construction works, and contact numbers for concerns/complaints.	EE	Prior to moving onto site and ongoing
		Storage facilities, elevated tanks, and other temporary structures onsite shall be located such that they have as little visual impact on local residents as possible.	Engineer and EE	During surveys and preliminary investigations and site set-up
		In areas where the visual environment is particularly important (e.g. along commercial/tourism routes) or where there are privacy concerns for surrounding buildings, the site may require screening. This could be in the form of a shade cloth, temporary walls, or other suitable materials prior to the beginning of construction.	Engineer and EE	During surveys and preliminary investigations and site set-up
		Special attention shall be given to the screening of highly reflective materials onsite.	EE	During site set-up
7.	Noise impacts	Construction vehicles are be to fitted with standard silencers prior to the beginning of construction	Contractor	
		Equipment that is fitted with noise reduction facilities (e.g. side flaps, silencers, etc.) will be used as per operating instructions and maintained properly during site operations.	Contractor	
8.	Dust/air pollution[17]	Vehicles traveling along access roads must adhere to speed limits to avoid creating excessive dust.	EE	Ongoing
		Camp construction/haulage road construction areas that have been stripped of vegetation must be dampened periodically to avoid excessive dust.	EE	Ongoing; more frequently during dry and windy conditions
		The contractor must make alternative arrangements (other than fires) for	Engineer	Ongoing.

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

[17] Establishment of the campsite and related temporary works can reduce air quality.

	Activity	Management/Mitigation	Responsible for Monitoring	Frequency
		cooking and/or heating requirements. LPG gas cookers may be used provided that all safety regulations are followed.		
9.	Soil erosion	The time that stripped areas are left open to exposure shall be minimized whenever possible. Care shall be taken to ensure that lead times are not excessive.	Engineer and EE	Throughout the duration of the subproject
		Wind screening and storm water control shall be undertaken to prevent soil loss from the site.	Engineer and EE	During site set-up
		Procedures that are in place to conserve topsoil during the construction phase of the subproject are to be applied to the set-up phase, i.e. topsoil is to be conserved while providing access to the site and setting up the camp.	Engineer and EE	Daily monitoring during site set-up
10.	Storm water[18]	To prevent storm water damage, the increase in storm water runoff resulting from construction activities must be estimated, and the drainage system assessed accordingly. A drainage plan must be submitted to the engineer for approval and must include the location and design criteria of any temporary stream crossings (siting and return period, etc.).	Engineer	During surveys and preliminary Investigations
		During site establishment, storm water culverts and drains are to be located and covered with metal grids to prevent blockages if deemed necessary by the engineer. (e.g. due to demolition work).	Engineer	During site set-up
		Temporary cut-off drains and berms may be required to capture storm water and promote infiltration.	Engineer and EE	During site set-up
11.	Water quality[19]	Storage areas that contain hazardous substances must be bunded with an approved impermeable liner.	Engineer	During site set-up
		Spills in bunded areas must be cleaned up, removed, and disposed of safely away from the bunded area as soon after detection as possible to minimize pollution risk and reduced bunding capacity.	Engineer and EE	During site set-up
		A designated bunded area is to be set aside for vehicle washing and maintenance. Materials caught in this bunded area must be disposed of at a suitable waste site or as directed by the engineer.	Engineer and EE	During site set-up
		Provision shall be made during set up for all polluted runoff to be treated with the engineer's approval before being discharged into the storm water system. (This will be required for the duration of	Engineer and EE	During site set-up and to be monitored weekly

[18] Serious financial and environmental impacts can be caused by unmanaged storm water.
[19] Incorrect disposal of substances and materials and polluted runoff can have serious negative effects on groundwater quality.

	Activity	Management/Mitigation	Responsible for Monitoring	Frequency
		the project.)		
12.	Conservation of the natural environment[20]	No vegetation may be cleared without prior permission from the engineer.	Engineer and EE	During site set-up and ongoing
		Trees that are not to be cleared shall be marked beforehand with danger tape. The environmental expert of the engineer (DSC) must be given a chance to mark vegetation that is to be conserved before the contractor begins clearing the site.	Engineer and EE	During site set-up
		Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas. (Particular attention must be paid to imported material.)	EE	Ongoing in campsite, haulage areas
13.	Set-up of waste management procedure	The excavation and use of rubbish pits onsite is forbidden.	EE	Ongoing
		Burning of waste is forbidden.	EE	Ongoing
14.	Cultural environment	Prior to the commencement of construction, all staff need to know what possible archaeological or historical objects of value may look like, and shall notify the engineer/contractor should such an item be uncovered.	EE	During site set-up and ongoing
15.	Security and safety	Lighting onsite is to be set up to provide maximum security and to enable easier policing of the site, without creating a visual nuisance to local residents or businesses.	Engineer	During site set-up
		Material stockpiles or stacks, such as pipes, must be stable and well secured to avoid collapse and possible injury to site workers and local residents.	Engineer and EE	Ongoing
		Flammable materials shall be stored as far as possible from adjacent residents/ businesses.	Engineer and EE	Ongoing
		All interested and affected parties shall be notified in advance of any known potential risks associated with the construction site and the activities on it. Examples are: • stringing of power lines • earthworks/earthmoving machinery on steep slopes above houses/ infrastructure • risk to residences along haulage roads/access routes	Engineer and EE	24 hours prior to activity in question

DSC = design and supervision consultant; EE = environmental expert of DSC/engineer

156. Table 29 outlines management of construction activities and workforce.

Table 29: Management of Construction and Workforce Activities

[20] Alien plant encroachment is particularly damaging to natural habitats, and is often associated with disturbance of the soil during construction activities. Care must be taken to conserve existing plant and animal life in and surrounding the site.

	Activity	Management/Mitigation	Responsible for Monitoring	Frequency
1.	Access to site	Contractors shall ensure that all side and miter drains and scour check walls on access and haul roads are functioning properly and are well maintained.	Engineer	Weekly and after heavy rains
		Contractors shall ensure that access roads are maintained in good condition by attending to potholes, corrugations, and storm water damage as soon as these develop.	Engineer	Weekly inspection
		If necessary, staff must be employed to clean surfaced roads adjacent to construction sites where materials have been spilt.	Contractor	When necessary
		Unnecessary compaction of soils by heavy vehicles must be avoided; construction vehicles must be restricted to demarcated access, haulage routes, and turning areas.	Contractor	Ongoing monitoring
		Cognizance of vehicle weight/ dimensions must be taken when using access constructed out of certain materials, e.g. paved surfaces/cobbled entranceways.	Engineer	Ongoing monitoring
2.	Maintenance of construction camp	The contractor must monitor and manage drainage of the campsite to avoid standing water and soil erosion.	Engineer	Ongoing monitoring
		Runoff from the campsite must not discharge into neighbors' properties.	Engineer	Ongoing monitoring
		Toilets are to be maintained in a clean state and shall be moved to ensure that they adequately service the work areas.	Contractor	Weekly inspection
		The Contractor is to ensure that open areas or the surrounding bush are not being used as a toilet facility.	Contractor	Weekly inspection
		The contractor shall ensure that all litter is collected from the work and camp areas daily.	Contractor	Ongoing monitoring
		Bins and/or skips shall be emptied regularly, and waste shall be disposed of at the pre-approved site. Waybills for all such disposals are to be kept by the contractor for review by the engineer/EE.	Contractor	Weekly inspection
		The contractor shall ensure that all litter is collected from the work and camp areas daily.	Contractor	Ongoing monitoring
		Eating areas shall be regularly serviced and cleaned to ensure the highest possible standards of hygiene and cleanliness.	Contractor	Daily monitoring
		The contractor shall ensure that his camp and working areas are kept clean and tidy at all times.	Contractor and engineer	Weekly monitoring
3.	Staff conduct	The contractor must monitor the performance of construction workers to ensure that the points relayed during their induction have been properly understood and are being followed. If	Contractor and Engineer	Ongoing monitoring

	Activity	Management/Mitigation	Responsible for Monitoring	Frequency
		necessary, the EE and/or a translator shall be called to the site to further explain aspects of environmental or social behavior that are unclear.		
		The rules explained in the worker conduct section must be followed at all times.	Contractor and engineer	Ongoing monitoring
4.	Dust and air pollution[21]	Vehicles traveling to and from the construction site must adhere to speed limits so as to avoid producing excessive dust.	Engineer	Ongoing monitoring
		A speed limit of 30 kph must be adhered to on all dirt roads.	Engineer	Ongoing monitoring
		Access and other cleared surfaces must be dampened whenever possible, especially in dry and windy conditions, to avoid excessive dust.	Engineer	Ongoing monitoring
		Where dust is unavoidable in residential or commercial areas, screening will be required, utilizing wooden supports and shade cloth.	Engineer	As directed by the engineer
		Vehicles and machinery are to be kept in good working order to meet manufacturers' specifications for safety, fuel consumption, etc.	Contractor	Ongoing monitoring
		Should excessive emissions be observed, the contractor is to have the equipment seen to as soon as possible.	Engineer	As directed by the engineer
		No fires are allowed onsite except for the burning of firebreaks.	Engineer	Ongoing monitoring
5.	Soil erosion	Once an area has been cleared of vegetation, the top layer (nominally 150 mm) of soil shall be removed and stockpiled in the designated area.	Contractor	Ongoing monitoring
		The full length of the works shall not be stripped of vegetation prior to commencing other activities. The time that stripped areas are exposed shall be minimized wherever possible.	Engineer and contractor	Ongoing monitoring
		Topsoiling and revegetation shall commence immediately after the completion of an activity, and at an agreed distance behind any particular work front.	Contractor	As each activity is completed
		Storm water control and wind screening shall be undertaken to prevent soil loss from the site.	Engineer	Ongoing monitoring
		Side tipping of spoil and excavated materials shall not be permitted; all spoil material shall be disposed of as directed by the engineer.[22]	Engineer	Ongoing monitoring
		Battering of all banks shall be such that cut-and-fill embankments are no steeper than previous natural slopes unless	Engineer and contractor	As the cut-and-fill activity is completed

[21] Main causes of air pollution during construction are dust from vehicle movements and stockpiles, vehicle emissions, and fires.

[22] Estimated total volume of unused excavated material to be disposed of is 26,257 m^3.

	Activity	Management/Mitigation	Responsible for Monitoring	Frequency
		otherwise permitted by the engineer. Cut-and -fill embankments steeper than previous ground levels shall be revegetated immediately on completion of trimming, or shall be protected against erosion using bioengineered stabilization measures.		
		All embankments, unless otherwise directed by the engineer, shall be protected by a cut-off drain to prevent water from cascading down the face of the embankment and causing erosion.	Engineer	Immediately after the creation of the embankment/stripping of vegetation
6.	Storm water	The contractor shall not in any way modify nor damage the banks or bed of streams, rivers, wetlands, or other open water bodies and drainage lines adjacent to or within the designated area, unless required as part of the construction project specification. Where such disturbance is unavoidable, modification of water bodies shall be kept to a minimum in terms of removal of riparian vegetation and opening up of the stream channel.	Contractor	Ongoing monitoring
		Earth, stone, and rubble are to be properly disposed of so as not to obstruct natural water pathways over the site, i.e., these materials must not be placed in storm water channels, drainage lines, or rivers.	Engineer	Monitoring throughout the duration of the project
		There shall be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed.	Engineer and contractor	Monthly inspection
		The use of high-velocity storm water pipelines shall be avoided in favor of open, high friction, semipermeable channels wherever feasible.	Engineer and contractor	As directed by the engineer
		A number of smaller storm water outfall points shall be constructed, rather than a few large outfall points.	Engineer and contractor	As directed by the engineer
		Storm water outfalls shall be designed to reduce flow velocity and avoid stream bank and soil erosion.	Engineer and contractor	As directed by the engineer
		During construction, unchanneled flow must be controlled to avoid soil erosion. Where large areas of soil are left exposed, rows of straw/hay or bundles of cut vegetation shall be dug into the soil in contours to slow surface wash and capture eroded soil. The spacing between rows will be dependent on slope.	Engineer and contractor	As surfaces become exposed
		Where surface runoff is concentrated (e.g. along exposed roadways/tracks), flow shall be slowed by contouring with hay bales or bundled vegetation generated during site clearance operation. If the area must be used for construction vehicles, berms may be used instead. The berms must be at	Engineer and contractor	Ongoing monitoring

	Activity	Management/Mitigation	Responsible for Monitoring	Frequency
		least 30 cm high and well compacted. The berms shall channel concentrated flow into detention ponds or areas protected with hay bales for flow reduction and sediment capture.		
7.	Water quality[23]	Mixing/decanting of all chemicals and hazardous substances must take place either on a tray or on an impermeable surface. Waste from these shall then be disposed of at a suitable waste site.	Contractor	Regular monitoring (refer to the environmental monitoring program)
		Every effort shall be made to ensure that any chemicals or hazardous substances do not contaminate the soil or ground water on site.	Contractor	Regular monitoring (refer to the environmental monitoring program)
		Care must be taken to ensure that runoff from vehicle or plant washing does not enter the ground water. Wash water must be passed through a three-chamber oil-grease trap prior to being discharged as effluent to a regular municipal sewer.	Contractor	Regular monitoring (refer to the environmental monitoring program)
		Site staff shall not be permitted to use any stream, river, other open water body, or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing, or for any construction or related activities. Municipal water (or another source approved by the engineer) shall instead be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, concrete mixing, compacting, etc.	Contractor	Regular monitoring (refer to the environmental monitoring program)
		Emergency contact numbers of the SPCB shall be referred to in order to deal with spillages and contamination of aquatic environments.	Engineer and contractor	As necessary
8.	Conservation of natural environment	As the work front progresses, the contractor is to check that vegetation clearing has the prior permission of the engineer.	Engineer	Ongoing monitoring
		Only trees that have not been marked beforehand are to be removed.	Contractor	Ongoing monitoring
		Gathering of firewood, fruit, plants, crops, or any other natural material on site or in areas adjacent to the site is prohibited.	Contractor	Ongoing monitoring
		The hunting of birds and animals onsite and in surrounding areas is forbidden.	Contractor	Ongoing monitoring
		Immediate revegetation of stripped areas and removal of alien species by deweeding must take place. This significantly reduces the amount of time	Contractor	Ongoing monitoring

[23] Water quality is affected by the incorrect handling of substances and materials. Soil erosion, sediment, mismanagement of polluted runoff from vehicle, and plant washing and wind dispersal of dry materials into rivers and watercourses are detrimental to water quality.

	Activity	Management/Mitigation	Responsible for Monitoring	Frequency
		and money that must be spent on alien plant management during rehabilitation.		
		Alien vegetation encroachment onto the site as a result of construction activities must be controlled during construction.	Contractor	Twice-monthly monitoring
		Where possible, cleared indigenous vegetation shall be kept in a nursery for use at a later stage in the site rehabilitation process.	Contractor	As the work front progresses
9.	Materials management	Stockpiles shall not be situated such that they obstruct natural water pathways.	Engineer and contractor	Location as directed by the engineer
		Stockpiles shall not exceed 2 m in height unless otherwise permitted by the engineer.	Engineer	Location as directed by the engineer
		If stockpiles are exposed to windy conditions or heavy rain, they shall be covered either by vegetation or with cloth, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases.	Contractor	As necessary
		Stockpiles shall be kept clear of weeds and alien vegetation growth by regular deweeding.	Contractor	Monthly monitoring
		All concrete mixing must take place on a designated impermeable surface.	Contractor	Ongoing monitoring
		No vehicles transporting concrete to the site may be washed onsite.	Contractor	Ongoing monitoring
		No vehicles transporting, placing, or compacting asphalt or any other bituminous product may be washed onsite.	Contractor	Monthly monitoring
		Lime and other powders must not be mixed during excessively windy conditions.	Contractor	As necessary
		All substances required for vehicle maintenance and repair must be stored in sealed containers until they can be disposed of/removed from the site.	Contractor	Ongoing monitoring
		Hazardous substances/materials are to be transported in sealed containers or bags.	Engineer and contractor	Ongoing monitoring
		Spraying of herbicides/pesticides shall not take place under windy conditions.	Contractor	As necessary
10.	Waste management	Refuse must be placed in designated skips/bins which must be regularly emptied. These shall remain within demarcated areas and shall be designed to prevent refuse from being blown by wind.	Contractor	Ongoing monitoring
		In addition to the waste facilities within the construction camp, provision must be made for waste receptacles to be placed at intervals along the work front.	Contractor	Ongoing monitoring
		Littering onsite is forbidden, and the site shall be cleared of litter at the end of each working day.	Contractor	Ongoing monitoring
		Recycling is to be encouraged by	Contractor	Ongoing monitoring

	Activity	Management/Mitigation	Responsible for Monitoring	Frequency
		providing separate receptacles for different types of waste, and making sure that staff are aware of their uses.		
		All waste must be removed from the site and transported to a disposal site. Waybills proving disposal at each site shall be provided for the engineer's inspection.	Engineer and contractor	Checked at each site meeting
		Construction rubble shall be disposed of in pre-agreed, demarcated spoil dumps that have been approved by the engineer, or at disposal sites.	Engineer and contractor	Ongoing monitoring
		Waste from toilets shall be disposed of regularly and in a responsible manner. Care must be taken to avoid contamination of soils and water, pollution, and nuisance to adjoining areas.	Contractor	Weekly monitoring
		Hazardous waste disposal must be carried out by the contractor in a responsible manner at an approved site. Waybills for this shall be provided.	Contractor and engineer	Ongoing monitoring
		A sump (earth or other) must be created for concrete waste. This is to be desludged regularly, and the cement waste is to be removed to the approved disposal site.	Engineer and contractor	Ongoing monitoring
11.	Social impacts[24]	Contractor's activities and movement of staff shall be restricted to designated construction areas.	Engineer	Ongoing
		Should the construction staff be approached by members of the public or other stakeholders, they shall assist them in locating the engineer or contractor, or provide a number by which they may contact the engineer or contractor.	Engineer and contractor	Ongoing monitoring
		The conduct of the construction staff when dealing with the public or other stakeholders shall be in a manner that is polite and courteous at all times. Failure to adhere to this requirement may result in the removal of staff from the site by the engineer.	Engineer	Ongoing monitoring
		Disruption of access for local residents must be minimized and must have the engineer's permission.	Engineer	Ongoing monitoring
		Provide walkways and metal sheets where required to maintain access across for people and vehicles.	Contractor	Ongoing monitoring
		Increase workforce in front of critical areas such as institutions, places of worship, business establishments, hospitals, and schools.	Contractor	Ongoing monitoring
		Consult businesses and institutions	Engineer and	At least 1 week prior

[24] Regular communication between the contractor and the interested and affected parties is important for the duration of the contract.

	Activity	Management/Mitigation	Responsible for Monitoring	Frequency
		regarding operating hours, and factor this in work schedules.	contractor	to the activity taking place
		The contractor is to inform neighbors in writing of disruptive activities at least 24 hours beforehand. This can take place by way of leaflets placed in the postboxes giving the engineer's and contractor's details or other method approved by the engineer. Provide signboards for pedestrians to inform them of nature and duration of construction works and contact numbers for concerns/complaints.	Engineer and contractor	At least 24 hours prior to the activity taking place
		Lighting on the construction site shall be pointed downwards and away from oncoming traffic and nearby houses.	Engineer	Ongoing monitoring
		The site must be kept clean to minimize visual impact.	Engineer	Weekly monitoring
		If screening is being used, this must be moved and re-erected as the work front progresses.	Engineer	Ongoing monitoring
		Machinery and vehicles are to be kept in good working order for the duration of the project to minimize noise nuisance to neighbors.	Contractor	Ongoing monitoring
		Notice of particularly noisy activities must be given to residents/businesses adjacent to the construction site. Examples of these include noise generated by jackhammers, diesel generator sets, excavators, etc., drilling, and dewatering pumps.	Engineer and contractor	At least 24 hours prior to the activity taking place
		Noisy activities must be restricted to the times given in the project specification or general conditions of the contract.	Engineer	Ongoing monitoring
		The engineer and contractor are responsible for ongoing communication with those people who are interested in or affected by the project.	Engineer and contractor	
		A complaints register (refer to the grievance redress mechanism) shall be housed at the site office. This shall be in carbon copy format, with numbered pages. Any missing pages must be accounted for by the contractor. This register is to be tabled during monthly site meetings.	Contractor	Monthly monitoring
		Interested and affected parties need to be made aware of the existence of the complaints book, and the methods of communication available to them.	Engineer and contractor	Ongoing monitoring
		Queries and complaints are to be handled by: (i) documenting details of such communications; (ii) submitting these for inclusion in complaints register; (iii) bringing issues to engineer's attention immediately; and (iv) taking remedial action as per engineer's instruction.	Contractor	Ongoing monitoring

	Activity	Management/Mitigation	Responsible for Monitoring	Frequency
		Selected staff are to be made available for formal consultation with the interested and affected parties in order to explain construction process and answer questions.	Contractor	Ongoing monitoring
12.	Cultural environment	Possible items of historical or archaeological value include old stone foundations, tools, clayware, jewelry, remains, fossils, etc.	Engineer	As required
		If something of this nature should be uncovered, ASI or the State Department of Archaeology shall be contacted and work shall be stopped immediately.	Engineer and EE	As required
13.	Environment safeguard officer	Contractor shall appoint one environment safeguard officer who shall be responsible for assisting contractor in implementation of EMP, community liaison, consultations with interested/affected parties, reporting, and grievance redressal on a day-to-day basis.	Engineer and EE	Person to be appointed before start of construction activities, and shall remain available throughout the project duration

ASI = Archeological Survey of India; EE = environmental expert of engineer (DSC).

157. Table 30 outlines the post-construction activities.

Table 30: Post-Construction Activities

	Activities	Management/Mitigation	Responsible for Monitoring	Frequency
1.	Construction camp	All structures comprising the construction camp are to be removed from site.	Engineer	Subproject completion
		The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc., and these shall be cleaned up.	Engineer	Subproject completion
		All hardened surfaces within the construction camp area shall be ripped, all imported materials removed, and the area shall be topsoiled and regrassed using the guidelines set out in the revegetation specification that forms part of this document.	Engineer	Subproject completion
		The contractor must arrange the cancellation of all temporary services.	Engineer	Subproject completion
2.	Vegetation	All areas that have been disturbed by construction activities (including the construction camp area) must be cleared of alien vegetation.	Engineer	Subproject completion
		Open areas are to be replanted as per the revegetation specification.	Engineer	Subproject completion
		All vegetation that has been cleared during construction is to be removed from site or used as much as per the revegetation specification (except for seeding alien vegetation).	Engineer	Subproject completion
		The contractor is to water and maintain all planted vegetation until the end of the defects liability period, and is to submit a method statement regarding this to the engineer.	Engineer	Subproject completion

	Activities	Management/Mitigation	Responsible for Monitoring	Frequency
3.	Land rehabilitation	All surfaces hardened due to construction activities are to be ripped and imported materials removed.	Contractor	Subproject completion
		All rubble is to be removed from the site to an approved disposal site. Burying of rubble onsite is prohibited.	Contractor	Subproject completion
		The site is to be cleared of all litter.	Contractor	Subproject completion
		Surfaces are to be checked for waste products from activities such as concreting or asphalting, and cleared in a manner approved by the engineer.	Contractor	Subproject completion
		All embankments are to be trimmed, shaped, and replanted to the satisfaction of the engineer.	Engineer and contractor	Subproject completion
		Borrow pits are to be closed and rehabilitated in accordance with the pre-approved management plan for each borrow pit. The contractor shall liaise with the engineer regarding these requirements.	Engineer	Subproject completion
		The contractor is to check that all watercourses are free from building rubble, spoil materials, and waste materials.	Contractor	Subproject completion
4.	Materials and infrastructure	Fences, barriers, and demarcations associated with the construction phase are to be removed from the site unless otherwise stipulated by the engineer.	Engineer	Subproject completion
		All residual stockpiles must be removed to spoil or spread onsite as directed by the engineer.	Engineer	Subproject completion
		All leftover building materials must be returned to the depot or removed from the site.	Contractor	Subproject completion
		The contractor must repair any damage that the construction work has caused on neighboring properties.	Contractors	As directed by the engineer
5.	General	A meeting is to be held onsite among the engineer, EE, and contractor to approve all remediation activities and to ensure that the site has been restored to a condition approved by the engineer.	Engineer and EE	Upon completion of the construction and maintenance phases
		Temporary roads must be closed, and access across these blocked.	Engineer and EE	Upon completion of construction
		Access or haulage roads that were built across watercourses must be rehabilitated by removing temporary bridges and any other materials placed in or near to watercourses. Revegetation of banks or streambeds is necessary to stabilize these, and must be approved by the engineer.	Engineer and contractor	Upon completion of construction
		All areas where temporary services were installed are to be rehabilitated to the satisfaction of the engineer.	Engineer and contractor	Upon completion of construction

EE = environmental expert of engineer (DSC).

C. Environmental Monitoring Program

158. Table 31 outlines the environmental monitoring program to ensure implementation of the management and mitigation measures specified in the EMP. The table shall be read within the context of the entire EMP.

Table 31: Environmental Monitoring Program

Aspect	Parameter	Standards	Location	Duration / Frequency	Implementation	Supervision
1. Site establishment and preliminary activities						
Legislation, permits, and agreements	Consent for establishment and consent to operate (in relation to hot mixing, wet mixing, batching plant, stone crushers, and diesel generators)	Air Act Water Act Noise Act	-	Prior to moving onto site and during construction	Contractor	Engineer/EE/ PMU/PSC
	Cutting permit for scheduled trees	Jammu and Kashmir Preservation of Species Act	-	Prior to moving onto site	Engineer and PIU	PMU/PSC
	Copy of EMP	EARF and ADB SPS	Subproject site, offices, website, library, etc.	At all times	Contractor, engineer, and EE	PMU/PSC
Access to site	Existing conditions	EMP	All access and haul roads	Prior to moving onto site	Engineer, EE, and contractor	PMU/PSC
	Road closures and traffic rerouting	Traffic management plan and EMP	All affected roads	One week in advance of the activity	Engineer and EE	PMU/PSC
	Notifications and road signages	Traffic management plan and EMP	All affected roads	1 week in advance of the activity	Engineer and EE in coordination with the contractor and traffic police	PMU/PSC
Construction camp	Approval of location and facilities	EMP	As identified	Prior to moving onto site	Contractor with the Engineer and EE	PMU/PSC
Equipment lay-down and storage area	Approval of location and facilities	EMP	As identified	Prior to moving onto site and during site set-up	Contractor with the engineer and EE	PMU/PSC
Materials management – sourcing	Approval of sources and suppliers	EMP	As identified	Prior to procurement of materials	Contractor with the engineer and EE	PMU/PSC
Education of site staff	Awareness level training - Environment - Health and safety	EMP and records	-	During staff induction, followed by schedule as determined	Contractor with the engineer and EE	PMU/PSC
Social impacts	Public consultations, information disclosure, communication	EARF, ADB SPS, and EMP	Subproject site	Prior to moving onto site and ongoing	Contractor with the engineer, EE, and PIU/PSC	PMU

Aspect	Parameter	Standards	Location	Duration / Frequency	Implementation	Supervision
	strategy					
	GRM register	EMP	Subproject site	Prior to moving onto site and ongoing	Contractor with the engineer, EE, and PIU	PMU/PSC
Noise	Baseline data for noise level in dB(A) L_{eq}	National Noise Standards	Four locations near construction sites as specified by the engineer	Prior to site set-up	Engineer and EE in coordination with the environmental monitoring laboratory of ERA	PMU/PSC
Air quality	Baseline ambient data for particulate matters 10 and 2.5 (PM_{10}, $PM_{2.5}$), sulfur dioxides (SO_2), nitrogen dioxide (NO_2)	National Ambient Air Quality Standards	Four locations near construction sites as specified by the engineer	Prior to site set-up	Engineer and EE in coordination with the environmental monitoring laboratory of ERA	PMU/PSC
Soil erosion	Soil erosion management measures	EMP	As identified by the engineer	During site set-up and throughout the duration of the subproject	Contractor with the engineer and EE	PMU/PSC
Storm water	Storm water management measures	EMP	As identified by the engineer	During site set-up and throughout the duration of the subproject	Contractor with the engineer and EE	PMU/PSC
Water quality	Baseline qualitative characteristics	EMP	Subproject sites[25]	Prior to site set-up	Contractor with engineer and EE	PMU/PSC
Conservation of natural environment	Existing conditions	EMP	Subproject sites	Prior to site set-up	Contractor with engineer and EE	PMU/PSC
Waste management procedure	Disposal sites	EMP	As determined	Prior to site set-up and ongoing throughout the subproject	Contractor with engineer and EE	PMU/PSC
Cultural environment	Chance finds	ASI Act and EMP	As determined	Prior to site set-up and ongoing throughout the subproject	Contractor with engineer and EE	PMU/PSC
2. Construction phase						
Access to site	Qualitative characteristics	Pre-subproject	All access and haul	Refer to EMP (table	Contractor	Engineer

[25] Subproject sites include approved construction site, equipment lay-down and storage area, watercourses along the subproject site, open drainages

Aspect	Parameter	Standards	Location	Duration / Frequency	Implementation	Supervision
		condition and EMP	roads	on management of construction and workforce activities)		
Construction camp	Qualitative characteristics	Pre-subproject condition and EMP	All access and haul roads	refer to EMP (table on management of construction and workforce activities)	Contractor	Engineer
Staff conduct	Site records (accidents, complaints)	EMP	Subproject sites	Ongoing	Contractor	Engineer
Air quality	PM_{10}, $PM_{2.5}$, SO_2, NO_2	National Ambient Air Quality Standards	Two locations near construction sites as specified by the engineer (DSC).	Once in 4 months (three times a year)	Contractor in close coordination with the engineer and environmental monitoring laboratory of ERA	PMU/PSC
Soil erosion	Soil erosion management measures	EMP	Subproject sites	Ongoing	Contractor	Engineer
Storm water	Soil erosion management measures	EMP	Subproject sites	Ongoing	Contractor	Engineer
Water quality	Qualitative characteristics	EMP and preexisting conditions	Subproject sites	Ongoing	Contractor	Engineer
Conservation of natural resources	Number of scheduled trees	Tree-cutting permit and EMP	Subproject sites	Ongoing	Contractor	Engineer
	Vegetation conditions	EMP	Subproject sites	Ongoing	Contractor	Engineer
Materials management	Qualitative characteristics	EMP	Subproject sites	Ongoing	Contractor	Engineer
Waste management	Qualitative characteristics	EMP	Subproject sites	Ongoing	Contractor	Engineer
	Disposal manifests	EMP	Subproject sites	Ongoing	Contractor	Engineer
Social impacts	Public consultations, information disclosure, communication strategy	EARF, ADB SPS, and EMP	Subproject sites	Ongoing	Contractor with the engineer, EE, and PIU	PMU/PSC
	GRM register	EMP	Subproject sites	Ongoing	Contractor with the engineer, EE, and PIU	PMU/PSC
Cultural environment	Chance finds	ASI Act and EMP	Subproject sites	Ongoing	Contractor	Engineer
Noise quality	Noise Level in dB(A) L_{eq}	National Noise	Two locations	Once in 4 months	Environmental monitoring	PMU/PSC

Aspect	Parameter	Standards	Location	Duration / Frequency	Implementation	Supervision
		Standards	near construction sites as specified by the engineer (DSC).	(three times a year)	laboratory of ERA	
3. Post-construction activities						
Construction camp	Preexisting conditions	EMP	Construction camp	Subproject completion	Contractor	Engineer
Vegetation	Preexisting conditions	Tree-cutting Permit and EMP	Subproject sites	Subproject completion	Contractor	Engineer
Land rehabilitation	Preexisting conditions	EMP	Subproject sites	Subproject completion	Contractor	Engineer
Materials and infrastructure	Preexisting conditions	EMP	Subproject sites	Subproject completion	Contractor	Engineer
General	Records	EMP	Subproject sites	Subproject completion	Contractor with engineer and EE	PMU/PSC
4. Operation and maintenance (defect liability period)						
Air quality	PM_{10}, $PM_{2.5}$, SO_2, NO_2	National Ambient Air Quality Standards	Two locations as specified by the ERA	Once in 6 months (defect liability period)	Environmental monitoring laboratory of ERA	PMU/PSC
Noise quality	Noise level in dB(A) L_{eq}	As per National Noise Standards	Two locations as specified by the ERA	Once in 6 months (defect liability period)	Environmental monitoring laboratory of ERA	PMU/PSC

EE = environmental expert of engineer (DSC)

D. Environmental Management and Monitoring Cost

159. The contractor's cost for site establishment, preliminary, construction, and defect liability activities will be incorporated into the contractual agreements, which will be binding on him for implementation. The air quality, surface water quality, and noise level monitoring of construction and defect liability phases will be conducted by the contractor.

160. The operation phase mitigation measures are again of good operating practices, which will be the responsibility of the implementing agency (ERA). The air quality and noise level monitoring during the operation and maintenance phase will be conducted by the environmental laboratory of ERA; therefore, there are no additional costs.

161. The activities identified in the environmental monitoring program mainly include site inspections and informal discussions with workers and local people, and this will be the responsibility of the PMU and PSC with the assistance of DSC, costs of which are part of project management.

162. Table 32 presents the estimated cost to implement the EMP.

Table 32: Indicative Cost for EMP Implementation

Component	Description	Number	Cost per Unit (INR)	Cost (INR)	Source of Funds
Legislation, permits, and agreements	Consent to establish and consent to operate for plants and machinery of the contractor	As required			These consents are to be obtained by contractor on his own cost.
Public consultations and information disclosure	Construction phase	Lump sum	500,000	500,000	
Baseline monitoring	Site preparation and preliminary activities				
Air		Four	7,000 per sample	28,000	Contractor's cost
Noise		Four	1,000 per sample	4,000	Contractor's cost
Dust suppression at subproject sites	Construction and defect liability phases	Lump sum	800,000	800,000	Contractor's cost
Traffic management	Safety signboards, delineators, traffic regulation equipment, flagman, temporary diversions, etc.				Included in engineering cost
Compensation for cutting of trees[26]	Compensation for tree-cutting with requisite permits	Lump sum	250,000	250,000	
Compensatory plantation[27]	497 x 2 = 994 (@1:2)	Lump sum	500,000	500,000	
Construction monitoring					
Air	Once in 4 months at two locations (for 3 years, total of 18 samples)	18	7,000 per sample	126,000	
Noise	Once in 4 months at two locations (for 3 years, total of 18 samples)	18	1,000 per sample	18,000	
Defects liability period (6 months)					
Air	Once at two locations	2	7,000 per sample	14,000	
Noise	Once at two locations	2	1,000 per sample	2,000	

[26] Compensation for cutting of trees involves cost of requisite permits from the concerned departments and the cost required to be paid to the owner of the trees after assessment by forest/sericulture/horticulture department.

[27] Compensatory plantation involves the cost of plantation and maintenance of the trees at a ratio of 1:2 (i.e. planting double the number of trees actually cut).

TOTAL (INR)	**2,242,000**	
TOTAL (USD)	**47,702.12**	

IX. CONCLUSION AND RECOMMENDATIONS

163. The process described in this document has assessed the environmental impacts of all elements of the infrastructure proposed under the elevated expressway corridor subproject in Srinagar City. Potential negative impacts were identified in relation to pre- construction and operation of the improved infrastructure, but no environmental impacts were identified as being due to either subproject design or location. Mitigation measures have been developed to reduce all negative impacts to acceptable levels. These were discussed with specialists responsible for the engineering aspects, and as a result some measures have already been included in the designs for the infrastructure. This means that the number of impacts and their significance have already been reduced by amending the design.

164. The public participation processes undertaken during project design ensure that stakeholders are engaged during the preparation of the IEE. The planned information disclosure measures and process for carrying out consultation with affected people will facilitate their participation during project implementation.

165. The subproject's grievance redress mechanism will provide the citizens with a platform for redress of their grievances, and describes the informal and formal channels, time frame, and mechanisms for resolving complaints about environmental performance.

166. The EMP will guide the environmentally sound construction of the subproject and ensure efficient lines of communication among the DSC (engineer), contractors, PIU, and PMU/PSC. The EMP will (i) ensure that the activities are undertaken in a responsible and non-detrimental manner; (ii) provide a proactive, feasible, and practical working tool to enable the measurement and monitoring of environmental performance onsite; (iii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iv) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (v) ensure that safety recommendations are complied with.

167. A copy of the EMP will be kept onsite during the construction period at all times. The EMP will be made binding on all contractors operating on the site, and will be included in the contractual clauses. Noncompliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

168. The subproject is unlikely to cause significant adverse impacts. The potential adverse impacts that are associated with design, construction, and operation can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures.

169. Therefore, as per ADB SPS, the subproject is classified as environmental category B and does not require further environmental impact assessment.

APPENDIX 1: Rapid Environmental Assessment (REA) Checklist

ROADS AND HIGHWAYS

Country/Project Title: India/J and K Urban Sector Development Investment Programme

Sector Division: Urban Transport

Screening Questions	Yes	No	Remarks
A. Project Siting Is the project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site		√	Burzhama archaeological site (distance of 20 km), historical Jamia Masjid (distance of 7km), Pathar Masjid (distance of 5 km), Hazratbal Shrine (distance of 15 km), and Chati Padshahi Gurudwara (distance of 8 km). However, these sites are located far away from the proposed subproject, which will have no impact on any of these places, and therefore no adverse impact is anticipated.
▪ Protected area		√	Dachigam National Park (20 km from the proposed subproject site)
▪ Wetland		√	
▪ Mangrove		√	
▪ Estuarine		√	
▪ Buffer zone of protected area		√	Dachigam National Park (20 km from the proposed subproject site)
▪ Special area for protecting biodiversity		√	Dachigam National Park (20 km from the proposed subproject site)
B. Potential Environmental Impacts Will the project cause…			
▪ encroachment on historical/cultural areas; disfiguration of landscape by road embankments, cuts, fills, and quarries?		√	No such impact is anticipated.
▪ encroachment on precious ecology (e.g. sensitive or protected areas)?		√	No
▪ alteration of surface water hydrology of waterways crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site?		√	No such impact is anticipated. The proposed subproject does not cross any perennial water body. However, there may be a minor increase in sediment load of rainfall run off for a short duration only.
▪ deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?		√	No such impact is anticipated.
▪ increased local air pollution due to rock crushing, cutting and filling works, and chemicals from asphalt processing?	√		A slight increase in local air pollution due to cutting and filling works and other associated construction activities is anticipated. This impact shall be temporary, site-specific, and reversible in nature.
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?		√	No such impact is anticipated. However, proper mitigation measures shall be taken to avoid any unanticipated health and safety issues.

▪ noise and vibration due to blasting and other civil works?	√		Noise level is expected to increase during construction activities, but it will be temporary, localized, and reversible. This shall be mitigated by taking necessary precautionary measures.
▪ dislocation or involuntary resettlement of people?	√		Resettlement plan will be needed in accordance with agreed resettlement framework.
▪ dislocation and compulsory resettlement of people living in right-of-way?	√		Details provided in social section of the report
▪ disproportionate impacts on the poor, women and children, indigenous peoples, or other vulnerable groups?		√	No such impact is envisaged.
▪ other social concerns relating to inconveniences in living conditions in the project areas that may trigger cases of upper respiratory problems and stress?		√	No such impact is anticipated. However, minor dust will be generated during the construction period, which will be localized and for a short duration only.
▪ hazardous driving conditions where construction interferes with preexisting roads?	√		Traffic blockages may be expected during construction stage. A traffic management plan shall have to be properly implemented to avoid any such situation.
▪ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases (such as STIs and HIV/AIDS) from workers to local populations?		√	No such impact is anticipated. Preference will be given to local laborers, and migratory labor shall be employed under unavoidable circumstances only.
▪ creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents?		√	No such impact is anticipated.
▪ accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials?	√		A traffic management plan shall be required for ensuring smooth flow of traffic and to avoid any such condition.
▪ increased noise and air pollution resulting from traffic volume?	√		Slight increase in noise and air pollution resulting from traffic volume is anticipated during construction stage. This will be temporary, site-specific, and reversible in nature.
▪ increased risk of water pollution from oil, grease and fuel spills, and other materials from vehicles using the road?		√	No such condition is anticipated.
▪ social conflicts if workers from other regions or countries are hired?		√	No such conflicts are anticipated. Preference will be given to local laborers, and migratory labor shall be employed under unavoidable circumstances only.
▪ large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		√	No such impact is anticipated.
▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel, and other chemicals during construction and operation?		√	No such impact is anticipated.
▪ community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community, or where their failure could result in injury to the community throughout project construction, operation, and decommissioning?	√		Community safety risks due to both accidental and natural causes can be anticipated in extreme cases. However, these have to be taken due care of while designing the various project components.

Climate Change and Disaster Risk Questions	**Yes**	**No**	**Remarks**

The following questions are not for environmental categorization. They are included in this checklist to help identify potential climate and disaster risks.			
• Is the project area subject to hazards such as earthquakes, floods, landslides, tropical cyclone winds, storm surges, tsunami, or volcanic eruptions and climate changes?		√	The area is not subject to floods, landslides, tropical cyclone winds, storm surges, tsunami, volcanic eruptions, and localized climate changes. However, the subproject area falls in Seismic Zone V as per the seismic zonation map of India.
▪ Could changes in temperature, precipitation, or extreme events patterns over the project lifespan affect technical or financial sustainability (e.g., increased erosion or landslides could increase maintenance costs, permafrost melting or increased soil moisture content could affect subgrade).		√	No
▪ Are there any demographic or socioeconomic aspects of the project area that are already vulnerable (e.g., high incidence of marginalized populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)?		√	No
▪ Could the project potentially increase the climate or disaster vulnerability of the surrounding area (e.g., by encouraging settlement in areas that will be more affected by floods in the future, or encouraging settlement in earthquake zones)?		√	No

APPENDIX 2

Traffic Management Plan

1. A traffic management plan (TMP) has been developed to cope with road traffic disruptions likely to be encountered with the commencement of work on the flyover/elevated expressway corridor from Jehangir Chowk to Rambagh-Natipora. It calls for coordinated actions from the authorities and the different services responsible for road/traffic management on a given road or network.

The TMP, managed by a coordinating authority, relies on:

- A structured organization at an operational level, comprising:
  - decisional organization involving authorities; and
  - functional organization involving the services who implement the decisions made.
- Specific organization means related to the transmission of information to end users, and coordinating measures related to traffic management and road traffic information.

Principles for Traffic Management Plan

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

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

Operating Policies for TMP

Analyze the impact due to street closure

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

(i) approval from the ward office or community to use the local streets as detours;
(ii) consultation with businesses, community members, traffic police, Department of Roads, etc. regarding the mitigation measures necessary at the detours where the road is diverted during the constructions;
(iii) determination of the maximum number of days allowed for road closure and incorporation of such provisions into the contract documents;
(iv) determination if additional traffic control or temporary improvements are needed along the detour route;
(v) considering how access will be provided to the worksite;
(vi) contacting emergency service, school officials, and transit authorities to determine if there are impacts to their operations; and
(vii) developing a notification program to the public so that the closure is not a surprise. As part of this program, the public shall be advised of alternate routes that commuters can take or will have to take as result of the traffic diversion.

4. If full road closure of certain streets within the area is not feasible due to inadequate capacity of the street or public opposition, the full closure can be restricted to weekends, with

the construction commencing on Friday night and ending on Sunday morning prior to the morning peak period.

Public awareness and notifications

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

6. The awareness campaign and the prior notification for the public will be a continuous activity which the project will pursue to compensate for the above delays and minimize public claims as a result of these problems. These activities will take place sufficiently in advance of the time when the roadblocks or traffic diversions take place at the particular streets. The reason for this is to allow sufficient time for the public and residents to digest the changes to their travel plans. ERA will notify the public about the roadblocks and traffic diversion through the print, TV, and radio media.

7. In order to ensure that the TMP is drawn up in a homogeneous manner, the area covered by the TMP can be split into two levels:

- the main network, directly concerned with the traffic disruptions that are to be dealt with; and
- the alternative network, made up of alternative roads to the main route, which in this case comprises mainly motorways.

Main network

8. The main network is made up of the following motorway sections:

1. Two-way traffic on Indira Gandhi Road (four-lane divided carriageway) from Jehangir Chowk to Solina, Haft Chinar Airport, Sanatnagar, Rawalpora, Gogoland, Old Airport, New Airport Road, and Budgam
2. Two-way traffic on Indira Gandhi Road (four-lane divided carriageway) from Jehangir Chowk to Rambagh intersection, Natipora, Nowgam, Bagat Kanipora, and Khanda
3. Two-way traffic on Indira Gandhi Road (four-lane divided carriageway) from Jehangir Chowk to Channapora, Baghe-i-Mehtab, Kralpora, Chadoora, Nagam, and Chrar-e-Sharief.

Alternative network

9. The main network comprises the following routes:

1. During construction of flyover, about 12-15 m in the middle of the road will be blocked for traffic movement with barricades. Aerodrome Road between Jehangir Chowk and Bund Road will be made one way, northbound. Traffic will move on both sides of remaining road in northbound direction only.
2. Road along the bank of flood relief channel will be converted into a westbound one-way road.
3. Two parallel roads east of Project Road (east of Amar Singh College) will be converted into southbound one-way roads as shown in drawing.
4. One-way loops near Jehangir Chowk will be provided and maintained as exists.

5. East-west connecting road between Residency Road and Aerodrome road will be converted into an eastbound one-way road.
6. In case of congestion on Project Road, traffic also will be diverted on to five alternatives west on Project Road through Batmaloo area, as shown in drawing.
7. Traffic from Batmaloo towards the south (Hyderpora, Natipora, Budgam etc.) will be diverted through Tengpora via NH Bypass.

10. In order to achieve smooth traffic movement with the above traffic diversion plan, the following measures are required:

(i) Existing footpaths along the subproject road are to be leveled with carriageway to the extent possible.
(ii) Enforcement of one-way system requires adequate traffic police. Although the TMP has been discussed with the traffic department, details of deployment of traffic police can be given only after traffic diversion plan is approved.
(iii) Parking of vehicles shall be banned along the subproject road during construction.
(iv) Parking of vehicles will be banned on the subproject road.
(v) Removal of temporary and permanent encroachments is very important for successful traffic management.
(vi) A smooth road for quick dispersal of traffic shall be provided.

Traffic Monitoring Strategy

11. The traffic monitoring strategy that will be implemented during the construction of the subproject is as follows:

i) **Onsite visits and traffic counts**. Onsite visits will be carried out through relevant government authorities as required by the project implementation unit (PIU)/consultants/other agencies, if any, during construction for monitoring of vehicles that are diverted as part of the TMP.

ii) **Adjustments to traffic signal settings.** For the subproject, temporary traffic control will be used to direct traffic around work zones during the working phase as given below.

- Different traffic signals in the form of cones, advanced warning signs, and flagmen will be used during the construction phase.
- All workers exposed to traffic must be attired in bright, contrasting, highly visible upper body garments, similar to that of flagmen.
- Provisions will be made for the movement of emergency vehicles in or around the construction site.

iii) **Pedestrian accommodation**. Every effort will be made to separate the movement of pedestrians from both the worksite activity and the adjacent traffic. The following steps will be adopted to accommodate pedestrians**:**

- Pedestrians will be provided with a reasonably safe, convenient, and accessible path that replicates the most desirable characteristics of the existing sidewalks or footpaths.
- Pedestrian information will be provided throughout the construction period in the form of clearly defined advanced warning signages.

- Clearly define transition to pedestrian detour routes or alternate walking paths.
- Barriers and channelizing devices should be visible to pedestrians.
- Clearly separate the work area from pedestrians.

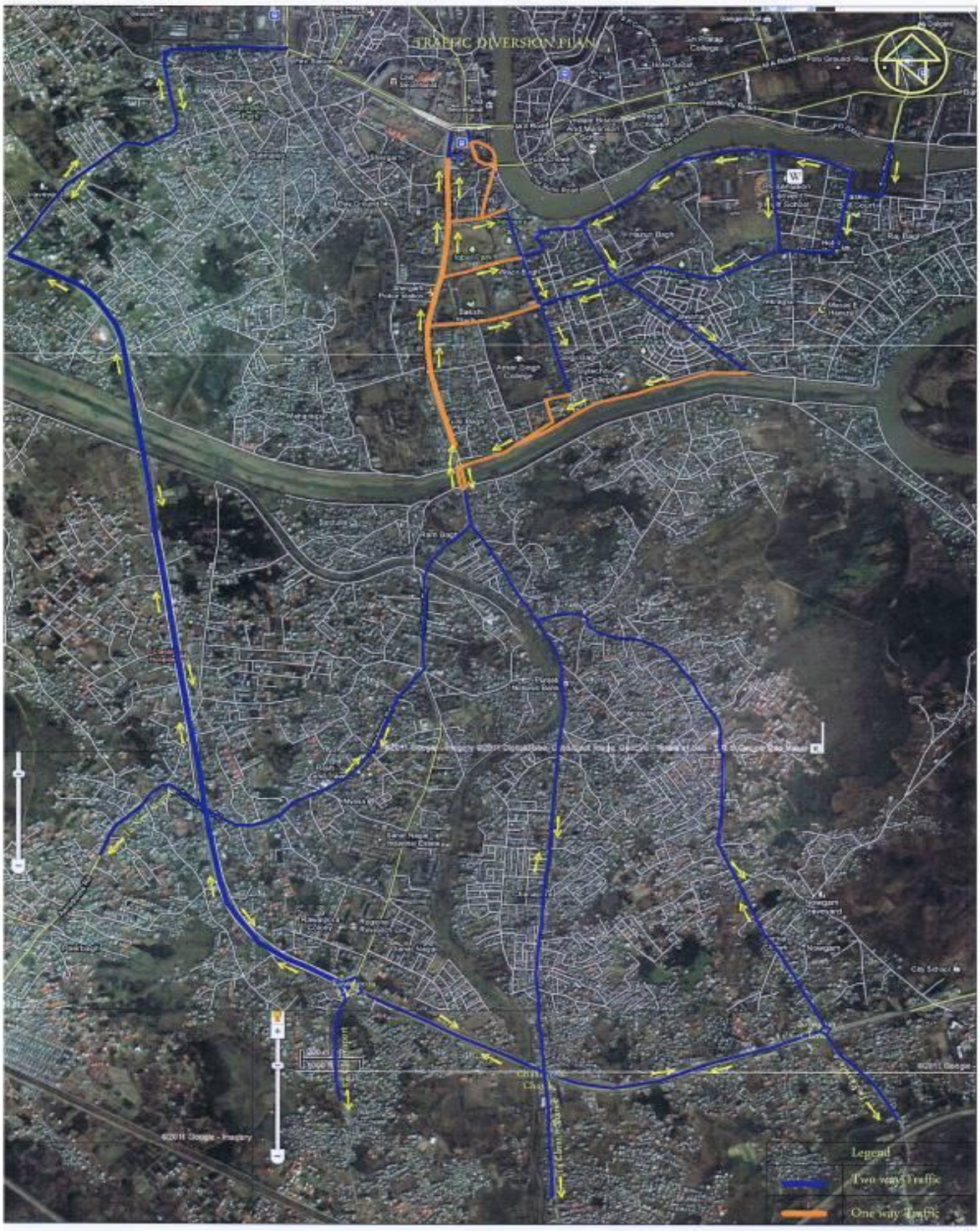
Pedestrian Protection

- Positive protection will separate vehicles from pedestrians and pedestrians from work area.
- Use channelizing devices to delineate the route (must be detectable).
- Protect pedestrians from vehicular traffic (positive protection).
- Protect pedestrians from hazards such as excavated pits, holes, cracks, and debris.
- Advanced signages will be placed at intersections.

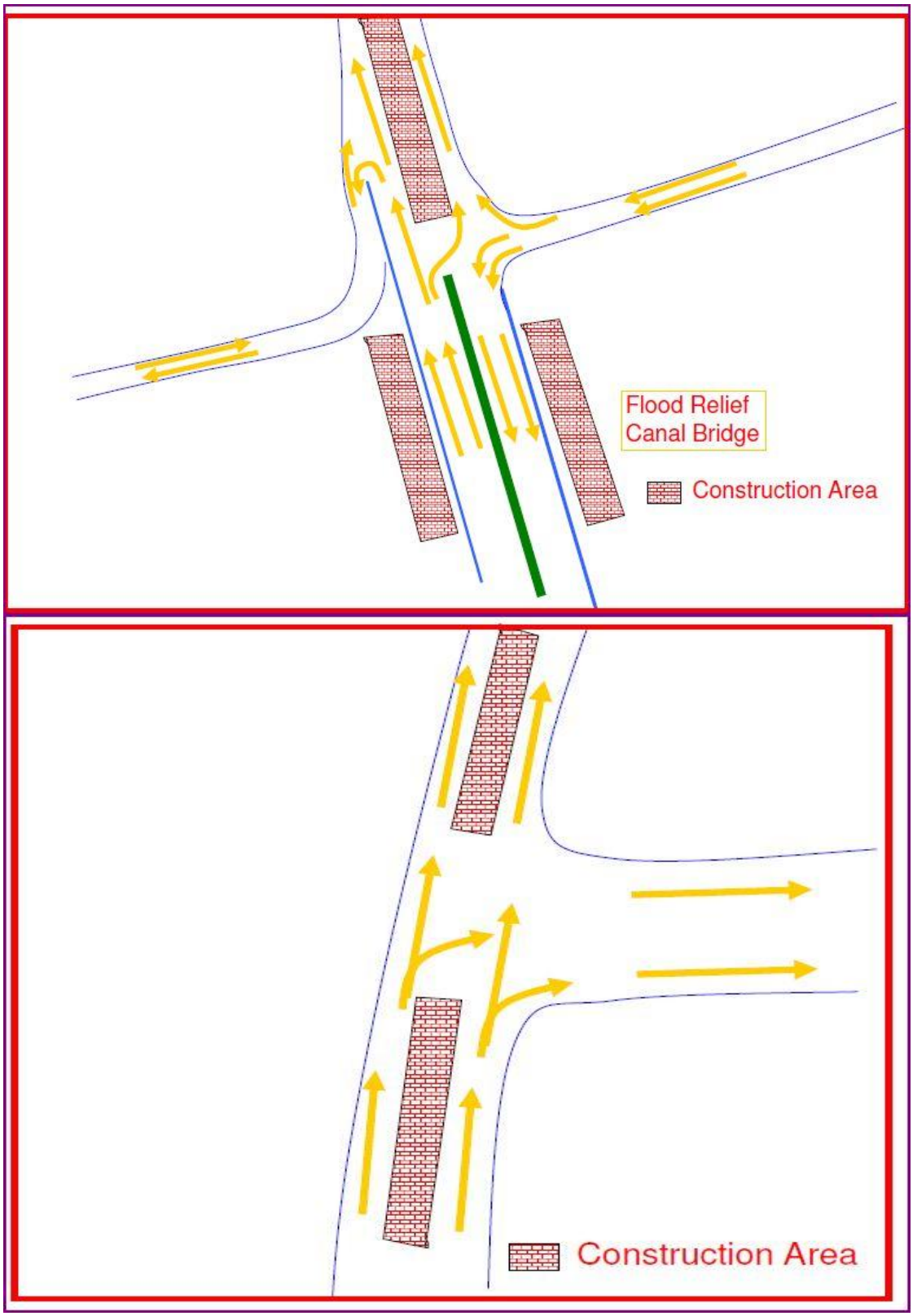
iv) Adjustments necessary for public transport operators

12. Different diversions will be used as part of the traffic management plan in order to provide a smooth flow of traffic during the construction phase of the subproject. However, small adjustments will be necessary, such as follows:

- Following of diversions will increase the length of travel time; therefore, adjustments in terms of early departure are required from public transport operators.
- Adjustments in terms of speed are needed at or near construction sites.
- Lane driving and avoidances of overtaking are required.
- “No Parking" zones must be observed
- Avoid unnecessary halting of vehicles.



Traffic Management Plan



Traffic Intersections (Circulation Plan) During Construction

APPENDIX 3: Public Consultation

Subproject: FLYOVER/EXPRESSWAY CORRIDOR FROM JEHANGIR CHOWK TO RAMBAGH-NATPORA IN SRINAGAR CITY

Issues discussed:

- awareness and extent of knowledge about the subproject;
- information on the benefits of the subproject in terms of economic and environmental enhancement;
- information on perceived benefits from the proposed subproject, including reduction in traffic congestion, travel time, fuel cost, and noise;
- information on perceived losses from the proposed subproject during execution in terms of increase in traffic congestion, air and noise pollution, etc.;
- presence of any historical/cultural site in the vicinity;
- information on trees to be cut and measures to be taken for compensatory plantation;
- presence of any protected area/wetland in or adjoining the construction site; and
- information on economic development in terms of rapid transit of goods and generation of direct employment during the execution of the subproject.

1. **Date and time of consultation:** 19 May 2011 at 11 a.m.
   Location: Jehangir Chowk, Rambagh, and Natipora

2. **Date and time of consultation**: 20 May 2011 at 11 a.m.
   Location : Jehangir Chowk, Rambagh, and Natipora

Public Consultation Details

S.No	Issues Discussed	Feedback Received	Remarks
1	Awareness and extent of knowledge about the subproject	Generally, all the people consulted were well aware of the proposed subproject.	Public consultation in different forms like one-on-one consultation, circulation of questionnaire, group discussions, etc. need to be a continuous process.
2	Information on the benefits of the subproject in terms of economic and environmental enhancement	People are fed up with the frequent traffic jams and want the subproject to be fast-tracked so that this problem is eliminated. In addition, people belonging to labor force wanted to be provided employment during the subproject execution.	It needs to be ensured that the contracting firm for the subproject employs, to the maximum possible extent, the local work force during the execution of the subproject.
3	Information on perceived benefits from the proposed subproject, including reduction in traffic congestion, travel time, fuel cost, and noise	People in general were very enthusiastic about the benefits of the subproject in terms of reduction/elimination of traffic jams, reduction in travel time and fuel cost, and also an improvement in the air quality in terms of reduced accumulation of emissions from vehicles and a reduction in noise levels.	-
4	Information on perceived losses from the proposed subproject during	People desired that an efficient traffic management plan shall	A practical and efficient traffic management plan

	execution in terms of increase in traffic congestion, air and noise pollution, etc.	be in place before the construction works are started so that problems like traffic congestion and air and noise pollution shall be kept to the minimum.	needs to be put in place before the start of construction work.
5	Presence of any historical/cultural site in the vicinity	There is no historical/cultural site in the corridor of the subproject.	-
6	Presence of any protected area/wetland in or adjoining the construction site	There is no protected area/wetland in the corridor of the subproject.	
8	Information on economic development in terms of rapid transit of goods and generation of direct employment during the execution of the subproject	People were well aware of the benefits of the subproject in terms of facilitation via rapid transit of goods and other materials. In addition, people at large were aware of the fact that during the execution of the subproject a large number of skilled/semi-skilled people will be employed, and thus they were very eager about the start of construction work.	
9	Privacy of people living in the subproject corridor	People living in the immediate vicinity of the proposed subproject raised their concern about maintaining their privacy once the elevated express road is in place.	It needs to be ensured that proper shields and barriers are erected on either side of the proposed expressway so that the privacy of the people living in the close vicinity of the subproject is protected.

List of participants

S.No	Name	Address	Occupation
1	Abdul Rashid Bathoo		Shopkeeper
2	Ashiq Hussain Bhat	Magarmal Bagh Crossing	Business
3	Ashiq Hussain Quershi		Shopkeeper
4	Ghulam Mohd Waza		Shopkeeper
5	Davinder Kumar	Magarmal Bagh Crossing	Business
6	Nazir Ahmad Gooru		Shopkeeper
7	Altaf Hussain Bhat	Batamaloo	Tailor
8	Muzzafer Ahmad Wani	Kazi Complex Magarmal Bagh	Shopkeeper
9	Bilal Ahmad Shah	Bakora Ganderbal	Student
10	Nisar Ahmad Pandith	Sariwarpora Pattan	Business
11	Abdul Gani Sheikh	Wazeer Bagh, Srinagar	Electrical appliance repair
12	Serajuudin Shah	Natipora, Srinagar	Salesman
13	Mashooq	Kursoo Rajbagh	Salesman
14	Parveez Ahmad Kumar	PHC Bemina Qamarwari	Student
15	Ghulam Rasool and Sons	Humhama, Srinagar	Business
16	Zahid Bashir	Humhama, Srinagar	Salesman
17	Tawheed Ahmad	Batamaloo, Srinagar	Business
18	Bilal Ahmad Bhat	Batamaloo, Srinagar	Business
19	Nazir Ahmad Bhat	Hyderpora, Srinagar	Business
20	Shakeel Ahmad	Karanagar, Srinagar	Business
21	Farooq Ahmad Bhat	Batamaloo, Srinagar	Shopkeeper
22	Gh. Mohidin Bhat	Batamaloo, Srinagar	Shopkeeper
23	Ghulam Mohidin Malik	Natipora, Srinagar	Cycle workshop

24	Manzoor Ahmad Wani	Budgam	Business
25	Ab. Qayoom	Hyderpora, Srinagar	Shopkeeper
26	Bilal Ahmad Bhat	Batamaloo, Srinagar	Shopkeeper
27	Mohd Amin Beigh	Qazi Complex Magarmal Bagh	Shopkeeper
28	Bashir Ahmad Mir	Bagh I Mehtab, Srinagar	Shopkeeper
29	Gh. Qadir Nadaf	Gogji Bagh, Srinagar	Shopkeeper
30	Ravinder Singh	Ranawari Near Gurduwara	Shopkeeper
31	Farooq Ahmad Bhat	Nowhar Chadoora Budgam	Salesman
32	Majid Wani	Alamgari Bazar, Srinagar	Shopkeeper
33	Shabir Ahmad Pandith	Chanapora, Srinagar	Shopkeeper
34	Bashir Ahmad Shah	Nowhata, Srinagar	Shopkeeper
35	Gh. Wazi Bhat	Srinagar	Business
36	Beant Singh	Mehjoor Nagar, Srinagar	Shopkeeper
37	Mohammad Shafi Dar	Chadoora Budgam	Salesman
38	Farooz Hussain	Rawalpora, Srinagar	Computer engineer
39	Sheikh Showket Hussain	Nawa Bazar, Srinagar	Worker
40	Firdous Ahmad	Kralpora Kupwara	Salesman
41	Riyaz Ahmad	Bagh I Mehtab, Srinagar	Shopkeeper
42	Javaid Ahmad Baba	Wathoora Budgam	Bank employee
43	Tamheeda wani	Rambagh, Srinagar	Student
44	Shazia	Barzulla Bagat, Srinagar	Government teacher
45	Bisma	Magarmal Bagh, Srinagar	Student
46	Sofia Shafi	Haft Chinar, Srinagar	Lecturer
47	Sheetal Kour	Haft Chinar, Srinagar	Housewife

Present issues:

1. There is massive traffic congestion on this road, which is the reason for problems for commuters.
2. Heavy traffic jams affect the people, especially the business community, as the customers avoid shopping in the congested areas.
3. Too much time is wasted while traveling through the area, and due to traffic jams there is very high noise, dust generation, and other environmental pollution.

Future prospects:

1. The construction of the elevated expressway corridor will cater to the prime need of Srinagar City.
2. The flyover would help to ease the massive traffic congestion which results in frequent jams, particularly during morning and evening hours.
3. It will drastically reduce the travel time and noise, air, and other environmental pollution in the area.
4. It will help the business community increase their business.
5. The project will increase pedestrian safety, reducing vulnerability to accidents as the proper pedestrian crossings will be developed and other signages installed.

Summary of outcomes:

1. The various issues related to the proposed subproject for the development of a flyover have been discussed at various locations like Jehangir Chowk, Rambagh, and Natipora.
2. Some of the local people are aware about the upcoming work. Most of the people are in favor of the subproject.
3. The major problems faced are related to traffic congestion, noise from plying vehicles, and elevated levels of air pollutants.
4. There is public desire for implementation of better measures to reduce noise, dust, and air pollution during the construction phase.

5. There is hope that local people will be given opportunities during the project tenure.
6. People expect that their problems shall be addressed and solutions implemented during the subproject execution.
7. People are ready to extend all types of support during execution of the subproject.
8. People suggested that adequate safety measures be provided.
9. ERA ensured that the requisite environmental management measures shall be incorporated in the EMP, and public consultation shall be a regular process during all stages of the subproject to solve any issues arising from the proposed work.

Minutes of Various Meetings

Government of Jammu & Kashmir
J&K Economic Reconstruction Agency
Hotel Tramboo Continental, Dal Gate, Srinagar
38 A/B Gandhi Nagar, Jammu
ERA
Ph: 0191-2434601, 0194-2501556
e-mail:

Sub: Construction of Expressway Corridor (Flyover) from Jehangir Chowk to Natipora – Record note of the Public Consultation Meeting held on 14th May 2011.

The consultation was held with members of the civil society i.e Kashmir Manufactures and Traders Federation (KMTF) on 14th May 2011 in the office of the Director Central, J&K ERA, Boulevard Srinagar. The list of participants is enclosed as Annexure A.

The objective of the meeting was to appraise the stakeholders about various features of the proposed Expressway corridor (flyover) from Jehangir Chowk to Rambagh- Natipora with particular emphasis on the resettlement, safeguards and rehabilitation of the displaced persons.

The deliberations of the consultation and the suggestions put forth are recorded as under:

1. The KMTF expressed concern over the growing traffic congestion in the city in particular on the road under reference.The Federation endorsed the proposal for construction of the flyover.

2. The Federation impressed that project should be taken up at the earliest as it is pivotal for decongestion of traffic on the said route and overall development of the state, as such offered their full support to the project while simultaneously requesting for safeguarding the interests of the business community likely to be affected. They requested that project should not impoverish the conditions of the affected shopkeepers.

3. ERA provided the Federation broader details of the resettlement impacts due to the project. The Federation was informed that around 280 shops are located in the alignment of the proposed project. While Srinagar Municipal Corporation (SMC) will be rehabilitating around 100 temporary shops-keepers/ khokha-wallas in what is commonly known as Cheap Market and Kabaddi Market in the shopping complex constructed by the Corporation in the immediate vicinity, rest of the displaced shop-keepers shall be taken care of by ERA.

4. The Federation was informed that the displaced persons will be suitably rehabilitated. This could be by way of project assisted alternate accommodation (shops) or cash compensation (self relocation). In case of latter option i.e.self relocation, the quantum of compensation shall be decided by the High Level Committee headed by Divisional Commissioner, Kashmir in consultation with the bonafide affected persons.

5. In case of Project Assisted Relocation, ERA has identified two relocation sites, on the basis of the business catchment area, one at Engineering Complex near Jehangir Chowk and other at Natipora-Airport Road intersection across Ram Bagh Bridge.

6. The Federation was given details about the availability of shops in the proposed shopping complexes at Jehangir chowk and Rambagh.

7. The Federation requested that the shopkeepers of Municipal Building located at Hari Singh High Street may be rehabilitated in the land adjacent to the existing building. However they were told that this was not possible as the available- land is too meagre to accommodate any new construction as per municipal bye-laws/norms as conveyed by Commissioner Srinagar Municipal Corporation during the course of a meeting held some days back.

8. The Federation contended that the market-valve of the present shops in the Municipal Building is more than that offered in exchange by J&K ERA and that the difference between the two should be paid to the affected shopkeepers .While disagreeing with the contention of the Federation, ERA agreed to flag the issue during negotiations in the HLC.

9. The meeting concluded with the Federation reiterating their support to the project and ERA assuring that the displaced shopkeepers will be suitably compensated/ rehabilitated.

No: DC/ERA/2011/3557-63
Dated: 23-05-2011

(Khalid Muzaffar) 23.5.11
Director Central

Copy to the:

1) The Chief Executive Officer, J&K ERA for information.
2) Divisional Commissioner (Kashmir) for information.
3) Commissioner, Srinagar Municipal Corporation for information.
4) Director Safeguards, J&K ERA for information.
5) Project Manager, JKUSDIP for information.
6) Social and Resettlement Expert ERA-Kashmir for information and record.
7) President Kashmir Manufactures and Traders Federation (KMTF), Srinagar for information.

PUBLIC CONSULTATION

Name of the Subproject: Flyover / Expressway at Zehangir Chowk.

Venue: Director ERA Central Office Transport Office Barzulla Sgr

Date: 14-May-2011

KASHMIR TRADERS & MANUFACTURERS FEDERATION (REGD.)

S. No.	Name	Occupation	Signature
01	Bashir Ahmad Dar General Secretary KTMF	Business 9419002939	
02	Mohammad yasin khan President, KTMF	Business 9419005268	
03	Ajaz Ahmad Khan Secretary pg. KTMF	Business 9419434066	
04	Farooq Ahmad Bhat Treasurer KTMF	Business 9419518416	
	ERA OFFICIALS		
1	M. R. Zargar Project Manager ERA.		
2	MASOOD SARAF A.P.M. ERA.		
3	Suhail Mircha. SAREL(K) ERA.		
4	Wajahat Nazaki P.C DHV.		

Government of Jammu & Kashmir
J&K Economic Reconstruction Agency
Hotel Tramboo Continental, Dal Gate, Srinagar
38 A/B Gandhi Nagar, Jammu
ERA
Ph: 0191-2434601, 0194-2501558
e-mail

Sub: Construction of Expressway Corridor (Flyover) from Jehangir Chowk to Natipora – Record note of the Public Consultation Meeting held on 23rd May 2011.

While several rounds of informal consultations were held with the tenant -shopkeepers of Estates Building at Magarmal Bagh crossing in the context of their rehabilitation due to the proposed Expressway Corridor (Flyover) from Jehangir Chowk to Rambagh-Natipora, a formal meeting was organised with them in the office of Director Central, ERA on 23rd May 2011.The meeting was initially proposed to be held at the site, however the venue was shifted at the request of the affected shop-keepers. The list of participants in the meetng is enclosed as Annexure A.

The objective of the meeting was to appraise the shop-keepers about various features of the proposed Expressway corridor (flyover) from Jehangir Chowk to Rambagh- Natipora with particular emphasis on their resettlement, safeguards and rehabilitation.

The deliberations of the consultation and the suggestions put forth by the affected shop-keepers are detailed as under:

1) The affected shopkeepers gave brief account of the consultations previously held with them by ERA.

2) The shopkeepers informed that shops they were in possession of are their only source of income and, if possible, may be spared. They felt that the acquisition of the structure under reference was not immediately required in the view of the fact that widening of link-road from Amira kadal to IG Road was to be taken up at a later stage. The shop-keepers were informed that entire building of Estates Department was coming in the alignment of the proposed flyover irrespective of widening of Amira Kadal –IG Road link.

3) The shopkeepers while agreeing to the necessity of the project contented that their shops were located on the prime location, and as such they should be rehabilitated at par with their present location.

4) The shopkeepers were informed that they will be suitably rehabilitated. This could be by way of project assisted alternate accommodation (shops) or cash compensation (self relocation). In case of latter option i.e. self relocation, the quantum of compensation shall be decided by the High Level Committee headed by Divisional Commissioner, Kashmir in consultation with the affected shop-keepers.

Contd. on Page 2/2

5) In case of Project Assisted Relocation, ERA has identified two relocation sites, on the basis of the business catchment area of the project, one at Engineering Complex near Jehangir Chowk and other at Natipora-Airport Road intersection across Ram Bagh Bridge.

6) In view of its close proximity to the proposed shopping complex at Jehangir chowk, the tenant-shopkeepers of Estates Building are proposed to be rehabilitated in the said complex. The shopkeepers were assured rehabilitation at the said place with the choice of opting for the other complex at Ram Bagh.

7) The shopkeepers requested that they may be rehabilitated by constructing a separate shop -line in the adjacent vacant plot of land reportedly belonging to a private party. The shopkeepers were informed that it may not be possible to concede to their request in view of the fact that a part of the said plot of land is coming in the alignment of the proposed project and widening of Amira Kadal –IG Road link. However it was agreed to flag the issue during the negotiations in the HLC.

8) The shopkeepers were informed that such of the shop-keepers who suffer loss of livelihood as a result of temporary closure of shops shall be provided cash-assistance for the period of temporary closure. This will be however subject to production of requisite documents in support of their claim. The cash-assistance will be released after proper verification of the documents.

9) The shopkeepers agreed in principle to negotiated settlement through the medium of private negotiations under the auspices of the HLC.

(Khalid Muzaffar) 26.5.11
Director Central

No.DC/ERA/2011/3566-71
Dated:26-05-2011

Copy to the:

1) The Chief Executive Officer, J&K ERA for information.
2) Divisional Commissioner Kashmir for information.
3) Director Safeguards, J&K ERA for information.
4) Project Manager, JKUSDIP, Kashmir for information.
5) Social and Resettlement Expert ERA-Kashmir for information and record.
6) Shopkeepers of Estates Building through Bashir Ahmed Shah C/o Shah Brothers, Estates Building, Magarmal Bagh Srinagar.

Estates Building Shopkeepers.

PUBLIC CONSUTLATION

Name of Subproject: Expressway/Flyover.

Venue: Director Office

Date: 23.05 2011 Time:

S. No	Name	Occupation	Signature
1	Gh. Nabi Bhat	United Hardware	[signature]
2.	Bashir Ah. Wangoo.	M/s Wangoo	[signature]
3.	Bashir Ah Shah.		
4.	Beant Singh.	RAINA Refrigeration / National Refrigeration	[signature]
	BA [illegible] SHAH		
	ERA OFFICERS.		
1.	Khalid Muzaffar.		
2.	Suhail Mirza.		

Govt. of Jammu & Kashmir
J&K Economic Reconstruction Agency
2nd Floor, Hotel Tramboo Continental,
Dalgate, Srinagar.

ERA

Sub: Construction of Expressway Corridor (Flyover) from Jehangir Chowk to Natipora- Record note of the Public Consultation Meeting held on 06th June 2011.

As a part of continuous consultations with the KTMF (Kashmir Traders and Manufactures Federation) and representatives of affected shopkeepers of HSHS (Hari Singh High Street) another round of meeting was held on 06th June 2011 in Conference Hall, ERA office complex. The list of the participants is annexed as *Annexure A.*

The deliberations of the consultation and suggestions put forth are recorded as under:

1. The KTMF and affected shopkeepers expressed satisfaction over the minutes issued for meeting held on 14th May 2011.
2. The Federation and affected shopkeepers accepting the importance and necessity of the Flyover reiterated their support to the project.
3. The Federation was given information regarding progress on the financial and physical components of the project achieved so far. They were also informed that alternate temporary shops (pre fab unit) for the affected shopkeepers of Government Central Market (GCM) both gutted and to be demolished were almost ready for being handed over to them.
4. The Federation was given a brief presentation about the ADB guidelines on safeguards related to the project, land acquisition procedures (Private Negotiation and Compulsory Acquisition) and role of DLC (Divisional Level Committee) which has been constituted by General Administration Department of Govt of Jammu and Kashmir, vide no 605 of 2011 dated 25-05-2011 for fast track implementation of Rehabilitation Plan and procedures for calculation of compensation for structures.
5. The Federation again contended their demand for payment of difference in market value of already existing shops and those in proposed rehabilitation complex. The Federation suggested that Market Value of shops at both the locations be ascertained by auctioning and difference if any, should be paid to the shop owners. While disagreeing with the contention, ERA agreed to flag the issue in Divisional Level Committee meeting.
6. The Federation again requested that shopkeepers of Municipal Building (13 Nos on front side) should be given shops at the back of present complex and while as rest of shops and godowns could be allotted in the proposed complex in the Engineering complex. The ERA informed that it will not be possible as the available land is too meager to accommodate

any new construction as per the municipal bye laws/norms as conveyed by Commissioner Srinagar Municipal Corporation during the course of meeting held earlier, however on the request of the Federation, ERA agreed to flag same in the Divisional Level Committee meeting.

7. The Federation requested that the boundary wall on High Court side of the proposed rehabilitation complex at Jehangir Chowk should be replaced by iron grills/ chain link fence, ERA agreed to flag the issue in the Divisional Level Committee meeting.

8. The meeting concluded with the vote of thanks

No: ERA/PM/JKUSDIP/K/1630-36
Dated: 20-06-2011

(M.R. Zargar)
Project Manager
JKUSDIP
ERA Kashmir

Copy to the:

1) Divisional Commissioner, (Kashmir) for information.
2) Commissioner, Srinagar Municipal Corporation for information.
3) Deputy Commissioner, Srinagar for information.
4) Director Central/Safeguards, J&K ERA for information.
5) Social and Resettlement Expert ERA Kashmir for information and record.
6) SA to CEO for information of CEO.
7) President Kashmir Traders and Manufactures Federation (KTMF), Srinagar for information.

Public Consultation

Name of the Subproject: Express Corridor /Fly over at Jehangir Chowk.
Venue: Conference Hall ERA office Complex
Date: 09-June-2011

KMTF & Shopkeepers(affected) of HSHS Srinagar

S.No.	Name	Occupation	Signature
01	Bashir Ahmad Dar	Secretary General KTMF	[signature]
02	Mohd Syed Bundy	President F Hari Singh High Street	[signature]
03	Gh. Mohd. Dar	Executive member	[signature]
04	Gowhar Ali Beg	Ex. Member	[signature]
05	Abdul Hamid	Executive Member	[signature]
06	Fayaz Ahmad Shah	Gen. Sec. HSHST Ass.	[signature]
07	Haji Mohd Shafi Zargar	Chairman HSHST Ass.	[signature]
08	Mahmood Yousuf	[illegible]	[signature]
09	K. A. SHAH	ADV. K.T.M.F	K.A.SHAH
10	Mohammed Yaseen Khan	President KTMF	[signature]

Contd on Page (2)

Public Consultation

Name of the Subproject: Express corridor / Flyover at Jehangir Chowk.

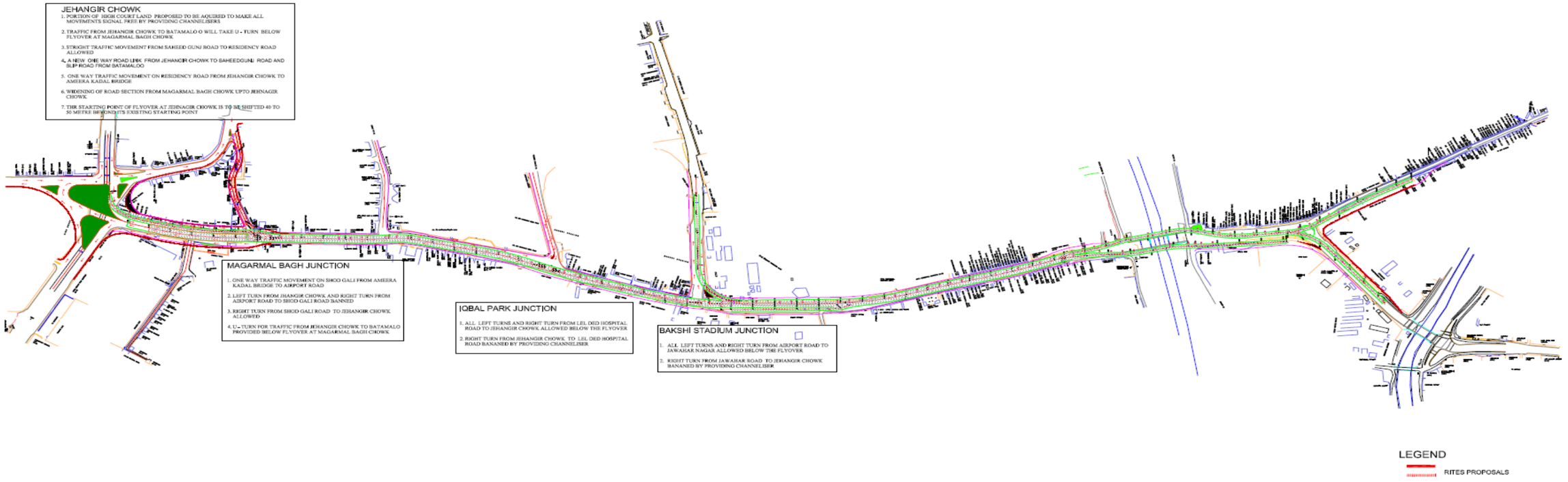
Venue: Conference Hall. ERA

Date: 09 - June - 2011

Kashmir Manufactures and Trader Federation and Shopkeepers

S.No.	Name	Occupation	Signature
(11)	M.R. Zargar	Project Manager (JKUSDIP) ERA, Kashmir	[signature]
(12)	Sohail Mircha	Social & Resettlement Expert, ERA, Kashmir	Sohail
(13)	Masood Hussain Sahy	Assistant Project Manager	[signature]
(14)	Najahat Nazki	Project Coordinator	[signature]
(15)	Altaf Qureshi	Project Engineer	Altaf

APPENDIX 4: Alignment of Proposed Flyover and Photographs of the Area



Proposed Flyover Site at Jehangir Chowk

Proposed Flyover Site at Bakshi Stadium Crossing

Existing Rambagh Bridge

Flood Channel at Rambagh

Y-junction at Rambagh

Existing Natipora Road