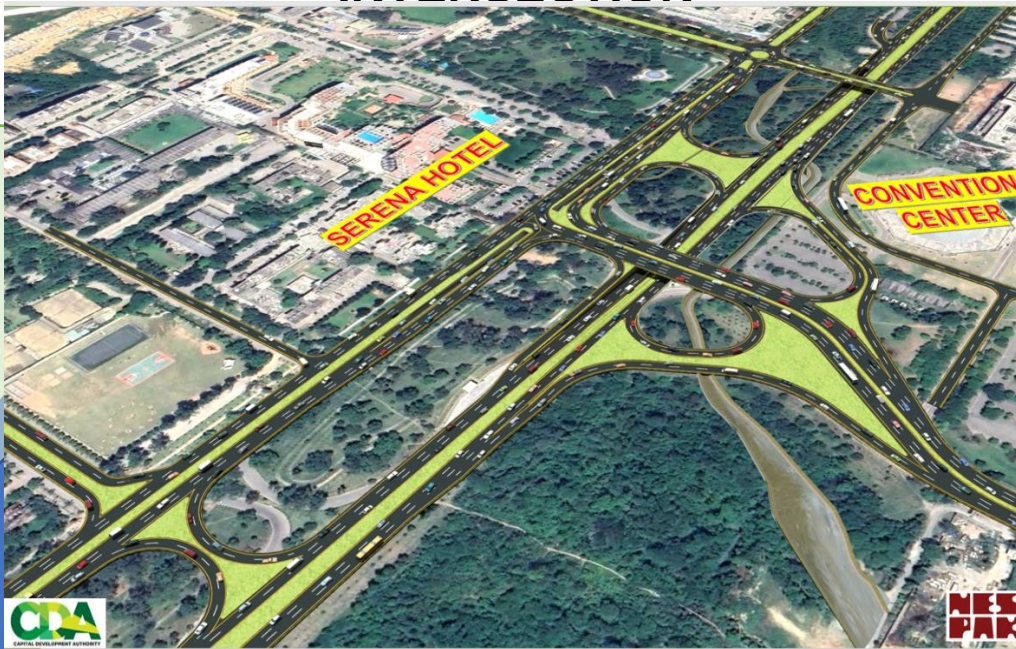


**CAPITAL DEVELOPMENT AUTHORITY**



**ENVIRONMENTAL IMPACT ASSESSMENT  
REPORT  
FOR**

**RESOLVING TRAFFIC CONGESTION ISSUES AT  
SERENA AND CONVENTION CENTRE  
INTERSECTION**



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## **LIST OF ABBREVIATIONS**

<b><u>Abbreviation</u></b>	<b><u>Description</u></b>
AASHTO	American Association of State Highway and Transportation Officials
AADT	Average Annual Daily Traffic
BOD	Bio-chemical Oxygen Demand
°C	Degree Centigrade
CC	Construction Contractor
CDA	Capital Development Authority
SC	Supervision Consultant
CO	Carbon Monoxide
DG	Director General
DO	Dissolved Oxygen
EE	Environmental Engineer
EMMP	Environmental Management and Monitoring Plan
EIA	Environmental Impact Assessment
EALS	Environment Afforestation Land and Social
HSE	Health Safety and Environment
ITP	Islamabad Traffic Police
IEE	Initial Environmental Examination
KPH	Kilometer per Hour
LAA	Land Acquisition Act
LOS	Level of Services
MCC	Manual Classified Counts
NEQS	National Environmental Quality Standards
NESPAK	National Engineering Services Pakistan
NCS	National Conservation Strategy
NO <sub>x</sub>	Nitrogen Oxides
NSR	Noise Sensitive Receptors
PEPA	Pakistan Environmental Protection Act
PEPC	Pakistan Environmental Protection Council
PGA	Peak Ground Acceleration
PPC	Pakistan Penal Code
PAP	Projected Affected Person
PPE	Personal Protective Equipment
PM	Particulate Matter
RE	Resident Engineer
SC	Supervision Consultant
STDs	Sexually Transmitted Diseases
RCC	Reinforce Cement Concrete
SO <sub>x</sub>	Sulfur Oxides
SWM	Solid Waste Management
TA	Technical Assistance
TA	Technical Assistance
TSS	Total Suspended Solids
TDS	Total Dissolved Solids
WHO	World Health Organization

## GLOSSARY

<b>AOI (Area of Influence):</b>	The Area likely to be affected by the project, including all its ancillary aspects, such as power transmission corridors, pipelines, canals, tunnels, relocation and access roads, borrow and Disposal areas, and construction camps, as well as unplanned developments induced by the project (e.g., spontaneous settlement, logging, or shifting agriculture along access roads).
<b>Alternatives</b>	Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, temporal alternatives or the “do-nothing” alternative.
<b>Affected Person / People (APs)-</b>	Any person affected by Project-related changes in use of land, water, natural resources, or income losses.
<b>Biodiversity</b>	The number and types of plants and animals that exist in a particular area.
<b>Baseline Condition</b>	A baseline condition is a measure of the subjects responses on the dependent variable before implementing the experimental manipulation. The reason to conduct a baseline condition is to identify the subjects' preexisting responses without the influence of the manipulation.
<b>Cultural resources</b>	A broad term covering any physical, natural and spiritual properties and features that are adapted, used and created by humans, in the past and the present. Cultural resources include traditional systems of cultural practice, belief or social interaction.
<b>Compensation</b>	Payment in cash or in kind for an asset or a resource that is acquired or affected by a project at the time the asset needs to be replaced.
<b>Concerned Stakeholders</b>	Those authorities whose responsibility is potentially affected by the project and other parties doing civil services. For example: authorities concerning public transport, energy supply, postal and telecommunication services etc. and also municipalities which area is likely to be affected are concerned stakeholders in this sense.

<b>Direct impacts</b>	Impacts that are caused directly by an activity and generally occur at the same time and at the place of the activity. These impacts are generally associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.
<b>Domestic Waste</b>	Solid waste, composed of garbage and rubbish, which normally originates from residential, private households, or apartment buildings. Domestic waste may contain a significant amount of toxic or hazardous waste from improperly discarded pesticides, paints, batteries, and cleaners.
<b>Do-nothing alternative</b>	The “do-nothing” alternative is the option of not undertaking the proposed activity or any of its alternatives. The “do-nothing” alternative also provides the baseline against which the impacts of other alternatives should be compared.
<b>Ecosystem</b>	Organisms together with their abiotic environment, forming an interacting system, inhabiting an identifiable space
<b>Effluent</b>	The water which flows out of the man made system into a water body, usually waste water
<b>Endangered species</b>	Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.
<b>Environment</b>	The surroundings within which humans exist and that are made up of: <ul style="list-style-type: none"> <li>i). The land, water and atmosphere of the earth;</li> <li>ii). Micro-organisms, plant and animal life;</li> <li>iii). Any part or combination of (i) and (ii) and the inter-relationships among and between them; and</li> <li>iv). The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.</li> </ul>

<b>Environmental Impact Assessment</b>	EIA is the formal process "aims to predict environmental impacts at an early stage in project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the predictions and options to decision-makers."
<b>Environmental Impact</b>	The degree of change in an environment resulting from the effect of an activity on the environment, whether desirable or undesirable. Impacts include both the direct or indirect consequences of an activity.
<b>Environmental Management Plan</b>	An EMP is a site-specific plan developed to ensure that all necessary measures are identified and implemented in order to protect the environment and comply with environmental legislation.
<b>Erosion</b>	Wearing a way of rock and soil by physical or chemical action, especially by wind or water, leading to removal of particles
<b>Flora</b>	The plant life of a region
<b>Fauna</b>	The animal life of a region
<b>Ground water</b>	Subsurface water in the saturated zone below the water table
<b>Habitat</b>	The natural home or environment of an animal, plant, or other organism.
<b>Hazardous</b>	Process or substances which have the potential to cause significant danger or harm to human health or the environment (e.g., hazardous waste)
<b>Indigenous</b>	Born, growing or produced naturally (native) in an area, region, or country
<b>Indirect Impact</b>	Indirect or induced changes that may occur as a result of the proposed activity (e.g. the reduction of water in a stream that supplies water to a reservoir that supplies water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

<b>Land</b>	Terrestrial bio-productive system that comprises soil, vegetation and other biota, as well as ecological and hydrological processes that operates within the system.
<b>Legal Requirement</b>	Identification and listing of the specific legislation and permit requirements which could potentially be infringed upon by the proposed project, if mitigation is necessary should the proposed development impact on a heritage resource
<b>Monitoring</b>	In an environmental context, the repetitive and continued observation, measurement and evaluation of environmental data to follow changes over a period of time to assess the efficiency of control measures.
<b>Negative impact</b>	A resultant change due to an activity that reduces the quality of the environment (e.g. by reducing indigenous species diversity and the reproductive capacity of the ecosystem; by damaging health; property or by causing nuisance).
<b>Noise</b>	Any acoustic phenomenon producing any aural sensation perceived as disagreeable or disturbing by an individual or group. Noise may therefore be defined as any unwanted sound or sound that is loud, unpleasant or unexpected.
<b>Pollutant</b>	A substance that contaminates
<b>Pollution</b>	Defilement or unfavorable alteration of the surroundings, normally as a result of human actions. In the water environment, any foreign substance that impairs the usefulness of water.
<b>Pollution Prevention</b>	Complete prevention of releasing hazardous substances having polluting properties to any public stream or water body.
<b>Positive Impact</b>	A resultant change due to an activity that improves the quality of the environment (e.g. by restoring natural species diversity and the reproductive capacity of the ecosystem; by removing nuisances or improving amenities)
<b>Rare and Endangered Species</b>	Species, which have naturally small populations, or species which have been reduced to small (often unstable) populations by man's activities

<b>Significant impact</b>	Any impacts by its magnitude, duration, intensity and probability of occurrence may have a notable effect on one or more aspects of the environment.
<b>Soil</b>	A mixture of organic and inorganic substances, the composition and structure of the latter is derived from the parent rock material. Soil also contains bacteria, fungi, viruses and micro-arthropods, nematodes and worms
<b>Solid Waste</b>	Any solid, semi-solid, liquid or contained gaseous materials discarded from industrial, commercial, mining or agricultural operations, and from community activities. Solid waste includes garbage, construction debris, commercial refuse, sludge from water supply or waste treatment plants, or air pollution control facilities, and other discarded materials.
<b>Surface Water</b>	All water naturally open to the atmosphere (rivers, lakes, reservoirs, ponds, streams, seas, estuaries) and all springs, wells, or other collectors directly influenced by surface water.
<b>Topography</b>	Referring to natural features on the surface of the earth
<b>Topsoil</b>	The top few centimeter of soil that contains most of the soil organic matters and nutrients

## **EXECUTIVE SUMMARY**

Serana Chowk is one of the busiest intersection of Islamabad. Its importance become more significant because it lies on Srinagar Highway.

Srinagar Highway, also known as Shahrah-e-Srinagar, is a multi-lane, two-way expressway and one of the longest roads in Islamabad, covering a distance of 25 kilometers (16 miles). The well-maintained green belts alongside the whole road further add to its charm.

There are several significant junctions and intersections along Srinagar Highway, which runs through the center of the city. It has a direct connection to Islamabad International Airport on its western end. On the other hand, Islamabad's connection to the Murree Road interchange lies at the eastern end of the highway. As a result, it ranks as one of the most significant intercity routes in Islamabad.

Residents also have easy access to the Pakistan Secretariat, Serena Hotel and other key areas of the city through this highway. It is also in close proximity to some renowned universities, such as Allama Iqbal Open University, National University of Science and Technology, and National University of Computers and Emerging Sciences.

### **Project Title**

Feasibility Study and Detailed Design for Resolving Traffic Congestion Issues at Serena and Convention Centre Intersection, Islamabad.

### **Scope of the Project**

Serana chowk is taking traffic coming from these aforesaid areas, which resultantly increase in excessive delays and traffic congestion problems. Due to bottleneck at this serena and convention Centre intersection, the traffic movements become more complex.

To set forth the area with this project i.e., underpass, the area will subsequently contribute to rapid accessibility and minimize the time and fuel of the motorists. Therefore, All the stake holders including Capital Development Authority wanted to construct an underpass on Serena/Convention center intersection to avoid blocking of roads during peak hours. The redesigning would improve the traffic flow. In parallel to this, CDA has also proposed to reconstruct/realignment of existing Nullah with key aim to make the project more feasible so that no traffic hindrance may have occurred after completion of project.

To overcome these problems, CDA therefore realizing the gravity of solution and has planned to conduct a feasibility study along with detailed design of resolving traffic congestion issues at this intersection. The project includes the following major works:

- Construction of underpass (4-Lane) with auxiliary lanes along Srinagar Highway for Zero Point and Barakahu Bound Traffic.
- Construction of Underpass 2-Lane for Diplomatic Enclave bound traffic.
- Construction of Loops for turning traffic at Convention Centre Chowk.
- Construction of approaching roads and auxiliary works.

## **PROJECT LOCATION AND ACCESSIBILITY**

### **Project Location**

Project Site is situated near key government offices, diplomatic missions, and the city center, offering convenient access to many of Islamabad's attractions and business districts.

It is well-situated to provide easy access to a variety of key locations and services such as Prime Minister's Secretariat, the Supreme Court, and other major government buildings. Besides, several embassies and consulates, making it convenient for international visitors.

### **Accessibility/Road Access of the Project**

The proposed underpass at Serena Hotel Intersection is easily accessible via several major roads in the city, namely Constitution Avenue, Jinnah Avenue, Khayaban-e-Suharwardy, Srinagar highway and Murree road.

To establish the baseline data, the Area of Influence (AOI) was identified through baseline information collection within maximum 100~200m of Spatial Scale from the proposed ROW of underpasses for abiotic factors. To specify this, the spatial scale of 50m x 50m square along the proposed reconstruction components are identified as Area of Influence (AOI) for biotic factors (predominantly tree inventories and grass land ecosystem) and social factors. Besides, ancillary works like temporary labor camps, storage and equipment yard also includes for assessment.

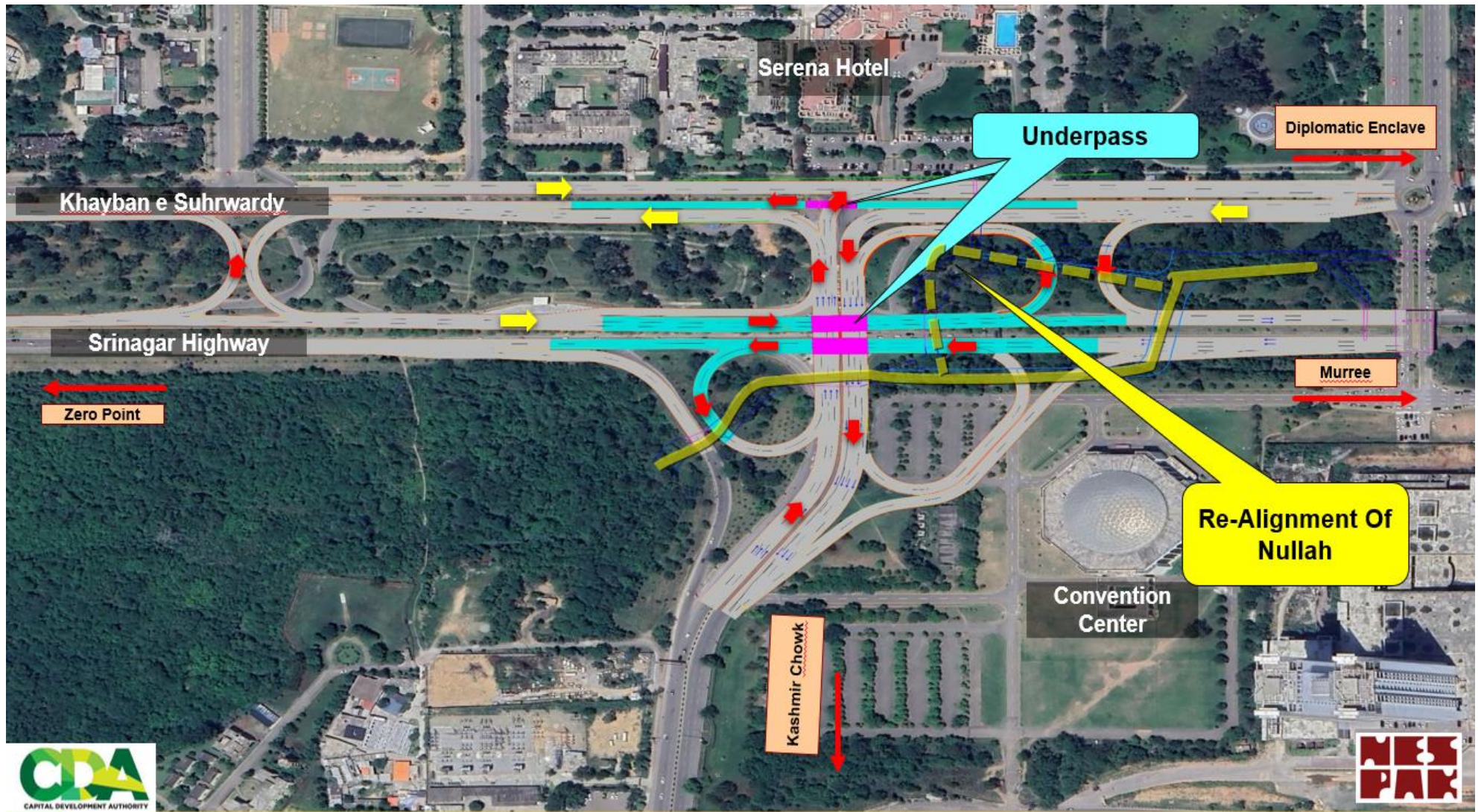
During onsite assessment, four different Land-Use types/sensitive receptors were taken for assessment within AOI Spatial Scale. These following four environmental/social variables are considered as strongly associated:

- i. Tree density/afforestation pattern along Srinagar Highway.
- ii. Nearby infrastructure/social amenities.
- iii. Abiotic environment.
- iv. Ecological dynamics/alterations.

These Land-Use types/landscape variables were extracted through onsite assessment conducted in June, 2024 and topographic mapping. Further, the impact on these landscape variables were correlated with the construction components for assessing the significance of impacts.

In a similar pattern, the main environmental variables were also taken for assessment, mainly including of air quality degradation and noise generation.

Environmental Impact Assessment Report  
Resolving Traffic Congestion at Serena and Convention Centre Intersection





<b><u>Technical Parameters</u></b>		
<b><u>Standard/Specification:</u></b> The project shall conform to the following specifications:		
<b><u>A. Underpass Along Srinagar Avenue Centaurus Bound Traffic</u></b>		
Through Length	:	530 m
Barrel Length	:	40 m
Ramps Length	:	490 m
Underpass Width (Typ)	:	9 m each side
<b><u>B. Underpass Along Khayaban-e-Suharwardy</u></b>		
Through Length	:	430 m
Barrel Length	:	40 m
Ramps Length	:	390 m
Underpass Width (Typ)	:	7 m
<b><u>C. Design Parameters</u></b>		
<b><u>Pavement Structure:</u></b>		
Asphalt Wearing Course	:	50mm
Asphalt Base Course	:	120mm
Water Bound Macadam	:	250mm
Subbase	:	200mm

**Activity Wise' Screening of Impacts during Design Phase**

Sr.#	Potential Issue	Risk Levels				
		Duration of impacts (long term, medium term, short term, temporary)	Likelihood (certain, likely, unlikely, rare)	Magnitude (major, moderate, minor, minimal)	Spatial Pattern (Widespread from ROW, within ROW, outside of ROW)	Sensitivity (Very severe, severe, mild, low)
1.	Improper Designing of Proposed 4-lane and 2-Lane Underpasses.	Long term	Unlikely	Moderate	Within ROW	Severe
2.	Improper selection of Camp, asphalt and batching plant sites due to noncompliance of SSEMP.	Short term	Likely	Moderate	Widespread from ROW	Mild
3.	Lack of integration of EIA requirement into construction bid documents.	Short term	Likely	Moderate	Within ROW	Severe
4.	Waste/construction Material dumping site/s.	Short term	Likely	Moderate	Within ROW	Mild
5.	Natural hazard risks (flooding/earthquakes).	Short term	Likely	Moderate		Mild

**Activity Wise' Screening of Impacts during Construction Phase.**

Sr.#	Potential Issue	Risk Levels				
		Duration of impacts (long term, medium term, short term, temporary)	Likelihood (certain, likely, unlikely, rare)	Magnitude (major, moderate, minor, minimal)	Spatial Pattern (Widespread from ROW, within ROW, outside of ROW)	Sensitivity (Very severe, severe, mild, low)
1.	Impact due to Traffic/Local Commuters	Short Term	Likely	Moderate	Within ROW	Severe
2.	Degradation of air quality due to Proposed scope of work.	Short term	Likely	Moderate	Within ROW	Low
3.	Construction of road not in accordance with Climatic design.	Short term	Likely	Moderate	Widespread from ROW	Severe
4.	Potential accidents and injuries to communities in project area during construction works Community Health safety.	Short term	Likely	Minor	Within ROW	Low
5.	High noise levels and vibration from Construction activities.	Short term	Likely	Moderate	Within ROW	Mild
6.	Wastewater accumulation	Short term	Likely	Minor	Widespread from ROW	Low
7.	Soil erosion and contamination	Short term	Less Likely	Minor	Not likely	Low
8.	Injuries to workers from lack of necessary training and/or not using PPEs etc. (Occupational Health & Safety).	Short term	Likely	Minor	Within ROW	Low
9.	Waste / construction Material disposal sites.	Short term	Likely	Moderate	Widespread from ROW	Mild

10.	Untreated disposal of Suitable and surplus material from construction sites.	Short term	Likely	Moderate	Widespread from ROW	Low
11.	Vegetation/Afforestation loss	Short term	Likely	Minor	Within ROW	Low
12.	Disruption to Existing Public Utilities	Short term	Likely	Minor	Within ROW	Severe

### Activity Wise' Screening of Impacts during Operational Phase.

Sr.#	Potential Issue	Risk Levels				
		Duration of impacts (long term, medium term, short term, temporary)	Likelihood (certain, likely, unlikely, rare)	Magnitude (major, moderate, minor, minimal)	Spatial Pattern (Widespread from ROW, within ROW, outside of ROW)	Sensitivity (Very severe, severe, mild, low)
1.	Road Safety Parameters	Long term	Likely	Minor	Widespread from ROW	Low
2.	Accident due to high speed	Long term	Likely	Major	Widespread from ROW	Mild
3.	Infrastructure & Transportation Facilities	Long term	Likely	Minor	Widespread from ROW	Low

### Findings and Recommendations

During onsite assessment, four different Land-Use types/sensitive receptors were taken for assessment within AOI Spatial Scale. These following four environmental/social variables are considered as strongly associated with the underpasses construction and allied works:

- i. Tree density/afforestation pattern along Srinagar Highway.
- ii. Nearby infrastructure/social amenities.
- iii. Abiotic environment.
- iv. Ecological dynamics/alterations.

In response to construction of civil design components (as described in Sub-section 3.6). The frequent envisaged negative impacts associated are given hereunder:

- Air pollution due to particulate material on account of dust, emissions from machinery, etc.
- Noise issues due to working of construction machinery on the project.

- Impacts related to Machinery Assembly area, material and equipment yard.
- Storage/stockpiling of construction material (Suitable and surplus material).
- Accident Risks; and Relocation of public utilities and effect on afforestation pattern; and
- Health and safety of workmen and neighbors etc.

Foregoing in view, Most of the Medium and High impacts identified in the study are temporary and manageable through:

- Implementing Environmental Management Plan; and
- Providing monitoring arrangements and resources during design, construction and operation stages of the project.
- **In Conclusion:** The proposed project will bring about a net-positive benefit in terms of alleviation traffic congestion and smooth traffic flow at Serena and Convention Centre Intersection. Environmental impacts of the project will be associated mostly with the construction phase. The impacts associated with social factors, particularly existing amenities will be temporary or reversible, phased over a period of time, localized, and manageable.

## **1. INTRODUCTION**

### **1.1 PROJECT BACKGROUND**

Serena Chowk is a significant intersection in Islamabad, connecting Constitution Avenue, Club Road (Murree Road), and other major roads. It is a bustling area, often experiencing heavy traffic, especially during peak hours.

Recently, the government announced the construction of an underpass at Serena Chowk to help alleviate traffic congestion. This project is part of a broader initiative to improve the city's infrastructure and provide a smoother transit experience for commuters.

Due to heavy traffic volume, frequent traffic blockage often occurs in peak hours. The existing context does not support traffic volume; therefore, it needs immediate improvement through viable option i.e., under passes at Serana Chowk.

Capital Development Authority (CDA) intends the Feasibility Study and Detailed Design for purpose to resolve traffic congestion at Serena and Convention Centre with the main aim to put forth an improved facility.

This EIA report serves to assess the current environment of project area, the proposed project activities, and their impact on the ambient environment. The report has assessed the potential impacts and addressed both the positive and negative impacts of the project.

### **1.2 NEED OF THE PROJECT**

Serana Chowk is one of the busiest intersection of Islamabad. Its importance become more significant because it lies on Srinagar Highway.

Srinagar Highway, also known as Shahrah-e-Srinagar, is a multi-lane, two-way expressway and one of the longest roads in Islamabad, covering a distance of 25 kilometres (16 miles). The well-maintained green belts alongside the whole road further add to its charm.

There are several significant junctions and intersections along Srinagar Highway, which runs through the center of the city. It has a direct connection to Islamabad International Airport on its western end. On the other hand, Islamabad's connection to the Murree Road interchange lies at the eastern end of the highway. As a result, it ranks as one of the most significant intercity routes in Islamabad.

Residents also have easy access to the Pakistan Secretariat, Serena Hotel and other key areas of the city through this highway. It is also in close proximity to some renowned universities, such as Allama Iqbal Open University, National University of Science and Technology, and National University of Computers and Emerging Sciences.

### **1.3 SCOPE OF THE PROJECT**

Serana/Convention intersection is taking traffic coming from these aforesaid areas, which resultantly increase in excessive delays and traffic congestion problems. Due to bottleneck at this serena and convention Centre intersection, the traffic movements become more complex.

To set forth the area with this project i.e., underpass, the area will subsequently contribute to rapid accessibility and minimize the time and fuel of the motorists. Therefore, All the stake holders including Capital Development Authority wanted to construct an underpass on Serena/Convention center intersection to avoid blocking of roads during peak hours. The redesigning would improve the traffic flow. In parallel to this, CDA has also proposed to reconstruct/realignment of existing Nullah with key aim to make the project more feasible so that no traffic hindrance may have occurred after completion of project.

To overcome these problems, CDA therefore realizing the gravity of solution and has planned to conduct a feasibility study along with detailed design of resolving traffic congestion issues at this intersection.

The project includes the following major works:

- Construction of underpass (4-Lane) with auxiliary lanes along Srinagar Highway for Zero Point and Barakahu Bound Traffic.
- Construction of Underpass 2-Lane for Diplomatic Enclave bound traffic.
- Construction of Loops for turning traffic at Convention Centre Chowk.
- Construction of approaching roads and auxiliary works.

#### **1.4 PROJECT IMPLEMENTING ORGANIZATIONS**

- Capital Development Authority (CDA) intends the Feasibility Study and Detailed Design for Resolving Traffic Congestion Issues at Serena Chowk to make it an improved facility.
- M/s NESPAK, have been awarded the contract through open competition for Feasibility Study and Detailed Design.

#### **1.5 NATURE OF THE PROJECT**

In order to alleviate traffic congestion at Serena chowk/intersection area, Capital Development Authority (CDA) has planned to conduct a feasibility study along-with detailed design of a construction of underpasses to manage traffic and uninterrupted, safer and improved flow of traffic at Club Road through Srinagar Highway. All the stake holders including CDA has contemplated to construct an underpass and realignment of Nullah to avoid blocking of roads during peak hours.

#### **1.6 LOCATION AND ACCESSIBILITY OF THE PROJECT**

The area is easily accessible through Srinagar highway at Northern end, while club road at eastern and Ataturk Avenue at western end. Currently, prolonged traffic signal at the junction of Serena Chowk, has been causing traffic mess, creating problems for motorists. Traffic jam could be seen during rush hours from these connecting roads.

Its importance become more significant because it lies on Srinagar Highway and Khayban-e-Suhrawardy. There are many educational institutes, business areas and hospitals/medical facilities area directly or indirectly connected to this intersection.

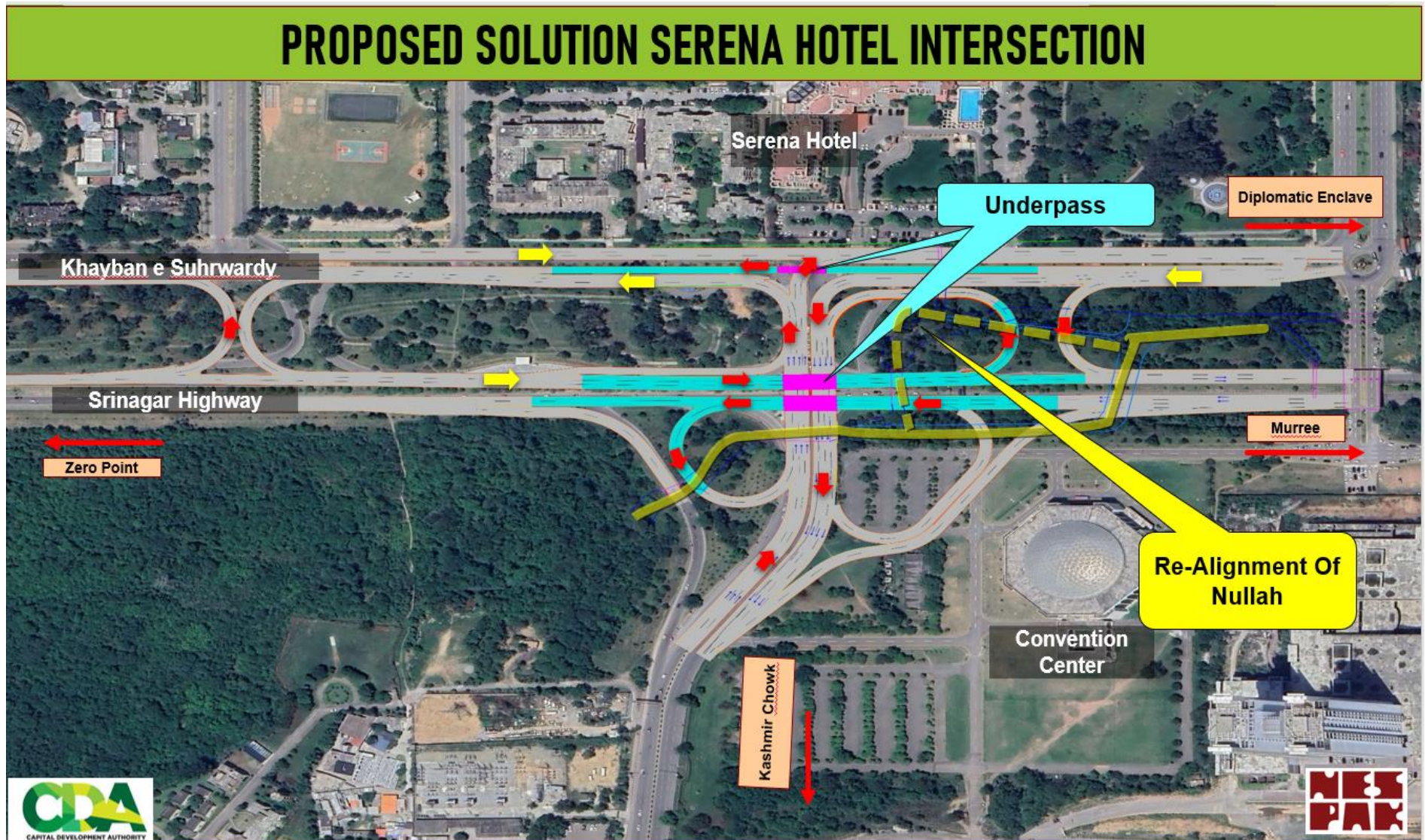


Figure 1: Lay out Map Showing the Location and Accessibility of the Project

## **1.7 ASSESSMENT METHODOLOGY**

To establish the baseline data, the Area of Influence (AOI) was identified through baseline information collection within maximum 100~200m of Spatial Scale from the proposed ROW of underpasses for abiotic factors. To specify this, the spatial scale of 50m x 50m square along the proposed reconstruction components are identified as Area of Influence (AOI) for biotic factors (predominantly tree inventories and grass land ecosystem) and social factors. Besides, ancillary works like temporary labor camps, storage and equipment yard also includes for assessment.

During onsite assessment, four different Land-Use types/sensitive receptors were taken for assessment within AOI Spatial Scale. These following four environmental/social variables are considered as strongly associated:

- i. Tree density/afforestation pattern along Srinagar Highway.
- ii. Nearby infrastructure/social amenities.
- iii. Abiotic environment.
- iv. Ecological dynamics/alterations.

These Land-Use types/landscape variables were extracted through onsite assessment conducted in June, 2024 and topographic mapping. Further, the impact on these landscape variables were correlated with the construction components for assessing the significance of impacts.

In a similar pattern, the main environmental variables were also taken for assessment, mainly including of air quality degradation and noise generation.

## **1.8 Statutory Requirement of Environmental Impact Assessment & Project Categorization**

Section 12 of Pakistan Environmental Protection Act 1997 requires that every new development project has to be preceded by an Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA) depending upon the nature and scope of the project and scale of impacts associated with the project.

The Pak Environmental Protection Agency (Review of IEE/EIA) Regulations 2000 categorize projects into two separate schedules depending on whether a project requires an IEE (Schedule) or an EIA (Schedule-II). The Regulations also require that all projects located in environmentally sensitive areas ensure submission of an EIA.

Schedule I categorizes those projects which are small scale projects, or which have narrow range of environmental impacts pertaining to these activities. Schedule II includes projects which are expected to impose severe environmental impacts and need thorough evaluation prior to commencement of project activities.

Transport sector projects like the subject project fall under schedule I and require and IEE submission to EPA. However, in conformity to the IEE/EIA regulations, 2000, the proposed project has been categorized into Schedule-II Category D: It states that Federal/Provincial Highway or major roads (except maintenance, re-building and reconstruction of existing roads) with total cost fifty million rupees and above.

This EIA report serves to assess the current environment of project area, the proposed project activities, and their impact on the ambient environment. The report has assessed the potential impacts and addressed both the positive and negative impacts of the project.

### **1.9 PURPOSE OF THE EIA REPORT**

The major activities performed under the EIA study are as under:

- All major and minor positive or negative impacts on the environment (physical, biological, social and ecological) during the inception as well as pre-construction, construction and operation of project are to be identified.
- Mitigation of negative impact as far as practically possible through modification in design and construction component.
- Apply appropriate engineering control measures to avoid any residual short term or long-term negative impact. Further, clearly and made known to all stake holders as well as those likely to be affected.
- A well developed and Site-Specific Environment Management Plan to be developed with inclusion of all components/parameters for controlling the ambient environment during construction and operation phase.

### **1.10 OBJECTIVE OF EIA STUDY**

The overall objective of EIA is to promote environmentally sustainable development in the of proposed apartment structures. The specific objectives of the EIA Study on the proposed construction of this project include the following:

- Documentation of relevant policy, legal and administrative frameworks;
- Collection and scrutinization of data related to physical, biological and socio-economic environments of the Project Area and to prepare Baseline Environmental Profile;
- Identification, prediction and evaluation of environmental impacts of the proposed Project;
- Implementation of mitigation measures to minimize the adverse impacts; and
- Preparation of an Environmental Management and Monitoring Plan.

### **1.11 STUDY TEAM**

A multidisciplinary team of experts was assigned to carrying out this study. The team includes:

<b>Name</b>	<b>: Designation</b>	<b>Role</b>
Mr. Jawad-UI-Haq	: Chief Engineer	Team Leader
Usman Haider Muhammadi	: Environmental Management Expert	Drafted EIA Report
Mr. Noshewan Naeem	: Civil Engineer	Design Engineer
Mr. Junaid	: Associate Engineer	Auto-Cad Operator

## **1.12 APPROACH AND ASSESSMENT METHODOLOGY**

### **1.12.1 Review of Project Activities**

The EIA study starts with review of project activities using the information from the client. In a scoping session with the Proponent, different aspects of the Project were discussed in terms of various environmental issues. Details of the past and proposed project activities were collected from the proponent. The impacts associated with the project were reviewed and mitigation measures were specified. In subsequent meetings with the Proponent the observations were communicated.

### **1.12.2 Review of Policy, Legislation and Guidelines**

The relevant national legislations, guidelines were reviewed to set the environmental standards and environmental management plan that the project would be required to adhere to during the construction and operation phase of the project.

### **1.12.3 Review of Secondary Data**

The project related information provided by the client was reviewed by the team of experts to identify key areas of study and analysis/assessment. Besides information from the proponent, available secondary data including environmental studies on similar projects by NESPAK and other was also reviewed. Available literature on project area was reviewed to collect information for development of social and environmental baseline profiles for the subject EIA, summarizing the following:

- Physical environment: topography, geology, soils, water resources, ambient air and climate.
- Biological environment: habitat types, flora and fauna, habitats within the proposed site and its surroundings
- Socio-economic environment: settlements, socio-economic conditions, infrastructure and land use; and
- Wildlife and Heritage aspects: sites of cultural, archaeological or historical significance.

### **1.12.4 Field Data Collection**

E&S experts looked around the site for the purpose to collect primary data on the physical, biological and socioeconomic conditions of the project area. Assessments were made to identify/observe the present environmental conditions of the site with respect to geology, topography, air and noise quality and hydrology etc.

### **1.12.5 Identification and Assessment of Impacts**

Potential impacts which may arise from underpass and realignment were identified. These include effects on physical, biological, and socio-economic environment. Impacts were identified, notably on the ecology and hydrology of the project area and assessed on the basis of field data collected from intersection site. Besides this, secondary data, expert opinion, and monitoring results (from previous similar studies at nearby surrounding) were also used and reviewed during impact assessment.

### 1.12.6 Recommendations for Mitigation and Monitoring Measures

Keeping in view the baseline data collected and impacts identified, mitigation measures were recommended to minimize, reduce, eliminate, or compensate for the potential environmental and social impacts on the project zone of influence. Mitigation measures were recommended on the basis of the engineering control measures adopted in previous similar nature of projects and onsite assessment of experts.

### 1.12.7 Development of Environmental Management Plan (EMP)

Environmental management plan (EMP) was developed for purpose to make the plan mandatory for the contract agreement and put forth implementation for each design and construction component. EMP included suggested measures and management plan to minimize the identified negative impacts, and monitoring programme to monitor residual impacts, if any, during the construction and operation. The EMP includes the following:

- Mitigation and monitoring plan.
- Defining roles and responsibilities of the proponent and contractors
- Requirements for communication, documentation and training during implementation of the project.
- Site-Specific Management Plan to oversee the project progress by the SC.

## 1.13 STRUCTURE OF THE REPORT

*Section 1 “Introduction”* briefly presents the project background, objectives, methodology and need of the EIA study.

*Section 2 “Policy, Legal and Administrative Framework”* comprises policy guidelines, statutory obligations and roles of institutions concerning EIA study of the proposed Project.

*Section 3 “Description of the Project”* furnishes information about the location of the proposed Project, cost and size of the project, its major components and alternatives considered for the proposed project to select at the preferred alternative for detailed environmental assessment.

*Section 4 “Environmental Baseline Profile”* establishes baseline conditions for physical, biological and socio-economic conditions prevalent in the project area.

*Section 5 “Public Consultation”* identifies the main stakeholders and their concerns raised through scoping sessions, and deals with the measures to mitigate the social impacts.

*Section 6 “Anticipated Environmental Impacts and Mitigation Measures”* identifies, predicts and evaluates impacts of the project activities during the construction and operation stages and deals with the measures proposed to mitigate potential environmental impacts of the road project.

*Section 7 “Environmental Management and Monitoring Plan”* outlines institutional arrangements for the implementation of the proposed mitigation measures, training needs of the staff for implementation of the mitigation measures, monitoring requirements, monitoring cost etc.

## **2. ENVIRONMENTAL POLICY, LAW AND ADMINISTRATIVE FRAMEWORK**

This chapter provides an overview of the national legislation for environmental protection and conservation. The Capital Development Authority (CDA) has been directed to undertake the matter of resolving traffic congestion issues at Serena and Convention Centre Intersection. Laws and regulations that are expected to apply in this project are discussed in this chapter.

The proposed project, like other development projects, requires an EIA in accordance with the Pakistan Environmental Protection Act (PEPA), 1997 and IEE/EIA Regulation, 2000.

Projects falling under category “D” specified in Schedule II require the proponent to file an EIA with the provincial agency, which is responsible for its review and accordance of approval or request any additional information deemed necessary.

### **2.1. Policy Framework**

The Ministry of Environment is the responsible authority for policy making on environmental protection in Pakistan.

Pakistan is a signatory to the Convention on Biological Diversity and is thereby obligated to develop a national strategy for the conservation of biodiversity. The Government of Pakistan constituted a Biodiversity Working Group, under the auspices of the Ministry of Environment, to develop a Biodiversity Action Plan for the country, which was completed after an extensive consultative exercise. The plan, which has been designed to complement the NCS and the proposed provincial conservation strategies, identifies the causes of biodiversity loss in Pakistan and suggests a series of proposals for action to conserve biodiversity in the country.

The Pakistan Environmental Protection Council (PEPC) has approved the action plan and steering committees at the federal and provincial levels have been formed to implement it.

Mid-term Review of NCS: Key Findings: An overview of the key environmental issues facing Pakistan is as follows:

- Per capita water availability in Pakistan has been decreasing at an alarming rate. In 1951, the per capita availability was 5300 cubic meter which has now decreased to 1105 cubic meter just touching water scarcity level of 1000 cubic meter.
- Almost all fresh-water resources are severely polluted due to discharge of untreated industrial and municipal wastes. Pollution of coastal waters due to waste discharges and oil spills coupled with reduced freshwater flows is resulting in declining fish yields.
- About 55 percent of population has access to a relatively safe drinking water source. Potable water quality, assessed against WHO standards, fails to meet all the specified criteria, confirming evidence of extremely high pollutant loads.
- Approximately 35 percent of population has access to adequate sanitation facilities.
- Air pollution is on the rise, especially in urban areas. Recent surveys conducted by Pakistan Environmental Protection Agency (PEPA) revealed presence of very high levels of suspended particulate matter (about 6 times higher than the World Health

Organization's guidelines). 'Smog' also seriously affects almost entire Punjab during December and January every year.

- Noise pollution has become a serious issue in major urban centres.
- Of about 54,850 tons of solid waste generated daily in urban areas, less than 60 per cent is collected. No city in Pakistan has proper waste collection and disposal system for municipal, hazardous or healthcare wastes.
- The deforestation rate has been estimated at 0.2-0.5 percent per annum. Forest cover, which was 4.8 percent of total land area in 1992, could hardly be increased substantially despite all efforts.
- Degradation and encroachment of natural forests, rangelands and freshwater and marine ecosystems are resulting in loss of biodiversity.
- Pakistan is a highly energy in-efficient country. It uses approximately same amount of energy to generate 1 dollar of GNP as the USA.

The situation just mentioned is the result of a number of constraining factors including high population growth rate, prevailing poverty, unplanned urban and industrial expansion, insufficient emphasis on environmental protection in the government policies, lack of public awareness and education and above all the ailing economy which has caused deficiencies in institutional capacity and resources for effective environmental management.

#### **2.1.1. National Environment Policy, 2005**

In March 2005, Government of Pakistan (GOP) launched its National Environmental Policy, which provides an overarching framework for addressing the environmental issues. Section 5 of the policy commits for integration of environment into development planning as instrument for achieving the objectives of National Environmental Policy. Its further states in clause (b) of subsection 5.1 that EIA related provisions of Environmental Protection Act, 1997, will be diligently enforced for all development projects. It also provides broad guidelines to the federal government, provincial governments, federally administered territories and local governments to address their environmental concerns and to ensure effective management of their environmental resources.

#### **2.1.2. National Resettlement Policy, 2002**

In March, 2002 Pakistan Environmental Protection Agency (Pak-EPA), GOP has issued its National Resettlement Policy, which explains the basis for compensation, rehabilitation and relocation of the affectees. It also explains the requirements and implementation of Resettlement Action Plan (RAP).

#### **2.1.3. The Biodiversity Action Plan**

The Biodiversity Action Plan, 2000 has been the most significant direct step towards addressing the issue of loss of biodiversity. It details the current status, trends, direct & indirect causes of loss of biodiversity; its principles, goals and aims; proposals for an action plan including planning & policies, legislation, identification and monitoring, in situ & ex-situ conservation, sustainable use, research and training, public education and awareness, Environmental Impact Assessment,

information extraction and financial resources etc. The Wild Birds and Animals Protection Act 1912<sup>1</sup>, the West Pakistan Wildlife Protection Ordinance 1959, the Wildlife Protection Rules 1972<sup>1</sup>, provide for the protection of flora and fauna in the territory, including vegetation and protected forest.

## **2.2. ADMINISTRATIVE AND INSTITUTIONAL SETUP FOR ENVIRONMENTAL MANAGEMENT**

Environmental issues are governed by three levels of the government viz. Federal, Provincial and Local Government. The Ministry of Environment and Local Government is the Ministry at the Federal level, which oversees the affairs of the environment in the country.

The PEPC has been formed by the Federal Government. It comprises Prime Minister /Chief executive as the chairperson, the Minister of the Ministry of Environment, Local Government and Rural Development as the vice-Chairperson; Governors of the Provinces; Ministers in charge of the subject of environment in the Provinces; Secretary to the Federal Government in charge of the Ministry of Environment, Local Government and Rural Development; Director General Federal EPA; heads of other federal and provincial departments; environmentalists and community representatives including scientists. The functions and powers of the Council include formulation of national environmental policy, enforcement of PEPA 1997, approval of the NEQS, incorporation of environmental considerations into national development plans and policies and provide guidelines for the protection and conservation of biodiversity in general and for the conservation of renewable and non-renewable resources.

The Federal government has also established the Federal EPA, which is headed by a Director General and has wide-ranging functions given in PEPA 1997. These include the preparation and coordination of national environmental policy for approval by the PEPC, administering and implementing the PEPA 1997 and preparation, revision or establishment of NEQS.

The Provincial Environmental Protection Agencies are established by the respective Provincial Governments. A Director General who exercises powers delegated to him by the Provincial Government heads each Provincial EPA. IEEs and EIAs are submitted to provincial EPAs for approval.

The proposed project would be located in federal Capital. Hence this EIA Report will be submitted to the Federal EPA for review and issue of environmental approval. Coordination of the environmental monitoring activity will be responsibility of Pak EPA; in this case Pak EPA has been duly authorized to enforce environmental compliance.

## **2.3. STATUTORY FRAMEWORK**

The constitution of Pakistan contains provision for environmental protection and resource conservation. The constitution mentions environmental pollution and the ecology as a subject in the concurrent legislative list, meaning that both the provincial and federal government may initiate and make legislation for the purpose. Article 9 of the Constitution defines the right to life

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<sup>1</sup> The Wild Birds and Animals Protection Act 1912 (Act No.VIII of 1912 dated 18.09.1912)

as a “fundamental right” in these words “No person shall be deprived of life or liberty save in accordance with law”. The Supreme Court of Pakistan in its judgment in the case Shehla Zia and others vs. WAPDA (1994) declared that the right to a clean environment is part of the fundamental constitutional right to life.

Several laws exist for the protection of the environment. Some of these laws are Federal and the rest Provincial in character. The promulgation of the Environmental Protection Ordinance 1983 was the first codifying legislation on the issue of environmental protection. This was indeed a consolidated enactment to plug the gaps and remove defects/deficiencies in the legislation. The promulgation of this ordinance was followed, in 1984, by the establishment of the Pakistan Environmental Protection Agency, the primary government institution dealing with environmental issues. Significant work on developing environmental policy was carried out in the late 1980s, which culminated in the drafting of the Pakistan National Conservation Strategy. Provincial environmental protection agencies were also established at about the same time. The Pak Environmental Quality Standards were established in 1993.

Prior to the 18<sup>th</sup> Amendment to the Constitution of Pakistan in 2010, the legislative powers were distributed between the federal and provincial governments through two ‘lists’ attached to the Constitution as Schedules. The Federal list covered the subjects over which the federal government had exclusive legislative power, while the ‘Concurrent List’ contained subjects regarding which both the federal and provincial governments could enact laws. The subject of ‘environmental pollution and ecology’ was included in the Concurrent List and hence allowed both the national and provincial governments to enact laws on the subject.

However, as a result of the 18th Amendment this subject is now in the exclusive domain of the provincial government. The main consequences of this change are as follows: i) The Ministry of Environment at the federal level have been abolished. Its functions related to the national environmental management have been transferred to the provinces. The international obligations in the context of environment will be managed by various ministries and departments of the federal government, ii) The Pakistan Environmental Protection Act 1997 (PEPA 1997) is technically no longer applicable to the provinces and is applicable only in the Islamabad Capital Territory. The provinces are required to enact their own legislation for environmental protection.

### **2.3.1. Pakistan EPA (Review of IEE/EIA) Regulations 2000**

The Pakistan Environmental Protection Agency (Review of EIA/IEE) Regulations 2000 define Schedules (I & II) of projects falling under the requirement of IEE or EIA. This EIA Study has, for environmental classification of the Project into Category A or B, taken account of the requirements of the Environmental Protection Agency (Review of EIA/IEE) Regulations 2014 which define Schedules (I & II) as follows:

Schedule I: A project falls in Schedule I if it is likely to have adverse environmental impacts, but of lesser degree or significance than those for category ‘A’ and all the mitigation measures to handle the impact is manageable. Such types of projects need IEE report including EMP.

Schedule II: Projects are categorized in Schedule II if they generate significant adverse environmental impacts that require a comprehensive management plan, or if the project is located within or passes through: a) Areas declared by the Government of Pakistan as environmentally

sensitive (National Parks/Sanctuaries/Game Reserve), b) Areas of international significance (e.g. protected wetland as designated by the RAMSAR Convention), or c) Areas designated by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) as cultural heritage sites.

According to Environmental Protection Agency Regulation, 2014, a proponent of a project falling in any category listed in Schedule II shall file an EIA with the Pakistan Environmental Protection Agency, since the listed projects are generally major projects and have the potential to affect many people.

### **2.3.2. Pakistan Environmental Assessment Guidelines**

The Federal EPA has prepared a set of guidelines for conducting environmental and social assessments. The guidelines derive from much of the existing work done by international donor agencies and NGOs. The package of regulations, of which the environmental and social guidelines form a part, includes the PEPA 1997 and the NEQS. These guidelines are listed below followed by comments on their relevance to proposed project:

- Policy and Procedures for Filing, Review and Approval of Environmental Assessments, Pakistan Environmental Protection Agency, September 1997: These guidelines define the policy context and the administrative procedures that govern the environmental assessment process from the project pre-feasibility stage to the approval of the environmental report. The section on administrative procedures has been superseded by the IEE-EIA Regulations, 2000.
- Guidelines for the Preparation and Review of Environmental Reports, Pakistan Environmental Protection Agency, 1997: The guidelines on the preparation and review of environmental reports target project proponents and specify:
  - i. The nature of the information to be included in environmental reports
  - ii. The minimum qualifications of the EIA conductors appointed
  - iii. The need to incorporate suitable mitigation measures at every stage of project implementation
  - iv. The need to specify monitoring procedures.
- The terms of reference for the reports are to be prepared by the project proponents themselves. The report must contain baseline data on the Study Area, detailed assessment thereof, and mitigation measures.
- Guidelines for Public Consultation, Pakistan Environmental Protection Agency, May 1997: These guidelines support the two guidelines mentioned above. They deal with possible approaches to public consultation and techniques for designing an effective program of consultation that reaches out to all major stakeholders and ensures the incorporation of their concerns in any impact assessment study.

Sectoral Guidelines for Environmental Reports: Housing estates and new Town developments: These guidelines are prepared to look specifically at the Environmental impacts resulting from constructing housing estates and townships in Pakistan. The guidelines examine the alternatives

on site and technology and impacts on the social and physical environment, during the construction and operation phases of the project and devices proposals for mitigation measures.

The EIA report submission and approval procedure is summarized below:

- a. Ten hardcopies of the EIA and two soft copies will be submitted together with a review fee and form included as Schedule V of the IEE-EIA Regulations.
- b. The EPA will conduct a preliminary scrutiny and reply within 10 days of the submittal of the report.
- c. If accepted, the EPA will set a date for public hearing and publish a notice in the print media. According the law, a minimum of 15-day notice is required for the public hearing.
- d. The EPA will review the EIA taking into account the any public comments received during the hearing or otherwise.
- e. The EPA is required to make every effort to complete the EIA review process within four (04) months of the issue of confirmation of completeness under regulation 9.
- f. The approval granted at the end of the review process, is valid for three years to start construction.
- g. Once the project construction is complete, the proponent is required to submit a request to EPA for confirmation of compliance. An environmental management plan for the operation phase is to accompany the request.

### **2.3.3. National Environmental Quality Standards (NEQS)**

The NEQS are uniform standards applicable to all kind of industrial and municipal effluents. Different Parameters are set showing permissible levels of pollutants in liquid effluent and gaseous emission. These were first promulgated in 1993 and were last revised in 2000. For liquid effluent, there are 32 parameters showing permissible level of pollutants before its discharge into sea, inland water & sewage. And, for gaseous emission, there are 16 parameters.

### **2.3.4. Pakistan Penal Code, 1860<sup>2</sup>**

The Pakistan Penal Code deals with offences where public or private property and/or human lives are affected due to the intentional or accidental misconduct of an individual or body of people. In the context of environment, Section XIV of PPC deals with the offences affecting the public health, safety, convenience, decency, morals and environmental pollution and empowers the local authorities to control noise, noxious emissions and disposal of effluents.

The NEQS/SEQS enforced by the EPAs supersede the application of this legislation on industries and municipalities. **The Penal Code, however, can provide a basis for the client to coordinate its activities with the local authorities to ensure that its construction activities do not become a cause of public nuisance or inconvenience.**

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<sup>2</sup> Pakistan Penal Code (XLV of1860)6th October 1860

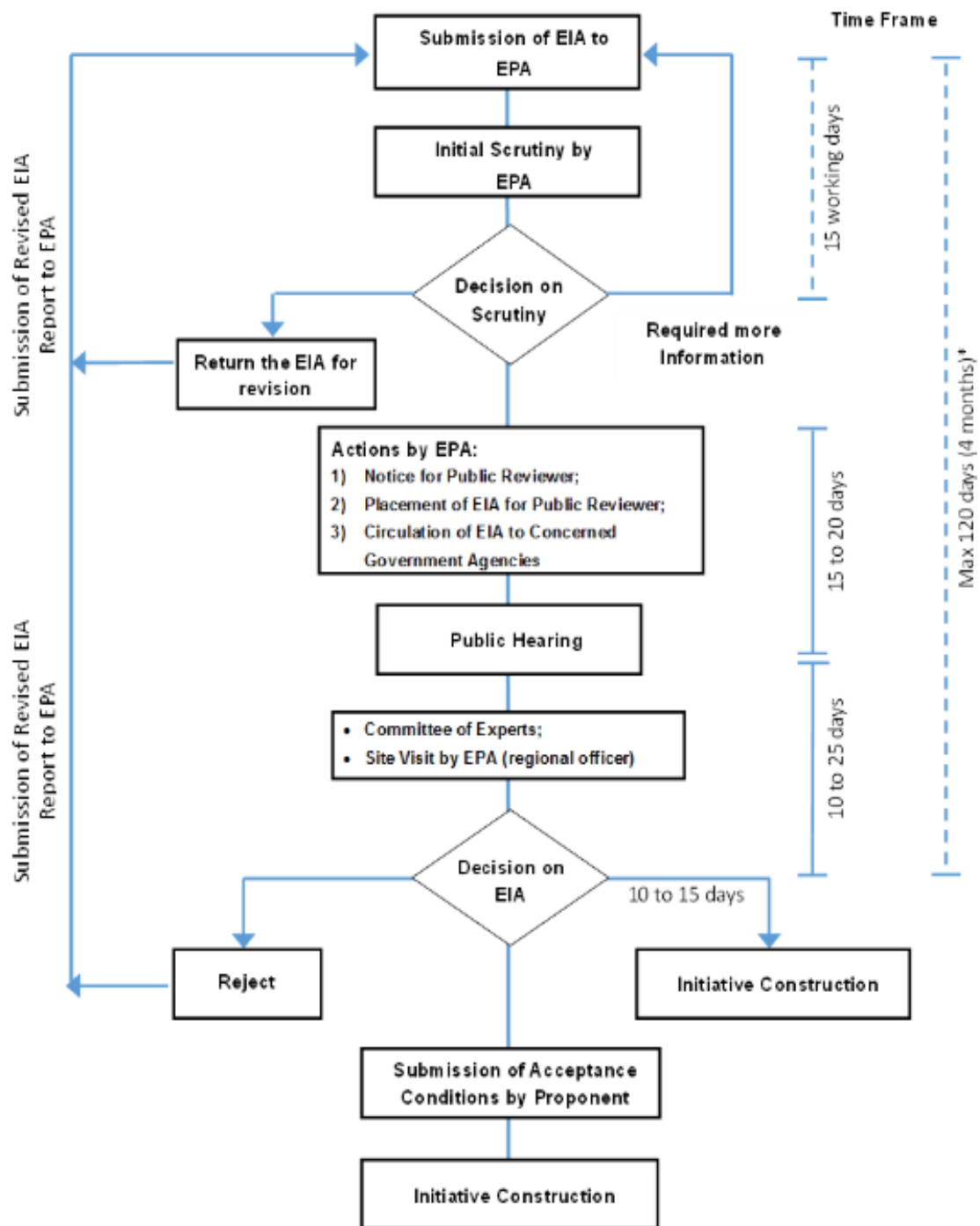


Figure 2: EIA Review and Approval Procedure

### **2.3.5. Factories Act, 1934**

The Act addresses health, safety and welfare of workers, disposal of solid waste and effluent, and damage to private and public property. The Factories Act also provides regulations for handling and disposing of toxic and hazardous materials.

Construction activity is classified as an industry and therefore the regulations will be applicable to the Project Contractor. The procedures for the disposal of solid and liquid waste and of toxic and hazardous wastes will be prescribed later in this document, particularly at EMMP of this draft report.

### **2.3.6. Forest Act 1927**

The Forest Act deals with the matters related with protection and conservation of natural vegetation/habitats. In that regard it empowers the concerned agency to declare protected and reserved forest areas and maintaining the same. In spite of the fact that it recognizes the right of people for access to the natural resources for their household use, it prohibits unlawful cutting of trees and other vegetation. The Project site does not encompass any reserve/protected forest area.

### **2.3.7. Cutting of Trees (prohibition) Act, 1992**

The Cutting of Trees Act mandates that no person shall, without prior written approval from authorized officer shall cut, fell or damage trees growing in:

- First Zone (Area adjacent to and beyond the external frontier of Pakistan to a line at four kilometers measured from the external frontiers of Pakistan) if the number of remaining trees in any field falls short of the number to be calculated at the rate of fifteen trees per acre.
- Second Zone (Area adjacent to and beyond the first zone extending towards Pakistan to a line of four kilometers measured from the first zone) if the number of remaining trees in any field falls short of the number to be calculated at the rate off ten trees per acre.

Noteworthy, the project site is not located in the zones as mentioned above; therefore, the provisions of this law do not apply to the project.

### **2.3.8. Land Acquisition Act, 1894<sup>3</sup>**

At present, the only legislation relating to land acquisition and compensation is the Land Acquisition Act (LAA) of 1894. The LAA is, however, limited to a cash compensation policy for the acquisition of land and built-up property, and damage to other assets, such as crops, trees, and infrastructure. The LAA does not consider the rehabilitation and resettlement of non-titled populations.

### **2.3.9. Highways Safety Ordinance**

This ordinance includes provisions for the licensing and registration of vehicles and construction equipment; maintenance of road vehicles; traffic control, offences, penalties, procedures; and the

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<sup>3</sup> The Land Acquisition Act 1894 (Act of 1894) <http://punjabelaws.gov.pk/laws/12.html>

establishment of a police force for motorways and national highways charged with regulating and controlling traffic on the national highways and keeping the highways clear of encroachments.

### **2.3.10. Motor Vehicle Rules, 1969**

Motor Vehicle Rules 1969 (MVR 1969) define powers and responsibilities of Motor Vehicle Examiners (MVEs). The establishment of MVE inspection system is one of the regulatory measures that can be taken to tackle the ambient air quality problems associated with the vehicular emissions during operation phase.

## **2.4. POLICIES, LAWS AND LEGISLATION APPLICABLE IN FEDERAL CAPITAL**

### **2.4.1. Pakistan Environmental Protection Act, 1997**

The Pakistan Environmental Protection Act, 1997 (PEPA) is the fundamental legislation empowering the government to formulate regulations for protecting the environment. It is broadly applicable to air, water, soil, marine and noise pollution, as well as to the handling of hazardous waste. Penalties have been prescribed for those contravening the provisions of the Act. The powers of the federal and provincial Environmental Protection Agencies (EPAs) have also been considerably enhanced under this legislation. In addition, the EPAs have been empowered to conduct inquiries into possible breaches of environmental law either upon the registration of a complaint or on their own accord. Under section 12 of PEPA (1997), no project involving construction activities or any change in the physical environment can be undertaken unless an Initial Environmental Examination (IEE) or EIA, as required, is conducted and a report submitted to the federal or provincial EPA.

### **2.4.2. Pakistan Environmental Protection Agency**

Pak EPA is headed by Director General (DG) with the aim to exercise the powers and perform the functions assigned to it under the provisions of this Act and the rules and regulations made thereunder. The Agency shall have technical and legal staff and may form advisory committees.

Pak EPA would have powers to enter or inspect under a search warrant issued by Environmental Protection Tribunal or a Court search at any time, any land or building etc. where there are reasonable grounds to believe that an offence under this Act has been or is being or likely to be committed. EPA may also take samples, arrange for testing or confiscate any article in discharge of their duties.

Some key functions and powers of Pak EPA under the PEPA 1997 are to:

- a). Administer and implement this Act and the rules and regulations made;
- b). Take all necessary measures for the implementation of the national environmental policies approved by the Council;
- c). Prepare and publish an annual National Environment Report on the state of the environment;
- d). Prepare, establish and revise the National Environmental Quality Standards with approval of the Council;
- e). Ensure enforcement of the National Environmental Quality Standards;

- f). establish standards for the quality of the ambient air, water and land, by notification in the official Gazette in consultation with the Provincial Agency concerned
- g). summon and enforce the attendance of any person and require him to supply any information or document needed for the conduct of any enquiry or investigation into any environmental issue.
- h). arrange for test and analysis of the samples at a certified laboratory.

#### **2.4.3. ICT Development Laws and Regulations**

The Capital Development Authority (CDA) has the responsibility for the overall planning, provision and supervision of public health services, covering adequate sanitation and garbage disposal within the territorial limits of the Islamabad Capital Territory (ICT). It also has the responsibility for the coordination of public health services with other relevant agencies. This includes collection, transportation and safe disposal of liquid and solid waste collected from residential areas, commercial areas, open spaces etc.

The CDA operations are governed generally by the provisions of the Islamabad Capital Territory Municipal Bye Laws, 1968 as amended from time to time; and specifically by the Islamabad Regulations 1979 (Upkeep of Cleanliness) as amended from time to time.

Recently, some departments have been shifted to Municipal Corporation Islamabad (MCI) including Water, sanitation and environment and issues related to water, sewerage, and environment are now taken care by the relevant administration of MCI.

#### **2.4.4. Islamabad Environmental Improvement Act, 1995**

Islamabad Environmental Improvement (Green Areas) Act, 1995 was proposed to (1) prevent the existing green area in the Islamabad Capital Territory from being used for purposes other than those for which they are reserved and (2) ensure that at least 20 % of the total area of any new scheme is reserved for the development of green areas. To this Act, "green areas" means land in the Islamabad Master Plan, or other schemes, reserved exclusively for parks, playgrounds, forests, nurseries, vegetative cover, green belts and open spaces on which no construction is planned.

#### **2.4.5. Islamabad Wildlife Ordinance, 1979**

The Islamabad Wildlife (Protection, Preservation, Conservation and Management) Ordinance 1979 provides the protection, preservation, conservation and management of wildlife in Islamabad Capital Territory. Main aim of this act is the preservation and conservation of wildlife, flora and fauna for sustainable development and also to comply with the concept of national parks internationally.

#### **2.4.6. Islamabad Capital Territory Local Government Act, 2015**

This Act is expedient to establish an elected local government system to devolve political, administrative and financial responsibility and authority to the elected representatives of the local governments; to promote good governance, effective delivery of services and transparent decision making through institutionalized participation of the people at local level; and, to deal with ancillary matters.

## **3. PROJECT DESCRIPTION**

### **3.1 GENERAL PROJECT DESCRIPTION**

At present, the main artery at Serena Chowk and Convention Centre is second busiest intersection in Srinagar Highway and carrying all type of traffic from not only Faizabad/Rawal road but also carrying traffic movement towards Islamabad and Peshawar Road areas (N-5).

There are several significant junctions and intersections along Srinagar Highway, which runs through the center of the city. It has a direct connection to Islamabad International Airport on its western end. On the other hand, Islamabad's connection to the Murree Road interchange lies at the eastern end of the highway. As a result, it ranks as one of the most significant intercity routes in Islamabad.

On the other hand, underpasses at Serena and Convention intersection project is also important for the city and Secretariat areas, as traffic rush on the main intersection wasted time and fuel of the motorists. All the stake holders including CDA wanted to construct two underpasses and realignment of existing Nullah on this Chowk/roundabout to avoid blocking. The redesigning of this Serena and Convention intersection would improve the traffic flow.

### **3.2 NEED FOR THE PROPOSED UNDERPASS**

Forgoing in view to this, a feasible solution is required to solve the traffic congestion problem at existing intersection (as shown in figure below) by intending of underpasses at Serena and Convention Centre intersections. Various option involving grade separation and geometrical Improvement of the intersection are under study and a most feasible option i.e., underpasses three feasible locations will be finalized after the consideration of various engineering aspects.

In parallel to this proposed development, CDA has also initiated working to construct realignment of existing Nullah to make the vehicular movement in safest and smoothest way. To make the project more feasible the integration of both proposed options is necessary so that no traffic hindrance occurs after completion of project.

The proposed development by CDA, will help in reducing frequent traffic jams/congestions at the intersection. Subsequently, major confounding environmental factors i.e., noise and air pollution will be reduced/eliminated at certain level through reduction in Vehicle Operating Cost (VOC) and Vehicle Time Travel (VTT).

To overcome these problems, CDA therefore realizing the gravity of solution and has planned to conduct a feasibility study along with detailed design of resolving traffic congestion issues at this intersection. The project includes the following major works:

- Construction of underpass (4-Lane) with auxiliary lanes along Srinagar Highway for Zero Point and Barakahu Bound Traffic.
- Construction of Underpass 2-Lane for Diplomatic Enclave bound traffic.
- Construction of Loops for turning traffic at Convention Centre Chowk.
- Construction of approaching roads and auxiliary works.

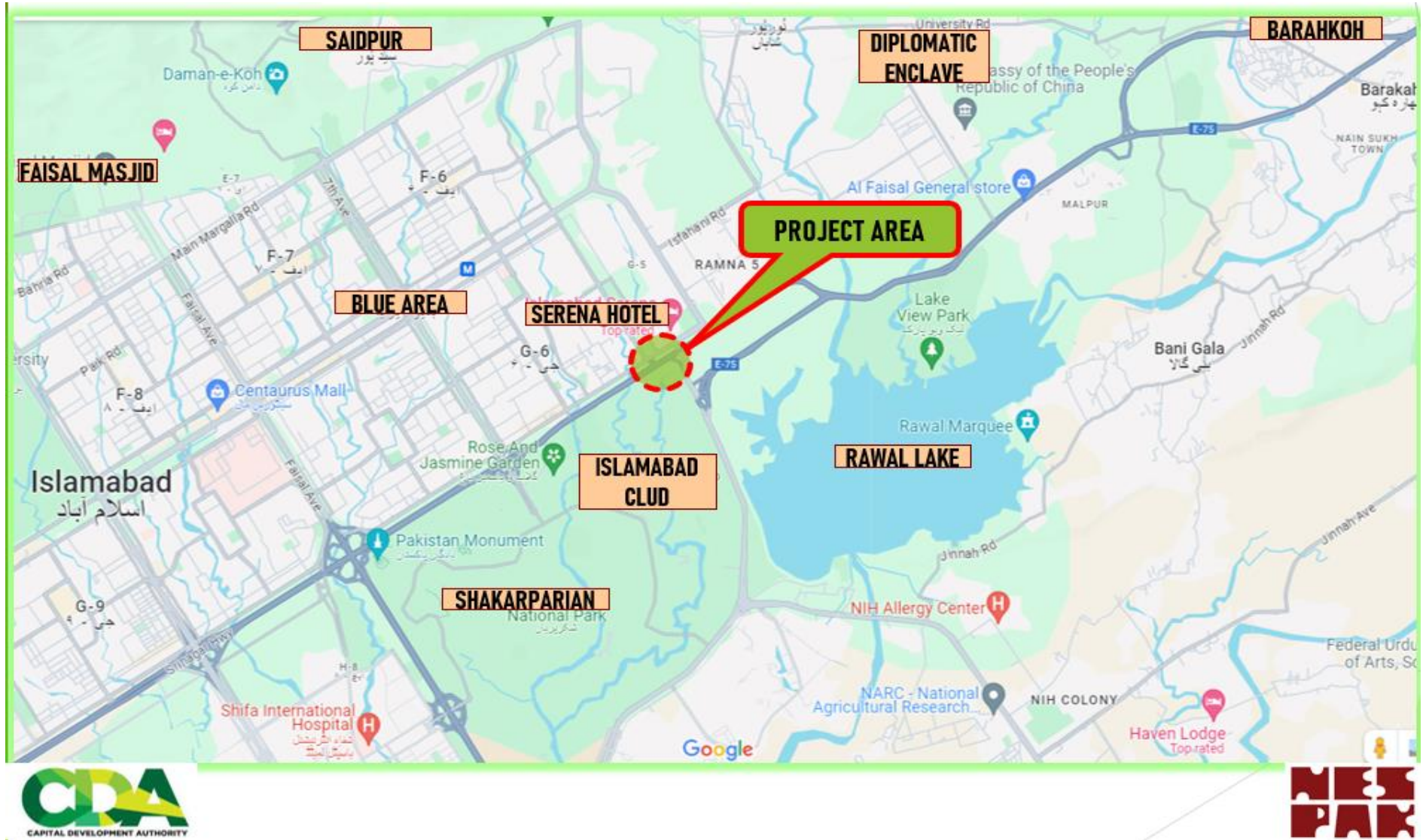


Figure 3: Map View of Project Site

Geographically, intersections at Srinagar Highway and Rawal road are now being imperative to solve congestion issues. In order to eliminate/reduce the contemporary issues, the underpass is now considered to be the only solution for safe access and movement of traffic, coming from other part of the city.

### **3.3 NEED/OBJECTIVE OF THE PROJECT**

Due to heavy traffic volume, frequent blocks often occur in peak hours. The existing intersection do not support traffic volume therefore it needs immediate improvement in form of construction of an under pass. To overcome these problems, CDA therefore realizing the gravity of solution and has planned to conduct a feasibility study along-with detailed design of; underpass and realignment of existing Nullah. At present, these roads are important links for the Blue area and accessibility to the other part of Islamabad.

The project includes the following major works:

- Construction of underpasses with auxiliary lane at Convention and Serana Intersection
- Two underpasses with ancillary works, including box culverts and retaining walls may be constructed.
- Realignment of existing Nullah.
- This project is also devised to facilitate renowned universities, such as Allama Iqbal Open University, National University of Science and Technology, and National University of Computers and Emerging Sciences and Government Offices located in closed proximity.

### **3.4 PROJECT LOCATION AND ACCESSIBILITY**

#### **3.4.1 Project Location**

Project Site is situated near key government offices, diplomatic missions, and the city center, offering convenient access to many of Islamabad's attractions and business districts.

It is well-situated to provide easy access to a variety of key locations and services such as Prime Minister's Secretariat, the Supreme Court, and other major government buildings. Besides, several embassies and consulates, making it convenient for international visitors.

#### **3.4.2 Accessibility/Road Access of the Project**

The proposed underpass at Serena Hotel Intersection is easily accessible via several major roads in the city, namely Constitution Avenue, Jinnah Avenue, Khayaban-e-Suharwardy, Srinagar highway and Murree road.



Figure 4: Aerial View of the Project Site



Figure 5: Proposed Location of underpasses-1&2

### 3.5 LAND-USE PATTERN OF EXISTING INTERSECTION (SERANA CHOWK)

The area surrounding Serena Hotel Islamabad characterized by a diverse land use pattern that includes government, commercial, residential, and recreational zones. Here are the main land use categories in the vicinity of proposed underpass location at Serena/convention Centre Intersection:

#### **Landscape Context:**

- Mainly confined to dense tree patches at western end/Southern Western End, enclosed to 300-400m from project site.
- Tree mainly belongs to different taxonomic groups, planted by CDA, which is roadside landscaping/plantation.

#### **Government and Diplomatic Areas**

- Convention Centre: The Convention Centre in Islamabad, also known as the Jinnah Convention Centre, is a prominent venue for conferences, exhibitions, and other large-scale events. Located in closed proximity to project site.
- Constitution Avenue: Home to key government buildings such as the Prime Minister's Secretariat, Supreme Court of Pakistan, and the National Assembly.
- Diplomatic Enclave: Houses several embassies and high commissions, making it a hub for diplomatic activities.

#### **Commercial Zones:**

- Blue Area: Islamabad's main business district is a short drive from the hotel, featuring a mix of office buildings, shopping centers, banks, and restaurants.

#### **Residential Areas:**

- Sector G-5: The hotel itself is located in Sector G-5, which includes a mix of government offices and residential accommodations.
- Adjacent Sectors (e.g., F-6, G-6): Predominantly residential with a mix of houses, apartments, and local markets.

#### **Recreational and Green Spaces:**

- Fatima Jinnah Park: A large park offering recreational facilities and green spaces, located a short drive from the hotel.
- Rawal Lake and Lake View Park: Popular for outdoor activities such as boating, picnicking, and nature walks.



Figure 6: Land-Use Pattern at Enclosed Area



Figure 7: Existing Landscape Context at Serena/Convention Centre Intersection

### 3.6 SCOPE AND DESIGN OF PROJECT

#### **Alignment:**

Scope of project is construction of Underpasses along with approaches. The plan showing the proposed location, exhibited at figure-7 & 8.

Scope of work of the proposed project is summarized below:

**Table-1: Scope under the Proposed Underpasses**

Detail of the technical parameters/inputs, scope and specification of the project are given below:

<b><u>Technical Parameters</u></b>		
<b><u>Standard/Specification:</u></b> The project shall conform to the following specifications:		
<b><u>D. Underpass Along Srinagar Avenue Centaurus Bound Traffic</u></b>		
Through Length	:	530 m
Barrel Length	:	40 m
Ramps Length	:	490 m
Underpass Width (Typ)	:	9 m each side
<b><u>E. Underpass Along Khayaban-e-Suharwardy</u></b>		
Through Length	:	430 m
Barrel Length	:	40 m
Ramps Length	:	390 m
Underpass Width (Typ)	:	7 m
<b><u>F. Design Parameters</u></b>		
<b><u>Pavement Structure:</u></b>		
Asphalt Wearing Course	:	50mm
Asphalt Base Course	:	120mm
Water Bound Macadam	:	250mm
Subbase	:	200mm

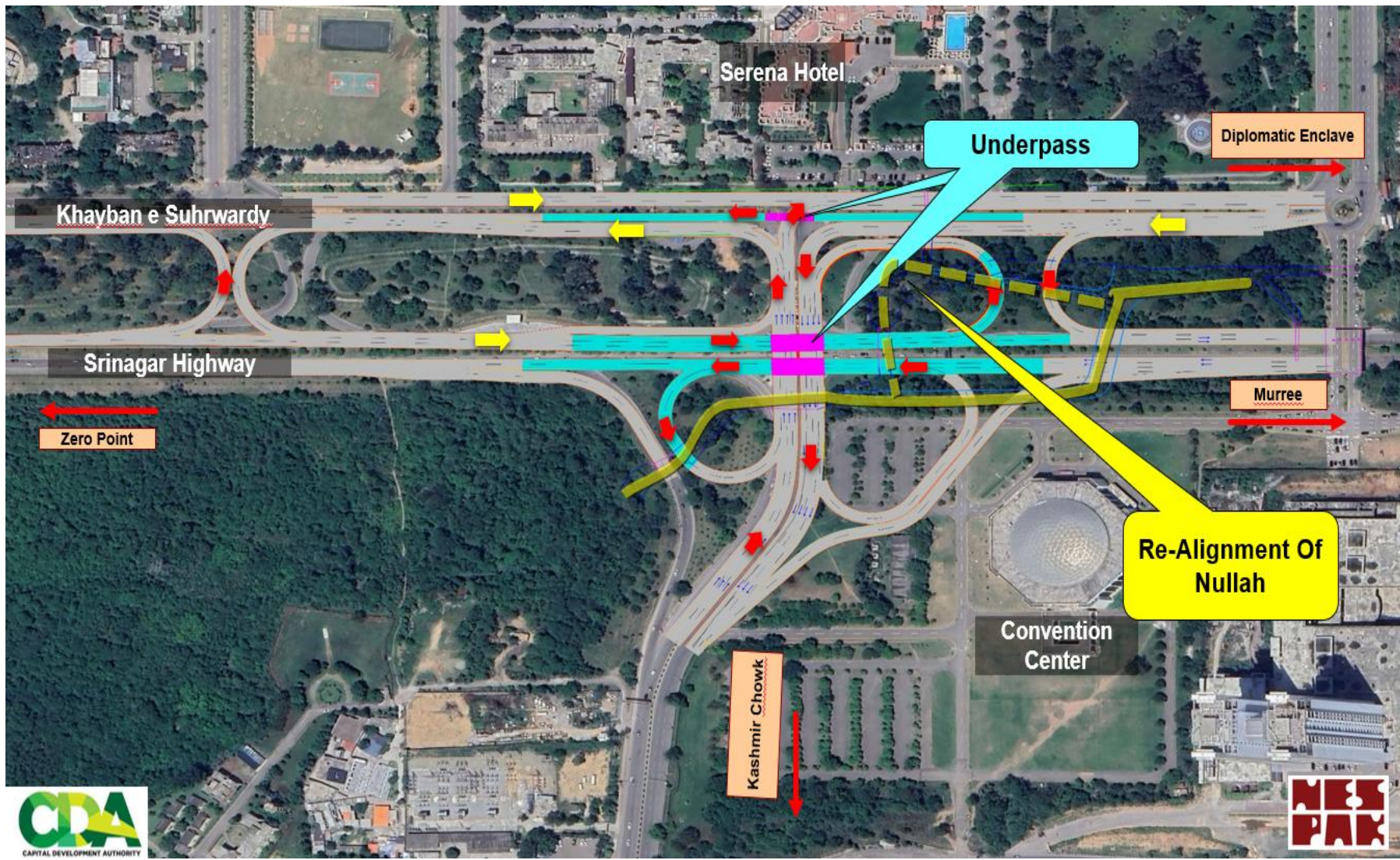


Figure 8: Proposed Solution Serena Hotel Intersection

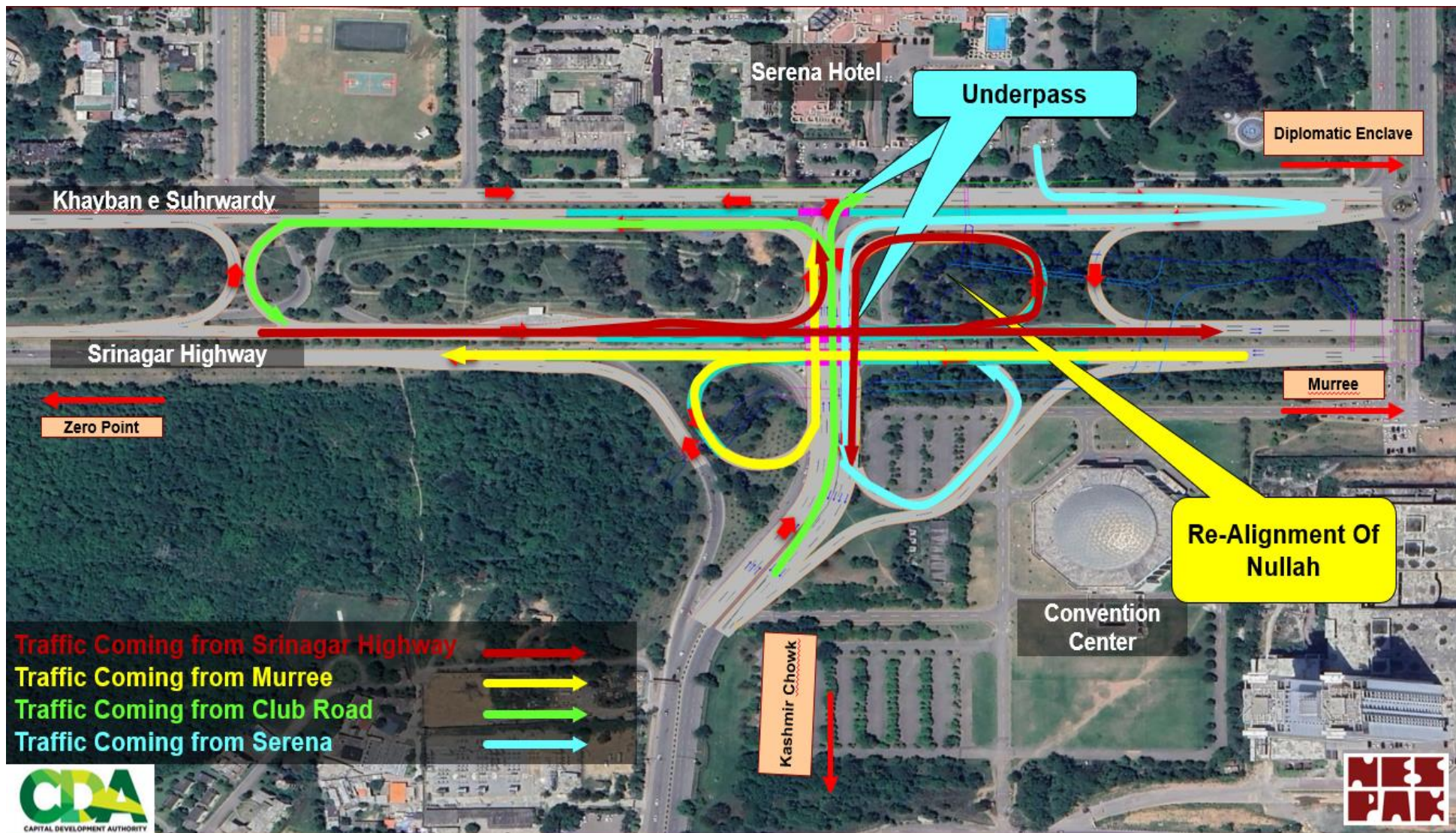


Figure 9: Proposed Traffic Circulation-Serena Hotel Intersection



Figure 10: Aerial Design Review- Serena Hotel and Convention Centre Intersection



Figure 11: Proposed Underpass Structures-Underpass 1-2&3

### 3.7 PROJECT IMPLEMENTATION SCHEDULE

NESPAK, the consultant for Project will give project's feasibility and compatibility, hence, to alleviate congestion, two underpasses with ancillary works, including box culverts and retaining walls may be constructed as finalized by the Competent Forum.

The execution would be started after receiving final consent/NOC from all in line departments.

### 3.8 COST OF THE PROJECT

The estimated PC1 cost of the proposed project is tabulated below. However, environmental mitigation and afforestation cost allocated is mentioned at Chapter-7 (EMMP).

**RESOLVING TRAFFIC CONGESTION ISSUES AT SERENA CHOWK AND CONVENTION  
CENTER CHOWK, ISLAMABAD  
COST ESTIMATE  
SUMMARY**

Bill No.	Description	Amount (Rs.)
1	Earthwork and Allied Activities	84,760,986
2	Subbase and Base	453,250,013
3	Surface Courses & Pavement	206,256,534
4.1	Structures (Underpass-1)	633,278,463
4.2	Structures (Underpass-2 & 3)	932,332,640
4.3	Structures (Retaining Walls)	394,679,190
4.4	Structures (Box Culverts)	154,857,939
4.5	Structures (Realignment of Nullah)	255,649,342
4.6	Structures (Geotechnical Investigations) (P.S)	5,000,000
5a	Storm water Drainage and Manhole works	90,244,777
5b	Drainage & Erosion Works	409,150,549
6	Ancillary Works	127,021,303
7	General Items	-
8	Electrical Works	120,559,383
	<b>Total Construction Cost =</b>	<b>3,867,041,117</b>
	Landscaping and Horticulture work @ 1% of Construction Cost	38,670,411
	Contingencies @ 2% of Construction Cost	77,340,822
	Shifting of Services LESCO, SNGPL, PTCL etc./ Diversion of Traffic / Energy charges (P.S)	50,000,000
	Consultancy Charges for Design Services @ 1.2% of Construction Cost	46,404,493
	Consultancy Charges for Construction Supervision @ 2% of Construction Cost (Man Month Basis)	77,340,822
	PST @ 5% of Construction Cost	193,352,056
-	<b>Total Project Cost =</b>	<b>4,350,149,722</b>

### **3.9 CONSIDERATION OF ALTERNATIVES**

No other alternative was considered, because, at present, the congestion due to local traffic is becoming major issue to solve through underpasses for congestion free movement. So, in order to overcome the unsafe movement of traffic flow, the incoming traffic from other part of the Islamabad and Murree road will be facilitated to approach other cities, which will ultimately save the time of people, fuel and money as well. Moreover, this will provide safe and quick access facilitation to various Government Offices, institutes, hospitals and businesses at enclosed areas.

The proposed development by CDA, will help in reducing frequent traffic jams/congestions at the intersections. Subsequently, major confounding environmental factors i.e., noise and air pollution will be reduced/eliminated at certain level through reduction in Vehicle Operating Cost (VOC) and Vehicle Time Travel (VTT). Thereby, no other alternative is considered to be implemented except provision of underpasses, particularly to alleviate traffic congestion in the area.

Addressing of traffic management issues, smooth traffic flow, reduce accidents, time saving and improved operating cost and, moreover passenger facilitation can also be accomplished by considering this option.

### **3.10 PROJECT ALTERNATIVES CONSIDERED**

#### **3.10.1 No Project Scenario**

One of the options considered was no project i.e., not to proceed with the remodeling through of existing intersections. However, this option was dropped because of the serious problem associated with the traffic at junction point, and the fact the city is expected to continue to grow thereby exacerbating the problem.

#### **3.10.2 Build Underpass Roads**

The second alternative considered was to build underpasses, culverts and retaining walls, to alleviate traffic congestion. This option was however under consideration, but the cost involved is too high and the probability of environmental and temporary inconvenience may also be high. This alternative would be most favorable during the frequent traffic flow from Srinagar highway and Murree Expressway (E-35). This redesigning option will have contribution to improve the traffic flow.

#### **3.10.3 Redesign the Area**

The third alternative considered was to redesign the area by diverting traffic alignment and putting new side roads to ease traffic flow into the area. However, this alternative is not feasible as it will only increase pressure on the new areas since the enclosed major infrastructure like Serena Hotel is also enclosed. In that way, redesign will eventually lead to greater disruption of the area due to the demolition/removal of structures that will allow new side roads. It will also lead to more structural damage. Furthermore, it will be more costly to execute. Consequently, this alternative cannot be socially viable.

### **3.10.4 Regulate Traffic**

The fourth alternative considered is to stop vehicles from entering the intersection areas crossing Srinagar highway and Murree Expressway (E-35). However, it was not feasible as it is the major road for entry and exit busy route flow coming from various Islamabad sectors and intersection on Srinagar Highway. Consequently, it is not possible to stop vehicular traffic in the area without impairing economic and social activities.

## **3.11 RESTORATION AND REHABILITATION PLAN**

Restitution of the project site and associated facilities including access tracks and stockpile and disposal sites, after construction activities is of utmost importance. Improper disposal of waste left at the end of the construction activities would lead to extensive disturbance to the environment.

Following measures will be adopted for the intersections site:

- All equipment and machinery at the project site will be de-mobilized;
- All waste at the project site will be disposed-off according to the requirement of EIA and NOC approval;
- Septic Tank with soakage pit at contractor's camp shall be properly dismantled;
- All temporary concrete structures at the project site will be dismantled, and construction and demolition material will be handed over to MCI for reuse or disposal;
- All the un-necessary pits at the project site will be backfilled from Right of Way (ROW).

## **3.12 CONSTRUCTION REQUIREMENT**

### **3.12.1 Construction Material**

The materials used in construction of the underpasses include: coarse aggregates (crush), fine aggregates (sand), steel, water, asphalt, reinforcement, cement etc. The probability of using fine aggregates is mainly through local vendors, while the soil, cement and steel will be procured from other sources. The construction material suitable for construction of may be obtained from Industrial area at 1-9.

### **3.12.2 Construction Camps**

Campsites will be selected keeping in view the availability of adequate area for establishing campsites, including parking areas for machinery at an appropriate distance from sensitive areas in the vicinity. For minimizing the environmental and social disturbances, the best practice of establishing camps, material and equipment is to maintain a safe distance from ROW i.e., 300-500 away from forest dominated/grassland patches and nearby infrastructures.

### **3.12.3 Manpower Requirements**

The manpower requirement during construction phase is estimated to be around 80-100 people, including labor, skilled and managerial staff, while during operation phase CDA, traffic police staff would be sufficient by ensuring regular patrolling and traffic management.

### **3.12.4 Water Requirement**

#### **Source of Water During Construction Phase**

Contractor will be responsible to arrange water for construction works. It is estimated that water tanker hold 2,000 gallon. The larger models of CDA tanker can hold upto 15,000 gallons. Thus, latest 2-3 tankers may deploy, for 2-3 trips are envisaged at site to cater construction demand. It is worth to note, this demand may vary for the ancillary works.

The water demand per capita during entire construction period would be estimated around 5 USD gallon/person/day.

### **3.12.5 Waste Generation**

The estimated waste generated at the site would be around 20,000 m<sup>3</sup> or above for each underpass might have been generated during structural excavations.

## **3.13 MAJOR PROJECT CONSTRUCTION ACTIVITIES**

This project includes construction retaining walls, culverts, sub-base and course pavement for underpasses. These works may need environmental and social viability along with a congestion free space.

Most of the construction activities during the proposed project will be confined to the existing intersection on Srinagar Highway and crossing areas. But, the following activities/facilities, particularly location and safe operation should be considered at this feasibility stage:

- Traffic Diversion Facility to manager traffic influx during peak hours
- Contractor's camp, labor camp, equipment and material yards, and additional depots;
- Asphalt Machinery Assembly area;
- Stockpile area for suitable and surplus excavated materials and spoils.
- Borrowing areas for obtaining earth, sand, coarse aggregates, and stone for rip-rap.

## **3.14 CONTRACTOR CAMP, MATERIAL AND EQUIPMENT YARD**

It is envisaged that the Project will attract about 80-100 of skilled/unskilled labor. It should be ensured that maximum labor hired would be local who will return home in the evening. It is a contractor's contractual obligation to develop a campsite and project office on site. The location should be at least 500 meters away from the nearby infrastructure and government offices.

### **3.14.1 Asphalt/Batching Plant**

In case the contractor prefers a location other than the one proposed, he/she will arrange for additional arrangement either through payment to the landowner(s) or approved from Govt in consultation with consultant's environmentalist and CDA.

### **3.14.2 Borrowing Areas**

The earth required for construction of cross slope and other works, would be preferable used at the available government land. If earth is required to be lifted from private own land, then the owner(s) of the land will be duly compensated. Contractor will be responsible to make an agreement with landowner to excavate and restore the borrow area.

### 3.15 CONSTRUCTION EQUIPMENT DETAILS

Table 2: List of Construction Equipment Required

SR. NO.	DESCRIPTION	QUANTITY
1	Graders	1
2	Tractors	3
3	Vibratory Rollers	2
4	Asphalt Mixing Plants	1
5	Stone Crushers	1
6	Batching Plants	1
7	Water Browsers	2
8	Oil Tankers	1
9	Water Sprinkling Water Carcass	4
10	Haulage Trucks	4
11	Excavators / Loaders	2
12	Small Vehicles	3
13	Dozer D-9, D-10 01+01	1 +1
14	Shift Roller	3
15	Asphalt Machine	2

### 3.16 HEALTH SAFETY EQUIPMENT

It must be ensured that the labor engaged in mixing concrete or mixing and laying asphalt will have long boots, overall, goggles, gloves, ear mufflers, safety jackets, safety hats etc. As an overall HSE measure all construction workers and anyone going into the construction area will use necessary PPE.

### 3.17 SIGNAGE

During construction, suitable signboards and traffic signs to be displayed on the construction site in particular and on the entire road length in general. This will help in forestalling any possible accidents.



### **3.18 EXISTING AVAILABLE FACILITIES AND LANDSCAPE CONTEXT FOR CONSTRUCTION OF UNDERPASSES**

#### **3.18.1 Road and Accessibility**

The existing intersection connects to Srinagar Highway from Easter End, and Murree Expressway (E-35) Western End. The site is readily approachable by all the primary roads of Islamabad i.e., Jinnah Avenue, Margalla road and Islamabad highway.

#### **3.18.2 Sewerage System**

Wastewater is generally disposed of through open drains to the nearby sewer system, to avoid water contamination and water borne diseases. At present, existing source is Nullah or water creeks crossing the project site. The sewerage system facility will be finalized upon receipt of approval from Capital Development Authority (CDA) and Water and Sanitation Agency (WASA). The environmentally viable option will be finalized and utilized after receiving formal approval from these concerned departments

#### **3.18.3 Surface Drainage**

At present, major source existing Nullah, instead a plan consisting of storm construction or concreted runoff will be developed and implemented upon approval of CDA and WASA.

#### **3.18.4 Domestic Waste Collection**

Currently, there is proper system of garbage to collect the waste materials by MCI and CDA management, and this would be helpful during construction phase of the project. However, there would be the requirement of transportation, collection and separation of waste. Hence, the consultation with concerned department (MCI in this case) for selecting the sound method of waste disposal should be considered prior to commencing the construction activities.

#### **3.18.5 Availability of Water for Construction**

Water for construction purposes is generally available through ground water, which is most suitable for all kind of construction activities. However, prior permission needs to be obtained from approving authorities after satisfying the suitability requirements of water. Contractor should make his own arrangements for obtaining water by any means. For proposed design structure works, mainly retaining structures and culverts, water may not be used directly if it consists of silt and fines in suspension.

#### **3.18.6 Energy**

The power (electricity) is accessible on the site and is connected to the project site.

#### **3.18.7 Communication**

The area is well covered by wireless communication facilities such as PTCL.

### 3.18.8 Vegetation Pattern at The Site

Ecologically, the proposed project is heterogeneous in terms of landscape context. The enclosed area around 300m is widely distributed area of tree densities. The area is also ecologically important for conserving vegetation on highlighted environmental variables in Figure-6.



Figure 12: Existing Landscape Context of the Area

## **4. DESCRIPTION OF PROJECT ENVIRONMENT**

### **4.1 GENERAL**

This chapter describes the existing environmental settings in the study area and is based upon the secondary information collected from the published sources, reconnaissance survey, primary socio-economic survey and environmental monitoring of air, noise, soil, ground water and surface water in the study area. The baseline for project area was established considering physical, biological/ecological, and socio-economic aspects along the project area. The baseline data was generated on meteorology, air quality, noise levels, ground and surface water quality, land environment including soil quality, land use pattern, biological environment, and the socio-economic status during the period of June 2024.

The information presented in this section covers:

- Physical Environment,
- Ecological Environment,
- Socioeconomic Environment.

Information for the above areas has been collected from both primary and secondary sources. Secondary data was extracted through topographic mapping, published literature, Census Reports etc. Primary data was collected through field surveys, onsite assessments and discussions with the locals.

### **4.2 THE STUDY AREA**

The proposed sites for underpass and its vicinity within 1km radius is taken as microenvironment for the EIA while sector . has been taken as the macroenvironment. Figure-13 shown the project location, micro and macroenvironment.

The area is situated at a height of 579 m above sea level. The boundaries of Islamabad are met by Punjab on the east, west, and south and by Khyber Pakhtunkhwa on the north. The city covers a region of around 906 km<sup>2</sup>. The longitude and latitude of the region are somewhere between 72°45'to 73°30'E and 33°30'to 33°50'N, respectively

### **4.3 PROJECT AREA OF INFLUENCE**

Maximum 100-150m from the ROW and project activities are identified as AOI of Noise, Dust and Water. Around 30 m x 30 m square around each structure are identified as AOI for affected infrastructure (structure or constructed landscape) (if any). The notable landmarks in the vicinity include Serena Hotel, ITP Serena Chowk office, green belts at median, grass land ecosystem and tree inventories.



Major environmental concerns are:

- Construction material drop off.
- environmental degradation from stock piles, asphalt movement and traffic diversions;
- Disposal of spoils/surplus and suitable materials.
- Inconvenience to road users due to construction activities.
- pollution of water by waste disposal.
- Geologic hazards, and;
- Removal of construction debris.
- Issues related to road safety and diversion during physical progress of civil components;

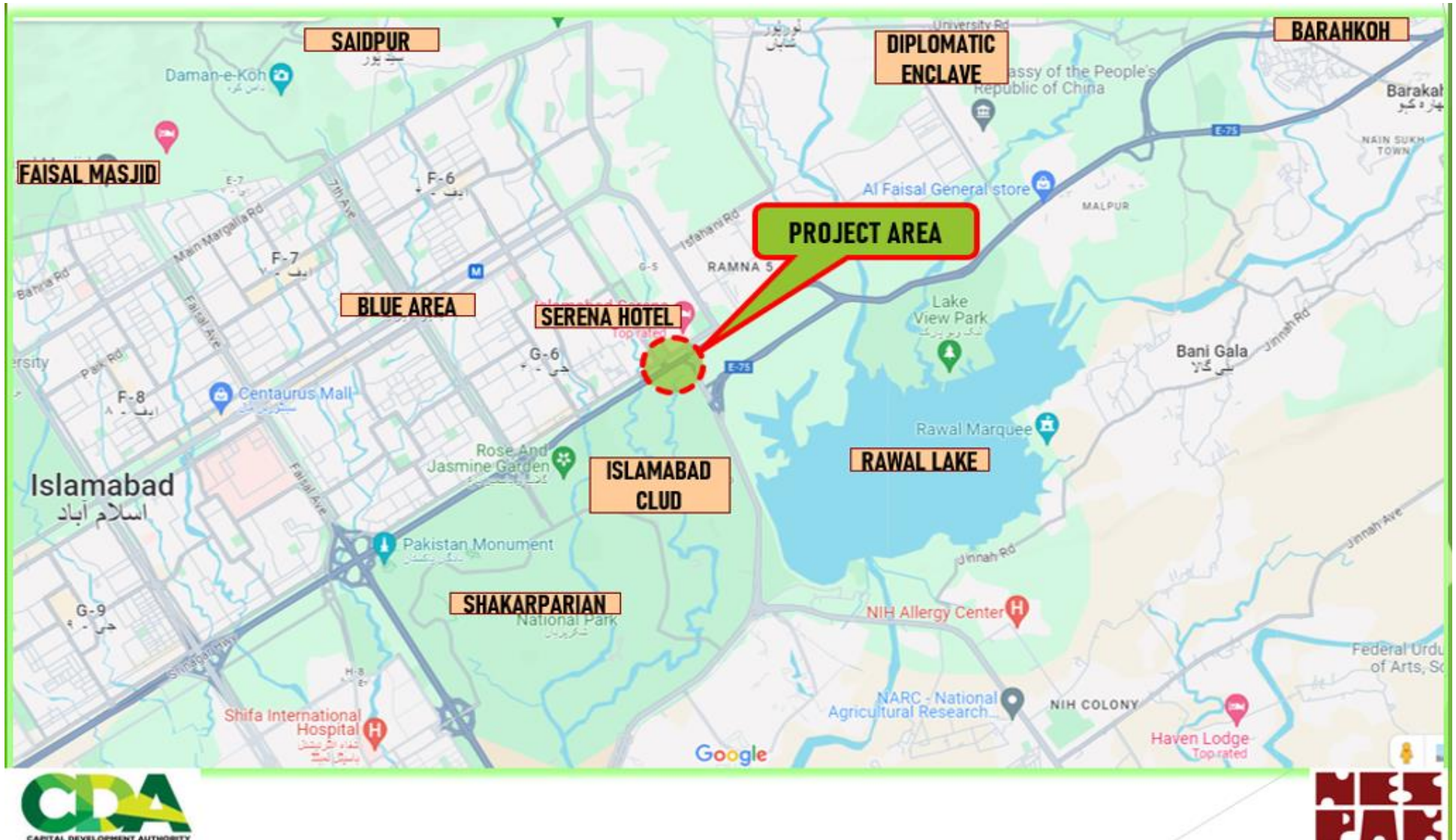


Figure 14: Project Location Map Showing Macro and Micro-environment.

## 4.4 PHYSICAL ENVIRONMENT

### 4.4.1 Topographic Features of Overall Area

The terrain in the city has significant variation in its terrain such that the elevations differences may reach up to 1175m. The Margalla hills, Kala Chitta, outer and lower Himalaya's ranges are main geological features of the study area. Some ridges may reach a height of 1600m with complex thrust and folded shales and limestones<sup>4</sup>. The foot of Margalla range stands at an elevation of about 620 m and the top of the mountain is about 1,200 m. Four major tributaries, namely Saidpur Kas, Tenawali Kas, Bedarawali Kas, and Johd Kas, originate from Margalla Hills. The northern part of the metropolitan area lies in the mountainous terrain of the Margalla Hills, a part of the lower and outer Himalayas, which also includes the Hazara and Kala Chitta Ranges. The Margalla Hills, which reach 1,600-m altitude near Islamabad, consist of many ridges of Jurassic through Eocene lime stones and shales that are complexly thrust, folded, and generally overturned. Margalla Hills Range acts as a wall forming the boundary of the Nullah Lai basin.

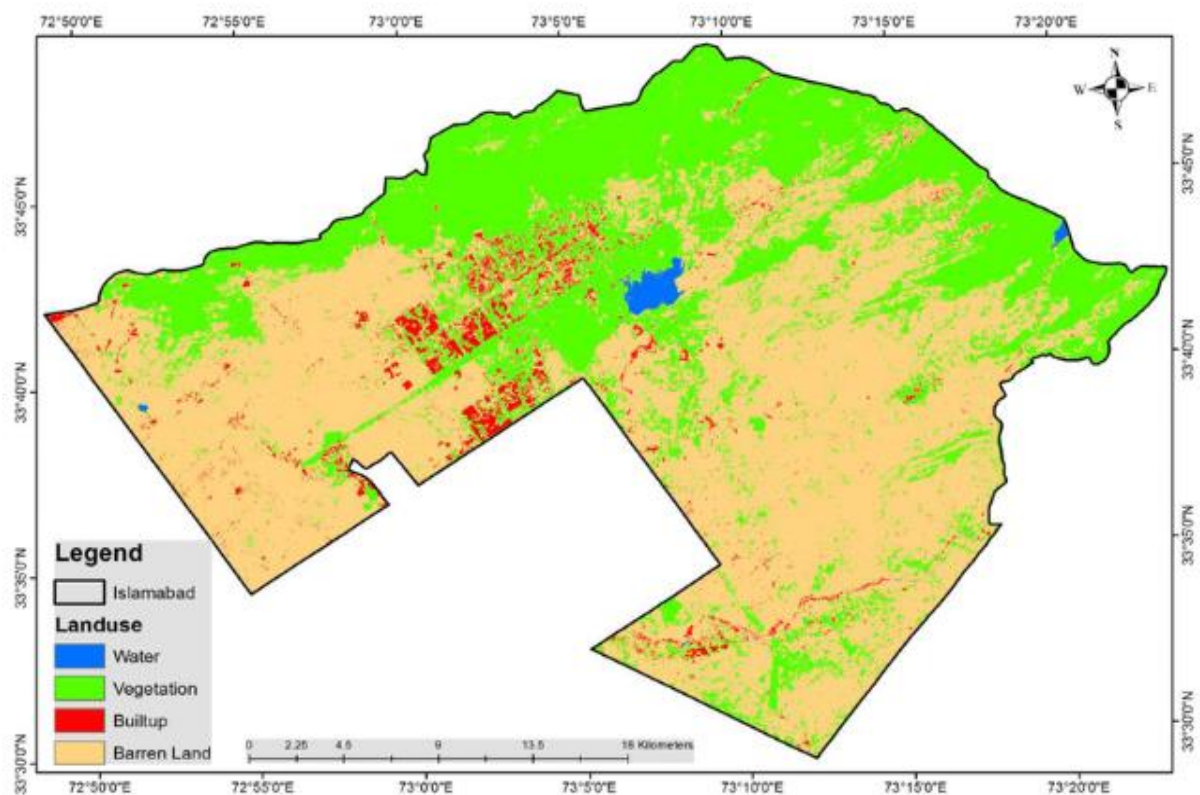


Figure 15: Landcover Classification Map of Islamabad<sup>5</sup>

<sup>4</sup> Assessment of Variation in Soil Parameters, For Design Of Lightly Loaded Structural Foundations, Life Science Journal, vol.10, no.12, 2013.

<sup>5</sup> Impact of Urbanization and Land Cover Dynamics.

#### 4.4.2 Geology and Soils

A recent study suggests that subsurface strata of Islamabad are mainly covered with layers of lean clay (CL) in medium stiff to stiff insitu state. The presence of silt, gravel and sand are also observed in quiet good percentage<sup>6</sup>.

Clay soils in the area exhibit five strata, from bottom to top:

1. Coarse pebbles with sand or clay;
2. An alluvial stratum deposited by an older river system in the Soan Basin,
3. Alluvial deposits of the present river system
4. An airborne top layer of silt or clay (loess), and
5. Conglomerate and loose gravel deposits.

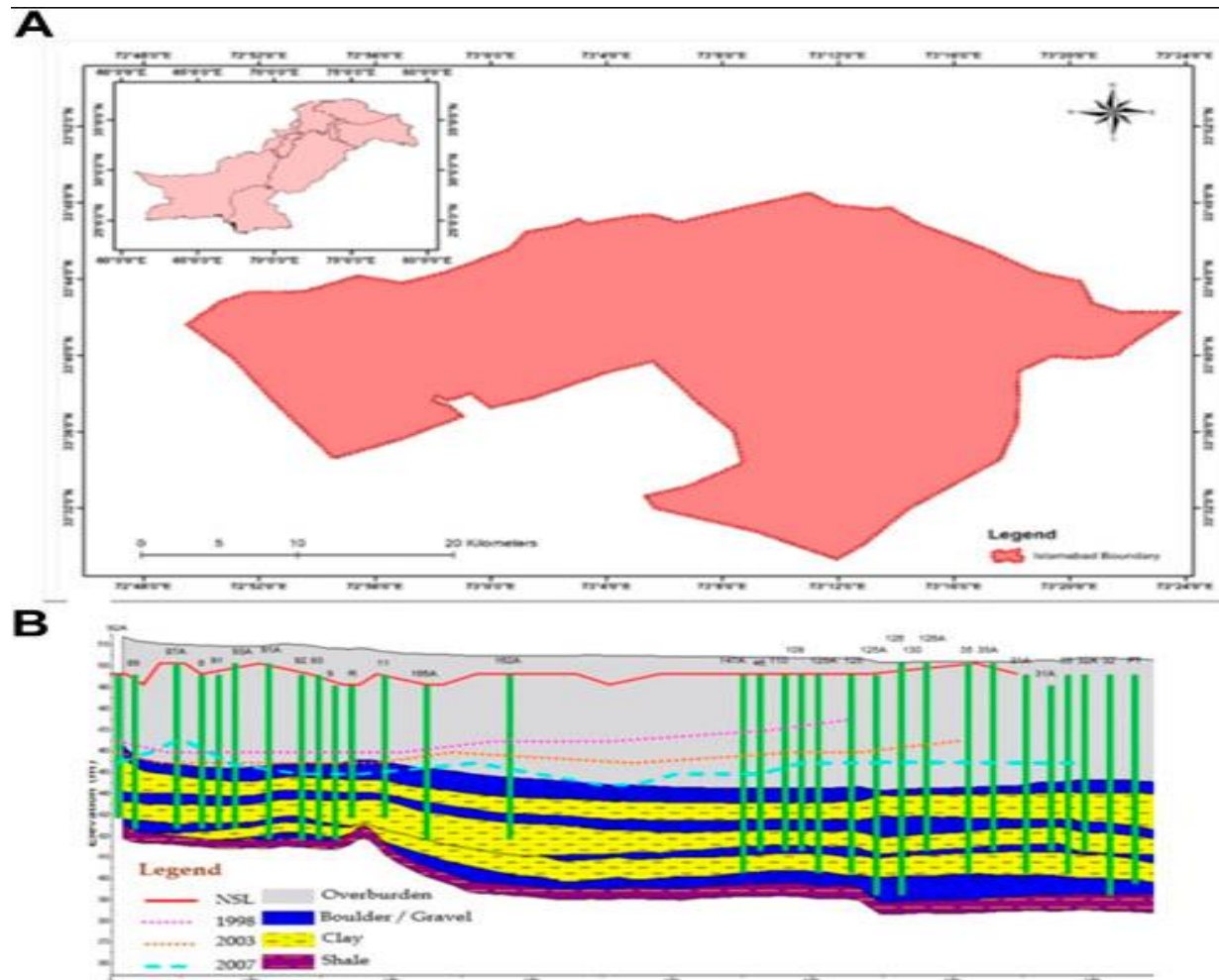


Figure 16: Soil Classification at Shallow Depth

<sup>6</sup> Geotechnical Characteristics of Sub-soil for Different Sectors of Islamabad.

### 4.4.3 Hydrology and Hydro-Geology

A number of streams originating from the Margala Hills join and form the Lai Nullah, the principal watercourse in Islamabad. It winds north to south through developed areas of the city and finally joins the Soan River. Lai Nullah carries rain runoff and sewage from a large part of Islamabad, and it also collects untreated local sewage. Domestic solid waste is also dumped in the nullah. It is a perennial surface water channel with occasional flooding during monsoon season. Reservoirs of the Rawal Dam and Khanpur Dam are the two major surface water bodies near the city, and they serve about 40% of present water demand.

The hydrogeological study of Islamabad has highlighted the occurrence of some shallow aquifers and some deeper aquifers in the subsurface. The shallower aquifers are composed of Holocene and the upper units are Pleistocene alluvium. The deeper aquifers are confined in the Lei-conglomerate of the Pleistocene era. The unconsolidated conglomerate beds of the Lei-conglomerate play the most important role in the groundwater aquifer in Islamabad<sup>7</sup>.

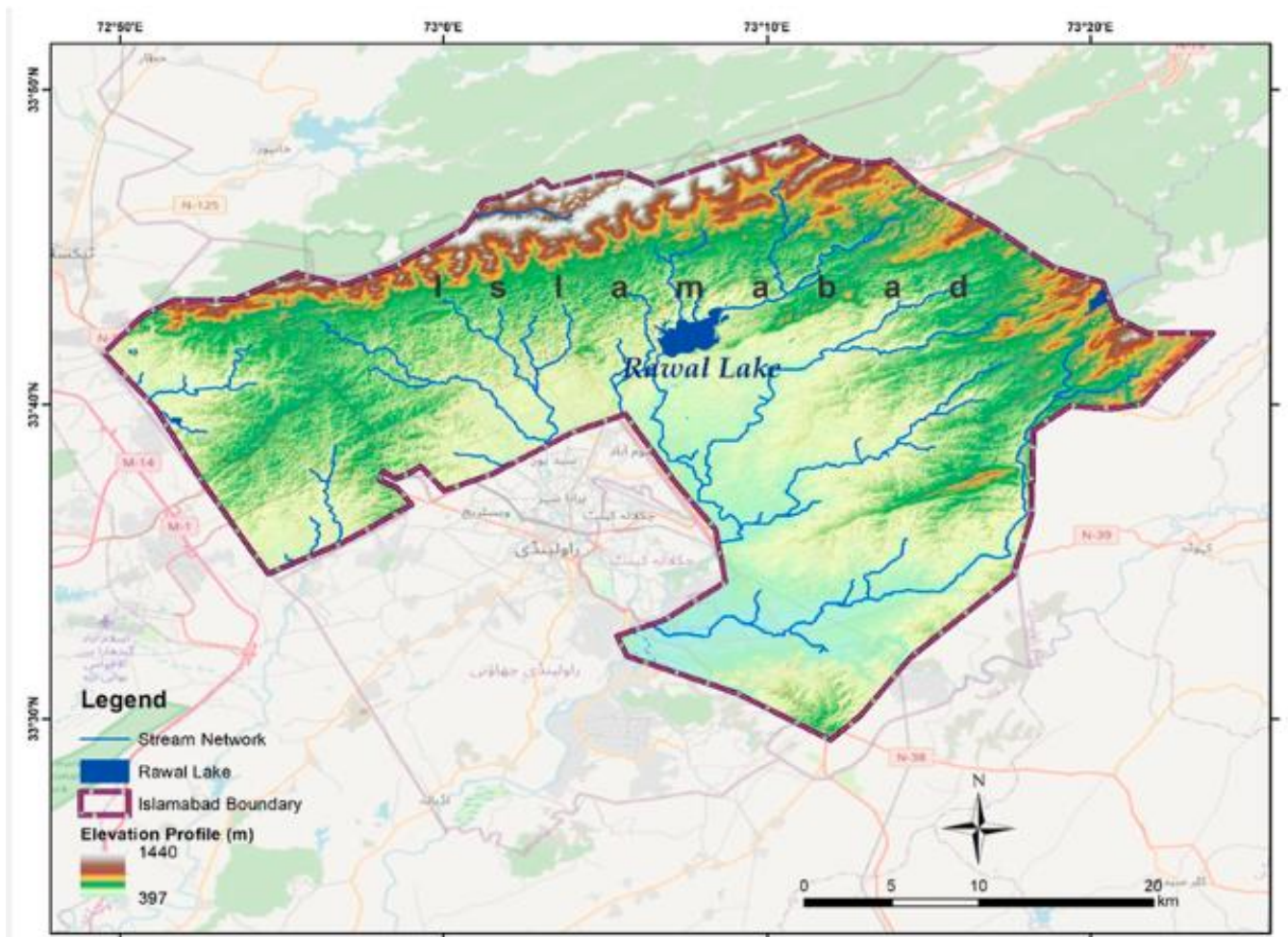


Figure 17: The main water streams and elevation profiling map of Islamabad.

<sup>7</sup> Impacts of urbanization, LULC, LST, and NDVI changes on the static water table with possible solutions and water policy discussions: A case from Islamabad, Pakistan

#### 4.4.4 Sub-Surface Geology

Most of the aquifers in Islamabad made up of boulders and gravel, which date from the Pleistocene to the present age. Alluvial fans mostly contain silt and clay particles along with gravel and sand.

Depth of groundwater table in the project area ranges is around 60 feet. The aquifer layers lying under the thick and impermeable layers of limestone store a huge amount of groundwater. These important areas of recharge, however dropped down by the forces of urbanization and emergence of residential colonies and building of streets, houses and industries.

#### 4.4.5 Seismic Hazard

The bedrocks in Islamabad are highly faulted, folded and overthrust due to the uplifting of Himalaya in Pliocene epoch. Main Boundary thrust is the main fault (Figure-17) that is widely fractured and some epicenters of the earthquake are also situated on this fault. The area is a part of active Himalayan foreland – fold and thrust belt region in the collision zone between Indo-Pakistan and Eurasian plates.

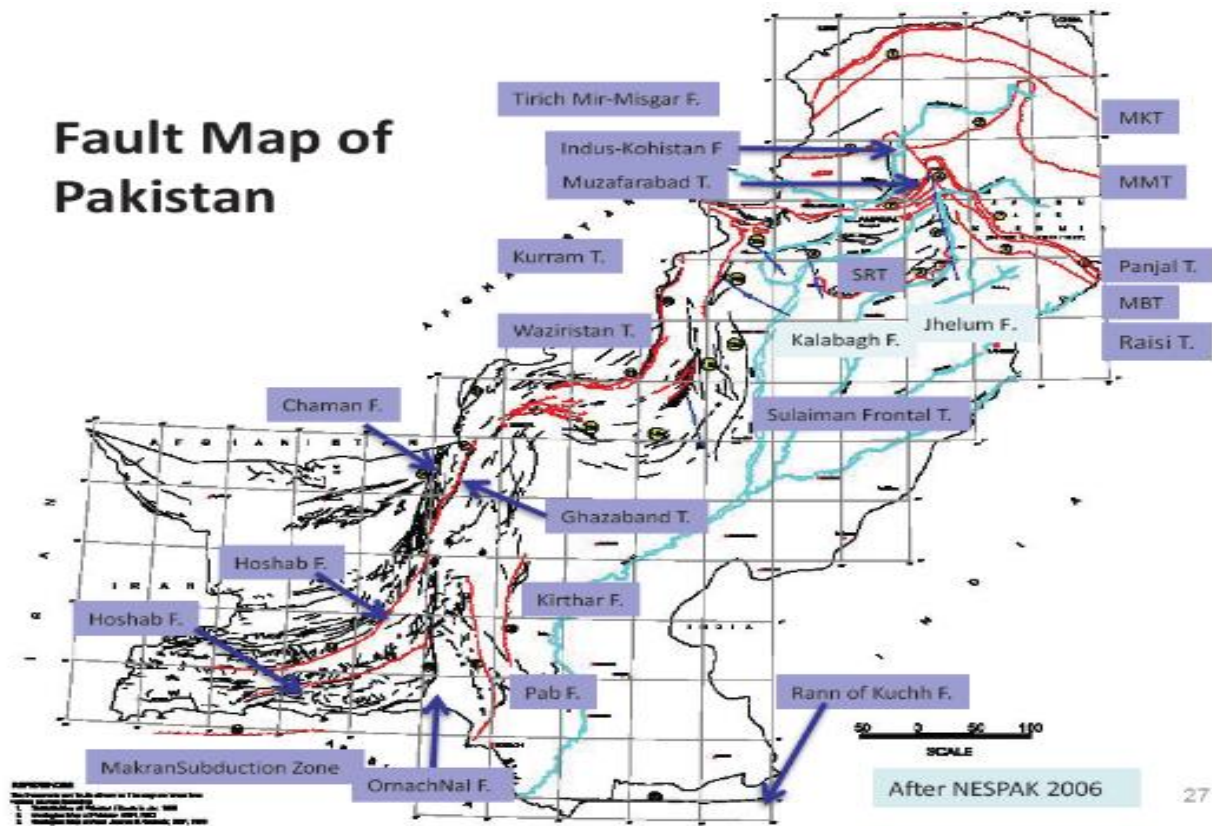


Figure 18: Earthquake of 8<sup>th</sup> October, 2005 in Northern Pakistan

According to Building Codes for Pakistan, the project area falls in **Zone 2B** which corresponds to peak ground acceleration of 0.16 to 0.24g. Studies by National Engineering Services of Pakistan

(NESPAK) indicated that a realistic seismic factor for building design should probably be higher than that indicated on the seismic zoning map of Pakistan (Adhami and others, 1980, p. 133). According to NESPAK, recommended design for 0.125-g (gravitational acceleration) horizontal acceleration for ordinary structures, and for 0.2 g without collapse for important structures (Adhami and others, 1980, p. 137). NESPAK (Adhami and others, 1980, p. 131) estimated that each year there is a 50 percent chance of a Richter magnitude 4 earthquake, an 8.33 percent chance of magnitude 5, a 1.67 percent chance of magnitude 6, a 0.26 percent chance of magnitude 7, and a 0.11 percent chance of magnitude 7.5 (recurrence intervals of 2, 12, 66, 380, and 912 years, respectively).

The October 8, 2005, earthquake with recorded magnitude of 7.9 on Richter scale caused vast destruction in Northern parts of the country and also caused the collapse of a residential plaza located within 2km of the proposed project site.



**Figure 19: Fault Map of Pakistan**

#### 4.4.6 Climate and Meteorology

Pakistan Meteorological Department (PMD) has meteorological station in Islamabad and the climate data recorded at this station represent the climatic conditions of the project area adequately.

The climate of the Project Area is semi-arid characterized by four distinct seasons in a year, that is, winter from Mid-November to February, spring during March and April summer from May to Mid-September and autumn from Mid-September to Mid- November.

##### Temperature

Islamabad has distinct seasons marked by wide variation in Temperature, hot summer and cold winters. The coldest month is January when the mean maximum temperature is 17.7°C and the mean minimum temperature is 2.6°C. June is the hottest month with mean maximum temperature around 40°C and mean minimum temperature 24°C.

**Table 3: Mean Monthly Maximum Temperature**

Year	Average Temperature
January	17.7
February	24.7
March	25.0
April	32.6
May	39.1
June	37.8
July	34.5
August	33.0
September	33.5
October	31.3
November	24.1
December	18.1

Source: Pakistan Meteorological Department

**Table 4: Mean Monthly Minimum Temperature**

Year	Average Temperature
January	3.8
February	9.9
March	11.4
April	16.2
May	23.7
June	23.8

July	24.9
August	24.2
September	21.0
October	16.6
November	10.7
December	5.5
Source: Pakistan Meteorological Department	

#### 4.4.6.1 Cloudy, Sunny and Precipitation Days

The figure shows the monthly number of sunny, partly cloudy, overcast and precipitation days. Days with less than 20% cloud cover are considered as sunny, with 20-80% cloud cover as partly cloudy and with more than 80% as overcast.

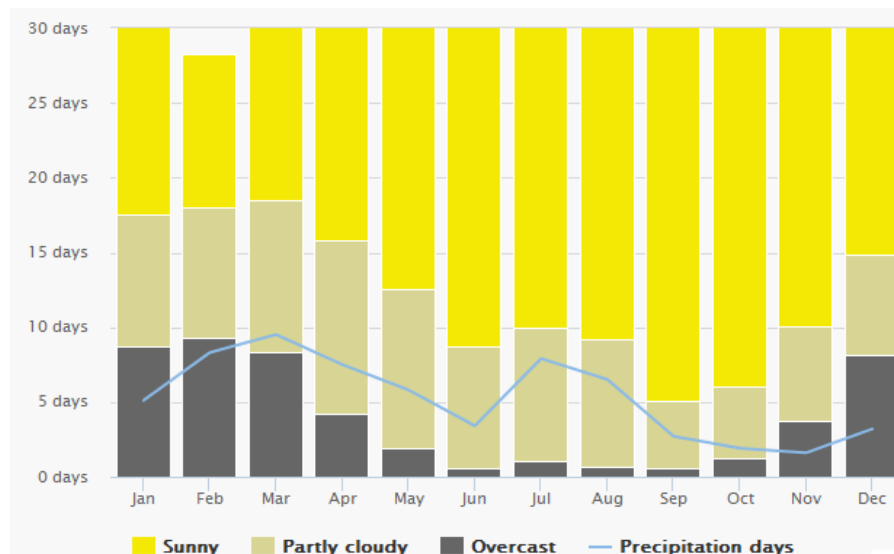


Figure 20: Average Monthly Cloudy and Sunny Days

#### 4.4.6.2 Rainfall

The project area around project site has a humid subtropical climate, and is characterized by five well-marked seasons: Winter (November – February), spring (March – April), summer (May – June), Rainy Monsoon (July –August) and autumn (September – October). The wettest month is July, with heavy rainfall and evening thunderstorms with the possibility of cloudburst. The monsoon rains usually start in June and peak in August. A much smaller winter monsoon peaks in March. Apart from the four monsoon months, the other months as mostly dry.

Table 5: Mean Monthly Precipitation

Year	Average Precipitation
January	70

February	27
March	61
April	19
May	76
June	126
July	504
August	418
September	52
October	92
November	120
December	133
Source: Pakistan Meteorological Department	

#### 4.4.6.3 Humidity

The mean relative humidity in summer is 60 - 80% while the mean relative humidity during winter is 70 - 90%. The average rain fall in the Islamabad city is 1,150 mm (approx.) last five years. Table-7 shows the last five years precipitation data recorded in Islamabad.

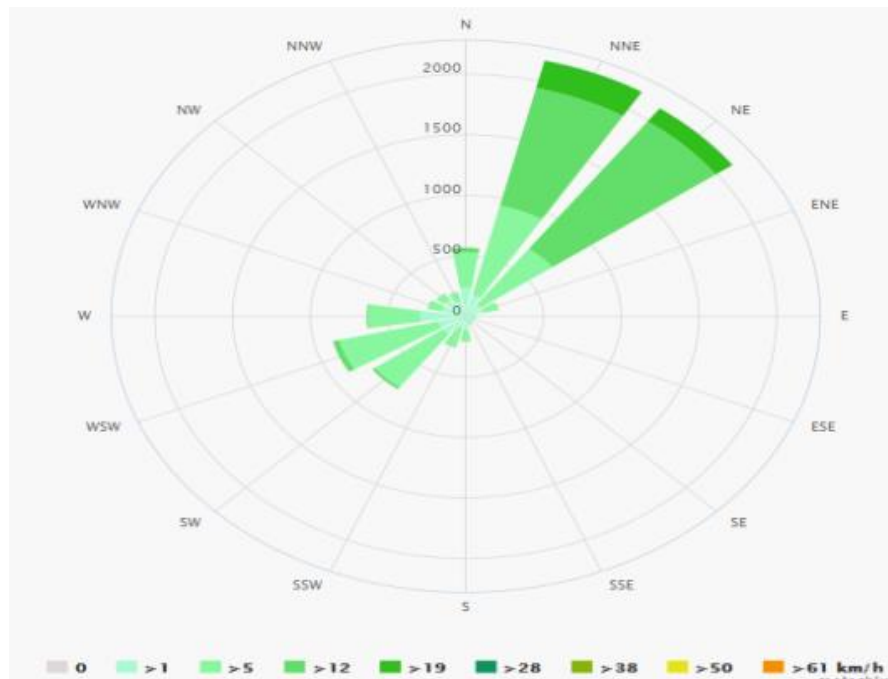
**Table 6: Wind Velocity and Direction of Islamabad**

Month	Direction in Degrees	Velocity in Knots	Steadiness %
January	283	1.4 to 1.7	49
February	290	2.3 to 2.7	59
March	306	2.7	48
April	304	2.4 to 2.5	36
May	321	2.7 to 3.1	18
June	159	2.5 to 3.0	32
July	150	2.2 to 2.4	67
August	148	1.4 to 1.7	40
September	191	1.1 to 1.3	20
October	303	0.8 to 1.1	22
November	292	0.6 to 1.0	49
December	296	0.7 to 1.3	56
30 Year Average	266	1.8 to 2.0	41

#### 4.4.6.4 Wind Speed

Over the course of the year, typical wind speeds vary from 0 m/s to 10 m/s (calm to fresh breeze), rarely exceeding 18 m/s (gale) as shown in Figure-17. The *highest* average wind speed of 5 m/s (gentle breeze) occurs around June, at which time the average daily maximum wind speed is 10

m/s (fresh breeze). The *lowest* average wind speed of 1 m/s (light air) occurs around December, at which time the average daily maximum wind speed is 5 m/s (gentle breeze). The wind rose for Islamabad area shows how many hours per year the wind blows from the indicated direction. Example SW: Wind is blowing from South-West (SW) to North-East (NE).



**Figure 21: Wind Speed and Diversion**

#### **4.4.7 Water Supply system**

The municipal water supply is the main source of water supply in the project area. The residential areas as well as commercial buildings generally receive water supply from CDA. To compensate for water shortage, water demand is also met through installation bore water and to some areas via private tanker service at fixed rates.

#### **4.4.8 Wastewater Drainage System**

The wastewater disposal system in project area comprises a network of sewers that collects and discharges the sewerage into main municipal sewerage lines.

#### **4.4.9 Solid Waste Management**

Solid waste management in Islamabad is done through Municipal Corporation (MCI) which collects waste from different areas of Islamabad through designated transportation system. However, due to mismanagement, not all of the generated waste get collected and only part of the solid waste is transported to an unorganized dumping site at Golra Morr.

## 4.5 ECOLOGICAL RESOURCES

In this section, the baseline environmental conditions pertaining to biological environment have been described on the basis of primary and the secondary data. A reconnaissance of the project area was carried out followed by desktop study regarding the ecology of project area.

The proposed site is located in an already developed area of Islamabad. As climate of Islamabad is humid sub-tropical climate, the vegetation of the area falls under scrub, dry, tropical thorn forest type as per phyto-geographical classification of the area.

### 4.5.1 Floral Composition

Islamabad is a representative of dry Subtropical Scrub Forest which is dominated by *Acacia modesta* (Phulai), *Ziziphus mauritiana* (Ber); *Ziziphus nummularia* (Mullah), etc. Other associates existing in varying proportions include *Prosopis cineraria* (Jand), *Melia azadirachta* (Dharek); *Morus alba* (Mulberry-Shahtoot); *Dalbergia sissoo* (Tahli-Shisham); *Acacia nilotica* (Kikar). In the undergrowth *Cannabis sativa* (Bhang), *Calotropis procera* (Desi Ak), *Parthenium hysterophorous* (Gandi Booti) and *Ocimum bacilicum* (Niazbo), are predominant.

As the area is part of Pothohar Plateau, the vegetation is characteristic of the tract. *Kau* (*Olea cuspidate*) is the climax species. It grows almost in pure form on northern slopes and in cool and sheltered situations on the southern slopes. Elsewhere Phulahi (*Acacia modesta*) dominates. *Sanatha* (*Deodonia viscosa*), *Granda* (*Carissa spinatum*) and *Pataki* (*Gymnospora royaleana*) grow as secondary species. With the shifting of Capital to Islamabad and urbanization of the tract, the majority of original vegetation of the tract was removed and replaced by commercial and residential hubs.

**Trees:** In general, Islamabad city and in particular the road side plantation area has been utilized to make the for landscaping/planation of trees from different taxonomic groups. These efforts were successful in increasing the vegetational cover of Islamabad and especially the surrounding hills. However during the past, a fast growing evergreen tree species Paper Mulberry(*Broussanatia papyrifera*) was also introduced in the city, which now occupies most of the vacant land and green belts, along the Kashmir Highway and its surrounding area has not only altered the edaphic characteristics but has also caused dust allergies and asthma among Islamabad residents. This species is most common along the streams and nullahs of Islamabad, including the study area. Another undesirable tree species planted along the roads and in open places was *Eucalyptus* (*Eucalyptus camaldulensis*). At present this plant is being discouraged on account of its higher water suction capabilities and for causing setback to soil fertility. At present no tree exists in the project site.

Among shrubs, *Parthenium heterophorous* is an exotic species and has spread in Islamabad's open places at an alarming rate. At present, it has formed thick pockets along roads, in open fields and along streams; it is perennial weed and also causes severe allergy and breathing problems.

### 4.5.2 Faunal Diversity

Due to increasing amount of urbanization, notable the construction of High Rise structures, most of the faunal species have been dispersed to another habitat. Majority of the species, migrated

to the surrounding Margalla hills, but still wildlife such as wild boar, jackals, fox, rats, hare and porcupines are present in the extensive and densely wooded areas. Wild boars sometimes even come on the roads during the night and get killed by the fast moving traffic on Srinagar Highway.

Overall, no endangered or rare species of flora or fauna are present in the project areas.

## **4.6 SOCIO-ECONOMIC BASELINE**

Socioeconomic baseline has been developed for the project through a review of secondary data as well as primary data collected using questionnaires and discussion with the locals in project area. Secondary data used included census reports and previous research work /studies done in Islamabad by government as well as research institutes.

### **4.6.1. Cultural Values and Ethnicity**

Islamabad symbolizes and exhibits the true culture of Pakistan. People live in Islamabad, move to this city from the different areas and belong to different wake of life. At present, this is city of aristocratic class people and hosting the headquarters of government, private companies and different embassies. All famous Pakistani educational institutes are also located within the city and serving the educational facilities to local communities. Around 99% population is Muslim belonging to either Sunni or Shiya sect. Other minority groups include Christians and Hindus etc.

### **4.6.2. Population Density**

Islamabad has an estimated population of 2,006,572 persons million as per recent census results. Annual growth rate of the city has been significant at 4.9%. The city is estimated to have around 336,182 households. Most of the houses are well constructed. The average household size is 6 persons as per the census results.

### **4.6.3. Occupation**

The project area comprises mainly Government offices, and offices of national and international firms. Most of the population is either employed in Federal Government offices or in private organizations. Remaining portion of population is self-employed and businesses of different magnitude. Over the years, Islamabad has become a very important financial and business city with lots of local and foreign banks and ever expanding private business. In the last decade there has been vast change in the city's traditional reputation.

### **4.6.4. Tourist attractions**

Islamabad city is an attraction for the tourists from all across the country particularly the southern part due to scenic landscapes in Surrounding areas. It has become livelier with lots of international food chains opening businesses and shopping mall open till late. It also serves as a base camp for people from the south and coastal areas like Karachi, visiting valleys like Swat and Kaghan and northern areas like Gilgit, Skardu and Chitral located in the Hindu Kush Mountains.

#### **4.6.5. Social Infrastructure**

##### **4.6.5.1 Education**

The literacy ratio in Islamabad Capital Territory has increased from 47.8 per cent in 1981, to 77.3 per cent in 1998. The literacy ratio for males is 83.2 per cent against 69.7 per cent for females. The ratio is much higher in urban areas when compared with rural areas both for male and female.

##### **4.6.5.2 Health Facilities**

There are six hospitals with 1,660 beds available to meet the growing health needs of the growing population of Islamabad Capital Territory. The hospitals are namely, Federal Government Service hospital with 337 beds, Capital Hospital with 261 beds, Pakistan Institute of Medical Sciences (PIMS) with 745 beds, Children Hospital with 230 beds, National Institute of Health with 50 beds and Shifa International Hospital (Private) with 37 beds.

##### **4.6.5.3 Agriculture**

No such area is confined with arable patches within and outside of Serena and Convention center intersections.

##### **4.6.5.4 Drinking water Supply**

The project site is facilitated by Society water Supply System. Moreover, the residents are also facilitated with water filtration plant by CDA.

##### **4.6.5.5 Lifestyle**

Almost all population of the project area has access to higher education, medical facilities, electricity, water, communication, infrastructure, transport etc.

##### **4.6.5.6 Religious and Archaeological Sites**

There are no religious or cultural site around the project site to be affected by the project.

## **5. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

### **5.1 Impact Assessment Methodology**

The significance of potential impacts in response to the civil construction components was assessed using the assessment methodology that considers, Area of Influence (AOI) as described at Chapter-4, Sub-section 4.3. The impact magnitude and sensitivity of receptors are described hereunder:

#### **5.1.1 Identification of Project Area of Influence (AOI)**

Prior to identifying the project's impact on environment and their analysis, it is considered imperative to define the Project Area of Influence (PAI). There are two (02) types of Project corridors which have been used for the following environmental baseline information, impacts assessment and mitigation purposes:

- The maximum spatial scale of 100~200m from the project activities are identified as AOI for abiotic factors and spatial scale of 50m x 50m square along the proposed underpasses for biotic factors are identified as Area of Influence (AOI) and social amenities.
- In addition, ancillary works include; the location of construction/contractor camps, vehicle, stockyards, material quarry areas and access roads also considered within AOI.
- The spatial patterns of construction components where direct impacts within ROW on the four identified land-use type/landscape variables (described at Section-1.1 Sub-section-1.7) were also assessed. For effective implementation of mitigation measures, the most notable and significant impacts are taken into assessment with the following impact screening criteria.

#### **5.1.2 Impact Magnitude**

The potential implications of the project have been categorized as major, moderate, minor or nominal based on consideration of the parameters such as i) duration of the impact and its effect; ii) the spatial extent of the impact; iii) reversibility; iv) likelihood; and v) legal standards and established professional criteria.

The magnitude of each potential impact of the project has been identified according to the categories outlined in Table-8.

**Table-7: Parameters for Determining Magnitude**

Parameters	Major	Moderate	Minor	Minimal
Duration of potential impact	Long term (beyond the project period).	Medium Term Lifespan of the project (within the project period)	Short term to construction period.	Temporary with no detectable potential impact.
Spatial Patterns of the potential impact	Widespread far beyond project boundaries	Beyond next project components, site boundaries or local area.	Within project boundary	Specific location within project component or site boundaries with no detectable potential impact
Reversibility of potential impacts	Potential impact is effectively permanent, requiring considerable intervention to return to baseline	Benchmark needs a year or so with some responses to come back to baseline	Baseline returns naturally or with limited response within a few months	Baseline remains constant
Legal standards and established professional criteria	Breaches national standards and or international guidelines.	Complies with limits given in national standards but violates international guidelines in one or more parameters.	Meets minimum national standard limits or international guidelines	Not applicable
Likelihood of potential impacts occurring	Occurs under typical operating or construction conditions	Happens under worst case (negative consequences) or best case (positive impact) working conditions (Likely)	Occurs under abnormal exceptional or emergency conditions (occasional)	Unlikely to happen

### 5.1.3 Sensitivity on Land-Use Type/Landscape Variables

The following four identified sensitive receptors/land-use patterns had been determined by taking the AOI into consideration underpasses development. Criteria for determining receptor sensitivity of the Project's potential impacts are outlined in Table-9.

- i. Tree density/afforestation pattern along Srinagar Highway.
- ii. Nearby infrastructure/social amenities.
- iii. Abiotic environment.
- iv. Ecological dynamics/alterations.

**Table 8: Criteria for Determining Sensitivity**

Sensitivity Determination	Definition
Very Severe	Vulnerable receptor with little or no ability to absorb proposed changes or minimal opportunities for mitigation
Severe	Vulnerable receptor with little or no ability to absorb proposed changes or limited opportunities for mitigation.
Mild	Vulnerable receptor with little or no ability to absorb proposed changes or moderate opportunities for mitigation.
Low	Vulnerable receptor with little or no ability to absorb proposed changes or excellent opportunities for mitigation.

#### 5.1.4 Assessing Significance

The significance of each potential impact followed by project scope of work as described in Sub-section 3.6 was established using the impact significance matrix shown in Table-10.

**Table 9: Significance Criteria**

Magnitude of Impact	Sensitivity of Receptors			
	Very Severe	Severe	Mild	Low
Major	Critical	High	Medium	Negligible
Moderate	High	High	Medium	Negligible
Minor	Medium	Medium	Minor	Negligible
Minimal	Negligible	Negligible	Negligible	Negligible

#### 5.1.5 Impact Screening Matrix

The 'activity wise' screening of potential impacts during the implementation phase are provided in tabular form hereunder:

**Table 10: Activity Wise' Screening of Impacts during Design Phase**

Sr.#	Potential Issue	Risk Levels				
		Duration of impacts (long term, medium term, short term, temporary)	Likelihood (certain, likely, unlikely, rare)	Magnitude (major, moderate, minor, minimal)	Spatial Pattern (Widespread from ROW, within ROW, outside of ROW)	Sensitivity (Very severe, severe, mild, low)
1.	Improper Designing of Proposed Underpasses	Long term	Unlikely	Moderate	Within ROW	Severe
2.	Improper selection of Camp, asphalt and batching plant sites due to noncompliance of SSEMP.	Short term	Likely	Moderate	Widespread from ROW	Mild
3.	Lack of integration of EIA requirement into construction bid documents.	Short term	Likely	Moderate	Within ROW	Severe
4.	Waste/construction Material dumping site/s.	Short term	Likely	Moderate	Within ROW	Mild
5.	Natural hazard risks (flooding/earthquakes).	Short term	Likely	Moderate		Mild

**Table 11: Activity Wise' Screening of Impacts during Construction Phase.**

Sr.#	Potential Issue	Risk Levels				
		Duration of impacts (long term, medium term, short term, temporary)	Likelihood (certain, likely, unlikely, rare)	Magnitude (major, moderate, minor, minimal)	Spatial Pattern (Widespread from ROW, within ROW, outside of ROW)	Sensitivity (Very severe, severe, mild, low)
1.	Impact due to Traffic/Local Commuters	Short Term	Likely	Moderate	Within ROW	Severe
2.	Degradation of air quality due to Proposed scope of work.	Short term	Likely	Moderate	Within ROW	Low
3.	Construction of road not in accordance with Climatic design.	Short term	Likely	Moderate	Widespread from ROW	Severe
4.	Potential accidents and injuries to communities in project area during construction works Community Health safety.	Short term	Likely	Minor	Within ROW	Low
5.	High noise levels and vibration from Construction activities.	Short term	Likely	Moderate	Within ROW	Mild
6.	Wastewater accumulation	Short term	Likely	Minor	Widespread from ROW	Low
7.	Soil erosion and contamination	Short term	Less Likely	Minor	Not likely	Low
8.	Injuries to workers from lack of necessary training and/or not using PPEs etc. (Occupational Health & Safety).	Short term	Likely	Minor	Within ROW	Low
9.	Waste / construction Material disposal sites.	Short term	Likely	Moderate	Widespread from ROW	Mild

10.	Untreated disposal of Suitable and surplus material from construction sites.	Short term	Likely	Moderate	Widespread from ROW	Low
11.	Vegetation/Afforestation loss	Short term	Likely	Minor	Within ROW	Low
12.	Disruption to Existing Public Utilities	Short term	Likely	Minor	Within ROW	Severe

**Table 12: Activity Wise' Screening of Impacts during Operational Phase.**

Sr.#	Potential Issue	Risk Levels				
		Duration of impacts (long term, medium term, short term, temporary)	Likelihood (certain, likely, unlikely, rare)	Magnitude (major, moderate, minor, minimal)	Spatial Pattern (Widespread from ROW, within ROW, outside of ROW)	Sensitivity (Very severe, severe, mild, low)
1.	Road Safety Parameters	Long term	Likely	Minor	Widespread from ROW	Low
2.	Accident due to high speed	Long term	Likely	Major	Widespread from ROW	Mild
3.	Infrastructure & Transportation Facilities	Long term	Likely	Minor	Widespread from ROW	Low

## 5.2 Impact Phases

This impact assessment and mitigation measures cover the entire cycle of the project activities, from structural excavation of barrels to operational time of the project. The coverage of each of project phases are defined as follows:

- Design / Pre-construction Phase
- Construction Phase
- Operation Phase

### **Mitigation Measures**

Mitigation is recommended through strategic avoidance combined with construction and monitoring. Bid and contract documents are recommended to specify that a Site-Specific Environmental Management Plan (SSEMP) shall be required for this project.

The Contractor shall ensure that the SSEMP, prepared and submitted to the CDA and SC or the designated person for review at least 10 days before taking possession of any work site. No access to the site will be allowed until the SSEMP is reviewed and approved by the client or the designated person after the review and recommendation of Pre-Construction Phase Impacts.

#### **5.2.1. Assessment during Pre-Construction/Design Phase**

The strongly associated factors are considered during the 'activity wise' screening of design phase impact as tabulated above (Table-11) while details are given hereunder:

##### **5.2.1.1. Improper Designing of Proposed 4-lane and 2-Lane Underpasses**

The possibility exists that in case the proposed underpasses are not designed in accordance with international standards and guidelines; American Association of State Highway and Transportation Officials (AASHTO), particularly with regards to compatible with the local climate and keeping in view the geological features. It could result in multiple potential impacts that could adversely affect the project area and economic losses.

Consideration like the provision of barrels, retaining walls, ramps and sub-base/sub-grade etc., is crucial; any fault may result in severity of flooding impacts, road damage, and other operational complexities.

#### **Mitigation Measures**

- Ensure that road has been designed in accordance with international standards and guidelines for road development (AASHTO).
- Consideration shall have been given to the stability of the sub-base, the base system to make all weather road. The sub-grade/water bound macadam must be sufficiently stable as per international standards.
- Provision of appropriate length of loops, water drains, retaining walls etc., are to be given in the road design.
- Care must be taken to ensure that tree cut/uprooting at centerline and ROW of Srinagar Highway is at minimal level.
- Ensure provision of maximum Signboards and road safety gadgets in the road design.

#### **Significance Criteria**

The significant impact is envisaged on tree density/afforestation pattern at median and either side of ROW. Therefore, the sensitivity of these notable receptor in response to improper road design is severe while the magnitude of impact is considered as major. The major parameter to be considered include "likelihood of potential impact" and is considered as "major" in magnitude (Table 7-1).

#### **Residual Impact**

The impacts during design phase are expected to be significant. However, with the implementation of mitigation measures outlined above, the environmental impact will be low in magnitude. Therefore, residual impact is expected to be not significant.

### **5.2.1.2. Improper Selection of Ancillary Facilities**

The duration of the construction activity is expected to be two years and a considerable amount of work force will be engaged. As a result, worker camps will need to be developed along the intersection sites and ancillary facilities will need to be provided such as electricity, washrooms for labor with suitable effluent and sewage disposal facilities as well as water for their everyday use for drinking and bathing etc.

The batching and asphalt plant location near to any identified sensitive receptor may cause the potential social and environmental impacts.

#### **Mitigation Measures**

- In order to prevent a nuisance, specific locations shall be designated for development of the labor camps. All necessary facilities and amenities shall be provided in these camps such as electricity, sufficient supply of water, solid and liquid effluent waste disposal facilities etc.
- The use of proper planning while identifying locations for the labor camps will ensure there is minimal disturbance to all key receptors and the traffic is not disrupted by labor camps being set up roadside next to the construction sites.
- It shall be ensured that the labour camp, batching plant, asphalt plant is situated at least 500m away from identified land-use types and populated area or in case of within the populated area the camp should be safeguarded with security persons to avoid any inconvenience to the locals.
- Ensure that the batching plant and asphalt plant are equipped with pollution abatement technology (i.e., wet scrubber or dry scrubbers).
- Ensure that, campsite management plan/labor management plan, developed according to the number of staff and approved subsequently by CDA and SC before execution.

#### **Significance Criteria**

The significant impact is envisaged on afforestation pattern along the Srinagar Highway, and ecological dynamics. Therefore, the sensitivity of these notable receptor in response to improper inappropriate selection of ancillary facilities is severe while the magnitude of impact is considered as major. The major parameter as per Table-8 to be considered include “Spatial pattern of potential impact” of this impact and is considered as “moderate” in magnitude.

#### **Residual Impacts**

The impacts of improper selection of camp, asphalt and batching plant sites on project are not expected to be significant with the implementation of mitigation measures outlined above. Therefore, residual impact is expected to be not significant.

### **5.2.1.3. Lack of Integration of EIA/EMMP requirements into Construction Bid Documents**

The bidding documents must reflect the requirement to select a qualified and experienced Contractor from the perspective of ensuring implementation of required safeguards during project development.

Lack of contractor's environmental safeguard capacity or selection of environment non-responsive contractors may result in failure of EMP implementation and may be a source of number of non-compliances.

#### **Mitigation Measures**

- The bid documents must include the EMMP/SSEMP and its implementation cost must be reflected in the BoQ.
- EMMP/SSEMP implementation and monitoring requirements must be part of bidding documents and necessary contractual binding must be agreed by project contractors before award of contract.
- Project contractors shall have qualified and experienced environmental staff to plan, arrange, implement, monitor and report as per EMMP/SSEMP requirements and submit progress reports/summary to SC for monitoring and subsequent approval.
- The Contractor will be required to define an Occupational and Environmental Health and Safety procedure for all proposed civil works. Also include camp operation, management of cement dust, and use of Personal Safety Equipment. These procedures should be developed and approved by the CDA in collaboration with the CSC before the Contractor commences any physical works on ground.

#### **Residual Impacts**

The impacts of lack of integration of EMMP/SSEMP requirements into construction bid documents are not expected to be significant with the implementation of mitigation measures outlined above. Therefore, residual impact is expected to be not significant.

### **5.2.1.4. Waste / Construction Material Dumping Sites**

During the pre-construction time, it must be anticipated on the generated construction waste (suitable and surplus) and their sustainable disposal. Therefore, waste/debris disposal site/s should be identified before to start the construction.

#### **Mitigation Measures**

- Contractor shall submit and get approval for the waste management plan for mucking material as well as the dumping site/s for this purpose.
- A waste management plan will be developed prior to the start of construction. This plan will cater to sorting of hazardous and non-hazardous materials prior to disposal, placing of waste bins at the project sites for waste disposal and an onsite hazardous waste storage facility i.e. designated area with secondary containment.

#### **Significance Criteria**

The significant impact is envisaged on existing tree density/afforestation patterns and social amenities/utilities. Therefore, the sensitivity of these notable receptor in response to waste disposal is severe while the magnitude of impact is considered as major. The determined parameter mainly “Reversibility of potential impact” of surplus/mucking material is the most probable with “moderate” in magnitude (Table-9).

### **Residual Impact**

The impacts of lack of Waste / construction material dumping sites are not expected to be significant with the implementation of mitigation measures outlined above. Therefore, residual impact is expected to be not significant.

#### **5.2.1.5. Natural Hazard Risks (Flooding, Earthquakes, etc.)**

Rainfall in moon-soon time mainly in July is the main significant abiotic factor. Besides earthquake in 2005 was also caused the collapse of a residential plaza located within 12km of the proposed project site.

### **Mitigation Measures**

Similarly, design to be made by keeping in view the Flood and Seismic Resistant Design.

### **Significance Criteria**

Due to this most significant abiotic factor, the significant impact is envisaged on all four land-use types/sensitive receptors. Therefore, the sensitivity of these notable receptor in response to natural hazard is severe while the magnitude of impact is considered as major. The determined parameter mainly “Duration of potential impact” is the most probable and magnitude is considered as “major” (Table-9, summarized in Table-12).

### **Residual Impact**

The seismic and flood devastation impacts not expected to be significant with the implementation of mitigation measures outlined above. Therefore, residual impact is expected to be not significant.

## **5.2.2. Assessment during Construction Phase**

### **5.2.2.1. Impacts due to Traffic/Local Commuters**

Traffic congestions will occur during the construction period especially near the adjacent areas around the Serena and Convention center intersection. Generally, traffic jam will be significant during morning and afternoon rush hours. In order to minimize impacts due to traffic a detail traffic impact assessment should be carried out in consultation with the Traffic Police (ITP) and CDA office, in to identify the status of traffic and find alternatives to reduce traffic congestions.

**Mitigation, Management and Monitoring:** A traffic management plan must be prepared and implemented. The following measures must be taken to reduce the hassle due to increased traffic:

- An advance notice should provide to local communities about the schedule of construction activities.

- Traffic regulations such as speed limits, time of transportation (especially night time) should enforce during transportation of materials and equipment and machinery.
- Condition of road to be surveyed and documented prior to activities;
- Installation of traffic warning signs, temporary traffic lights or traffic control personnel where construction and associated traffic has created significant impacts;

### **Significance Criteria**

It is, therefore concluded that the consequence of the impact would be Medium and its likelihood would also be medium. This impact is therefore assigned Moderate in Nature with the determined parameter mainly “Duration of Potential Impact” (Table-9, summarized in Table-12), if traffic diversion is not strictly adhered during construction phase.

### **Residual Impact**

The impacts due to traffic and local commuters are not expected to be significant with the implementation if traffic diversion is approved and signed by ITP office and designated SSP office, Faizabad.

#### **5.2.2.2. Degradation of Air Quality due to Proposed Scope of Works**

##### **Impact Assessment**

- The construction works will involve earth works, excavation for barrel structural formation, and transporting and dumping of dry material. This will likely lead to an increase in Suspended Particulate Matter (SPM) in and around the construction zones.
- Potential sources of particulate matter emission include earthworks (dirt or debris pushing and grading), truck dumping, hauling, vehicle movement, combustion of liquid fuel in equipment and vehicles, land excavation, and concrete mixing and batching plant.
- Vehicles carrying construction material are expected to result in increased SPM levels near the haul roads.
- At the construction yard, the dust levels are also expected to increase due to unloading of construction materials. It shall be ensured that most of the excavated material will be used within the project for barrel retaining walls and backfilling at underpass site areas.
- Poor air quality due to the release of contaminants into the workplace can result in possible respiratory irritation, discomfort, or illness to workers, alteration in ecosystem. Construction/Site management should take appropriate measures to maintain air quality in the work area.
- The quantity of dust that will be generated on a particular day will depend on the magnitude and nature of activity and the atmospheric conditions prevailing on the day. Due to the uncertainty in values of these parameters, it is not possible to calculate the quantity from a ‘bottom-up’ approach, that is, from adding PM<sub>10</sub> emissions from every activity on the construction site separately.

**Table-13: Control Measures for Fugitive Dust Emissions.**

Source	Control Measures
<b>Earth Moving</b>	For any earth moving, damping down of upper soil/watering must be conducted as required to prevent visible dust emissions.
<b>Disturbed Surface Areas</b>	Areas that cannot be stabilized, such as wind driven dust, must have an application of water at least twice a day.
<b>Unpaved roads</b>	Periodic sprinkling on all roads used for any vehicular traffic at least twice per day during active operations and restrict vehicle speed to 20 kmph.
<b>Structural Excavation for Sub-base Layering</b>	Apply water to at least 80 percent of the surface areas on a daily basis when there is evidence of wind driven fugitive dust or install an enclosure where possible.
<b>Track-out control</b>	Wash down of construction vehicles (particularly tyres) prior to departure from site.

**Mitigation Measures**

- As per baseline climatic condition described in Subsection 4.4.6, it must be ensured that the active road construction site and the immediately adjoining areas, water are sprinkled every three hours and at a higher frequency if felt necessary, at all construction sites to suppress dust emissions if required.
- All heavy equipment and machinery shall be fitted in full compliance with the national and local environmental standards.
- Stockpiled soil and sand shall be slightly wetted before loading, particularly in windy conditions.
- Fuel-efficient and well-maintained haulage trucks shall be employed to minimize exhaust emissions.
- Vehicles transporting soil, sand and other construction materials shall be covered with tarpaulin.
- Limitations to speeds of such vehicles as felt necessary. Transport through Murree Expressway (E-35) or Srinagar Highway during peak hours should be avoided.
- The need for large stockpiles shall be minimized by careful planning of the supply of materials from controlled sources. Stockpiles should not be located within 50m of sensitive receptor and shall be covered with tarpaulin when not in use and at the end of the working day to enclose dust. If large stockpiles (>25m<sup>3</sup>) of crushed materials are necessary, they should be enclosed with side barriers and also covered when not in use.

- Dust emissions due to road travel shall be minimized through good construction practices (such as keeping stockpiles down wind and away from communities) and sprinkling water over the access road.

### **Vehicular and Exhaust Emissions**

- Regularly change the engine oil and use new engines/machinery/equipment having good efficiency and fuel burning characteristics.
- Controlled technology generator and batching plants will be used to avoid excessive emissions.
- Burning of wastes at any site will not be allowed.
- The stack height of generators will be at least 3 meters above the ground.
- Training of the technicians and operators of the construction machinery and drivers of the vehicles.
- All type of machinery and generator must comply with the NEQS. Vehicles, which are not in compliance with NEQS are not allowed to use.

### **Significance Criteria**

All identified sensitive receptors/environmental factors (refer Sub-section 5.1.3) are strongly associated with all construction components; hence it is the most considered variable for controlling the ambient environment. As per landscape context, the impact significance is very high due to sensitivity of impact would be very severe with magnitude as “Major” during execution of retaining walls and underpass excavation works. The most significant parameter to be considered include Spatial Pattern of Potential Impact of air quality on sensitive receptors.

### **Residual Impact**

Provided the proposed mitigative measures are implemented, the air quality impacts due to scope of works will be short term and moderate on environmental and landscape variables. Therefore, no significant adverse residual environmental impacts are likely to occur.

#### **5.2.2.3. Noise Level and Vibration**

The road infrastructure development will result in different construction equipment and machinery being used which will generate high noise levels at the project site and in the project area.

Each construction activity has its unique noise characteristics due to use of different equipment items. The construction activities will include use of a large number of trucks, generators, excavators etc., which can generate significant noise.

Due to the various construction activities, there will be temporary noise impacts in the immediate vicinity of the project site. The movement of heavy vehicles, loading, transportation and unloading of construction materials produces significant noise during the construction stage. However, these increased noise levels will prevail only for a short duration during the construction phase.

### **Mitigation Measures**

- All the equipment and machinery used during construction phase should be well maintained and in compliance with NEQS.
- Grievance Redress Mechanism (GRM) shall be established for both labourer and commuters.
- Other sources of vibration at construction site are rollers, compactors or any loose part of machinery exposure which may cause serious injury or workplace sickness. Further ensure that no equipment and machinery with loose or vibratory parts is allowed. Such issues will be fixed through maintenance of the machinery on periodic basis. Use of rollers for land grading will be carried out during day times and with intermittent intervals to reduce the impacts of vibration on surrounding environment.

### **Significance Criteria**

This environmental factor is strongly associated on all identified sensitive receptors (refer Sub-section 5.1.3) on physical progress of all construction components; hence it is the most considered variable for controlling the ambient environment. As per landscape context, the impact significance is very high due to sensitivity of impact would be very severe with magnitude as “Major”. The most significant parameter to be considered include Spatial Pattern of Potential Impact of noise generation on sensitive receptors.

### **Residual Impact**

Provided the proposed mitigative measures are implemented, the noise and vibration impact due to construction works will be short term and minor. Therefore, no significant adverse residual environmental impacts are likely to occur.

#### **5.2.2.4. Construction of Road not in Accordance with Climatic Design**

### **Impact Assessment**

If the proposed road is not rehabilitated in accordance with the climate resistant design and its corresponding design parameters, could lead to a number of unanticipated impacts such as water accumulation on road, road cracks, poor roadways and road safety will lead to accidents, etc.

### **Mitigation measures**

The following mitigation measures will be applied while implementing project scope of work:

- Method statements must be prepared by the Contractor and approved by the Construction Supervision Consultant (CSC) prior to commencement of construction works.
- The CSC must closely monitor the construction works being conducted by the Contractor to ensure the finalized design is implemented in compliance of the approved finalized designs.
- Any variation by the Contractor in the finalized design must be immediately highlighted and corrective measures must be implemented to ensure full compliance with the finalized design of the road.

- The proponent shall ensure that construction activities are being carried out in compliance to project design following best international practices. It will closely review and monitor the activities of CSC and contractors involved in construction activities.

### **Significance Criteria**

The significant impact is envisaged on all four land-use types/sensitive receptors (refer Sub-section 5.1.3). Therefore, the sensitivity of these receptors is severe while the magnitude of impact is considered as major. The most frequent parameter during physical progress is “Duration of potential impact” is the most probable on sensitive receptors with “major” in magnitude on all four land-use types/sensitive receptors.

### **Residual Impact**

The impacts of the road design on project are not expected to be significant with the implementation of mitigation measures outlined above. Therefore, residual impact is expected to be not significant.

#### **5.2.2.5. Erosion/Soil Contamination and Water Bodies**

The works proposed for development may result in soil erosion and soil contamination. Spoils will be generated from the interlinked activities, particularly during sub-base layer and TST structures. Potential impacts from spoils and their disposal are (i) land for disposal of spoil, (ii) potential erosion from the spoil areas and spoil material reaching the nearby Nullah, and (iii) aesthetic impacts. Excavated soil will be stored at site and will be used as backfilling during operations.

During the project construction, spills of fuel, lubricants and chemicals can take place while transferring from one container to another or during refueling. Also, during maintenance of equipment and vehicles, through leakages from equipment and containers and as a result of traffic accidents.

### **Mitigation measures**

- Any drainage structures, culverts or pipes crossing the project site may need to be modified or protected and the detailed designs must make provisions to protect or provision all infrastructure that may be affected by the construction works.
- Any drainage structures, culverts or pipes crossing at both LOTs may need to be modified or protected and the detailed designs must make provisions to protect or re-provision all infrastructure that may be affected by the construction works.
- Regular inspections will be carried out to detect leakages in construction vehicles and equipment and all vehicles will be washed in external commercial facilities.
- Stockpiles of construction and dusty materials along to the edges of water body;
- Transportation of eroded material by construction vehicles;
- Fuel and oil storage areas;
- Disposal of mucking material at safe distance from arable and built-up areas;

- For timely compliance of these impact construction contractor (CC) in consultant safeguard supervisory consultant shall adhere following measures with short- and long-term mitigation measures:
- CC will prepare Environmental Management Plan to address environmental impacts during civil works.
- Monitor environmental quality parameters such as air, noise, surface and ground water concentrations in the vicinity of the earthwork areas.
- All areas intended for storage of hazardous materials to be quarantined and provided with adequate facilities to combat emergency situations complying all the applicable statutory stipulation.

### **Significance Criteria on Sensitive Receptors**

The main probability of significant impact on sensitive receptors is envisaged on nearby infrastructure/amenities (mainly Serena Hotel and grassland ecosystem). Therefore, the sensitivity of these receptors is severe while the magnitude of impact is considered as major. The most frequent parameter to be considered include “Spatial Pattern of potential impact” due to the most probable impact with “major” in magnitude on waterways and arable land.

### **Residual Impact**

The impacts of the road design on project are not expected to be significant with the implementation of mitigation measures outlined above. Therefore, residual impact is expected to be not significant.

#### **5.2.2.6. Potential Accidents and Injuries to Communities in project area (Community Health & safety)**

### **Impact Assessment**

The civil works mainly structural excavation during barrel width formation of underpass will involve the use of considerable heavy machinery at the project site along with posing the risk to the commuters and workers. In addition, the risk to commuters on the road during the construction works will be significant and thus a number of precautionary measures will be necessary to minimize the risk of possible accidents. Community Health & Safety may be compromised during road travel particularly in night hours if adequate barriers and signage is not provided at construction sites.

### **Mitigation Measures**

The following mitigation measures will be applied while implementing project scope of work:

- Work areas outside the project site, especially where machinery is involved, will be barricaded and will be constantly monitored to ensure that local residents, particularly children stay away while excavated areas being prepared for road.
- Road related infrastructure will be cordoned off. Also, no machinery will be left unattended, particularly in running condition.

- Local communities in the project area will be briefed on traffic safety.
- Speed limit of 20 km/hr will be maintained by all project related vehicles and nighttime driving of project vehicles will be limited where possible.
- Educate drivers on safe driving practices to minimize accidents and to prevent spill of hazardous substances and other construction materials during transport.
- Contractor must take proper safety measures (placing warning tapes around excavations) to avoid people, especially children, accidentally falling into excavations.
- All the working platforms must be cordoned off with special care by well-trained skilled workers.
- Contractor will prepare construction management plan which will include the hazard prevention and safety plan, which will address health and safety of the people in the project area.
- The project In-charge (RE) should ensure the contractor staff working in the project are well trained and educated in the Health, Safety and Environment (HSE) hazards associated with their duties, and that of the public, in the project area.

#### **Significance Criteria on Sensitive Receptors**

The significant impact is envisaged at nearby structure/amenities and Tree densities/grass land. Therefore, the sensitivity of these receptors is severe while the magnitude of impact is considered as Mild. The parameter to be adopted for controlling the impact during physical progress is “reversibility and likelihood of potential impact” due to the magnitude of impact at Built-up and populated areas are envisaged to be “major”.

#### **Residual Impact**

The foreseeable residual impact is only envisaged, due to lack of HSE inspection and accountability of budgets allocated of HSE adherence. Provided the proposed mitigation measures are implemented, the community health and safety impacts due to construction works will be short term and minor. Therefore, no significant adverse residual environmental impacts are likely to occur.

#### **5.2.2.7. Injuries to Workers from Lack of Necessary Training and/or Not Using PPEs (Occupational Health & Safety)**

Only construction labor and construction staff hired during the civil works will be subject to occupational health and safety risks. So, a well-developed implementation plan is always the requirement of this nature of project, to eliminate or reduce the issues pertaining to Health and Safety of both workers and community. The major OHS hazards expected during the proposed scope of work are as follows:

- Slips, trips and falls, especially while carrying heavy or bulky loads;
- Psychological stress due to dissatisfaction at work due to issues with peers, superiors etc.;

- General ill feeling as a result of work in confined spaces and development of 'sick building syndrome.

### **Mitigation Measures**

- The Contractor will be required to prepare and implement an effective Worker Health and Safety Plan that is supported by trained first aid personnel and emergency response facilities. Construction contracts will include standard Worker Health and Safety measures and contractors will be bound to implement these fully.
- Monitoring will be required to ensure that the health and safety plan based on contract specifications is followed.
- Cement feed hopper areas will be inspected daily to ensure compliance with the requirement of dust masks.
- Surfaces (including flooring and work surfaces) in camps, kitchens, dining areas and workshops should be solid and easy to clean. Flooring for work camps must be float finished concrete or better.
- The Contractor shall submit to the Engineer of CSC for approval a site layout plan, identifying work areas, accommodation, kitchen, dining area, sanitary facilities, location of generators, plant and vehicle parking, transport routes through the camp, pedestrian routes through the camp, evacuation routes, emergency exits, batching plants, storage areas, waste facilities etc.
- Fire extinguishers should be provided throughout camps and work sites. Fire extinguishers should be inspected monthly and maintained, as necessary.
- An adequate and reliable supply of safe drinking water shall be made available at readily accessible and suitable places including at all camps.
- The Contractor shall take samples from each supply of drinking water and arrange for analysis of these samples at Pak-EPA certified laboratory prior to its use by the Contractor's staff. The results of these tests for each supply must be submitted to the Engineer of CSC and must demonstrate that each water supply meets national and World Health Organization standards for drinking water.
- Public sensitization training should be provided to workers to avoid social conflicts between residents and the construction contractor, Occurrence of any such impacts can be avoided by community sensitive project planning and implementation and through effective involvement of local administration.
- Site personnel will be provided appropriate type of personal protective equipment (PPEs). Contractor will ensure consistent use of PPEs.

### **Residual Impact**

Provided the proposed mitigation measures are implemented, the worker health and safety impacts due to construction works will be short term and minor. Therefore, no significant adverse residual environmental impacts are likely to occur.

### **5.2.2.8. Hazardous and Non-hazardous Waste Management**

#### **Impact Assessment**

Potential sources of waste will include spoils generated during earth work, base & sub-base, surface ramp width, and barrel structures (Sub-section 3.6, Table 1). The major waste generation includes domestic wastes (solid & wastewater), fuel or oil leakages or spills, onsite effluents from vehicle wash & cleaning, and cement spills.

- Waste disposal of materials containing contents of both hazardous and nonhazardous nature such as scrap wood, bricks, concrete, asphalt, plumbing etc. can potentially become a serious environmental issue, particularly with the local contractors.
- Domestic wastes generated during construction of road will include sewage, grey water (from kitchen, laundry, and showers), kitchen wastes, combustible wastes and recyclable wastes from contractor camps.

#### **Mitigation Measures**

- A waste management plan to be developed prior to the start of construction. This plan will cater to sorting of hazardous and non-hazardous materials prior to disposal, placing of waste bins at the project sites for waste disposal and an onsite hazardous waste storage facility i.e., designated area with secondary containment.
- Fuel and hazardous material storage points must be included in camp layout plan to be submitted for approval. Hazardous material storage areas shall include a concrete floor to prevent soil contamination in case of leaks or spills.
- Fuel tanks will be checked daily for leaks and all such leaks will be plugged immediately.
- Hazardous waste will be initially stored on site at designated area and then handed over to EPA certified contractor to final disposal.

#### **Significance Criteria on Sensitive Receptors**

The significance of this impact is envisaged on ecosystem alteration, nearby infrastructure and tree densities. Therefore, the sensitivity of these receptors is severe while the magnitude of impact is considered as Moderate. The parameter to be adopted for controlling the impact during progress of civil components is “reversibility and likelihood of potential impact” due to the magnitude of impact at waterways, built-up and populated areas with “moderate” in magnitude as per Table-9, summarized in Table-12.

#### **Residual Impact**

The residuals are foreseen due to lack of supervision of mitigation measures for controlling this impact. But, provided the proposed mitigation measures are implemented, the Hazardous & Non-Hazardous Waste Management during construction phase will be short term and moderate. Therefore, no significant adverse residual environmental impacts are likely to occur.

### **5.2.2.9. Untreated Disposal of Surplus/Suitable Material**

#### **Impact Assessment**

The staff and labor camps for the construction of the road will be a source of wastewater generated from the toilets, washrooms and the kitchen. The wastewater will not meet the national environmental standards and will therefore need treatment prior to disposal.

### **Mitigation Measures**

- A closed sewage treatment system including soak pits and septic tank will be constructed to treat the effluent from the construction/labor camps.
- Sewage treatment system will be installed at each respective labor camp based on the number of laborers residing at the respective camp.
- Sprinkling of grey water or sewage will not be allowed; in case the septic tank gets filled with sludge, septic tank shall be emptied through vacuum truck and material shall be transferred to treatment facility or approved municipal drain.
- Water being released from any batching plant(s) must be treated as per requirements of NEQS prior to release to sewerage system/any other water body.

### **Significance Criteria on Sensitive Receptors**

The significance of this impact is envisaged on ecosystem alteration, nearby infrastructure and tree densities. Therefore, the sensitivity would be Mild on these receptors while the magnitude of impact is considered as Moderate. The parameter to be adopted for controlling the impact during construction of underpasses is “reversibility and likelihood of potential impact” due to the magnitude of impact at waterways, built-up and populated areas with “moderate” in magnitude as per Table-9, summarized in Table-12.

### **Residual Impact**

The residuals are foreseen, unless the impacts left un-supervised for controlling this impact. But, provided the proposed mitigation measures are implemented, the impacts due to disposal of suitable and surplus material during construction phase will be short term and moderate. Therefore, no significant adverse residual environmental impacts are likely to occur.

#### **5.2.2.10. Vegetation and Afforestation Loss**

Based on the onsite assessment, the nearby surrounding areas will be altered due to intervention of activities. However, there are uniform distribution of trees or planted trees (Afforestation by CDA) observed at various scales.

As discussed earlier, the construction will be carried out within the existing within the ROW. The current landscape context clearly indicate that construction of underpasses affects the existing floral composition of the ambient area.

### **Mitigation Measures**

Only trees falling within the proposed DED/Scope of works will be cut for proposed underpasses and ancillary works. Remnant tree density areas at either side or median, must be conserved with strict supervision.

### **Significance Criteria on Sensitive Receptors**

The significance of this impact is envisaged on tree density/afforestation pattern along the Srinagar Highway. Therefore, the sensitivity of this receptor is Severe on these receptors while the magnitude of impact is considered as Moderate. The parameter to be adopted for controlling the impact during construction of underpasses are “Spatial pattern of potential impact” due to the magnitude of impact on tree density sites with “moderate” in magnitude as per Table-8, summarized in Table-12.

### **Residual Impact**

The residual impacts are likely to be occurred on ambient air quality. But plantation of medium sized trees against each tree cut at site may provide floral diversity and maintain the dust suppression and air quality after two to three years.

#### **5.2.2.11. Disruption of Existing Public Utilities/ Infrastructure**

### **Impact Assessment**

There may be some disruption to the already existing utilities like electricity poles, underground telephone lines, water supply lines, gas pipelines and power transmission lines etc. along the Srinagar Highway. Deep excavation for the construction may damage the structure stability of the surrounding building/service roads and may result in foundation collapse of the structure.

**Mitigation, Management and Monitoring:** Mitigation measures will include rehabilitation of existing utilities before construction to avoid any inconvenience to the residents of the project area or provide them with alternate arrangement during the construction period. Before starting the excavation, utilities details study and soil investigations shall be thoroughly conducted to develop understanding of the area. Furthermore, following shall be considered:

- Unnecessary excavation should be avoided;
- Excavations shall be carried out carefully to avoid damaging infrastructure in the surroundings of the project area;
- Restitution/Rehabilitation plan to be strictly implemented;
- Temporary retaining structures shall be provided; and
- NOCs from relevant departments should be arranged.

### **Significance Criteria on Sensitive Receptors**

The significance of this impact is envisaged on social amenities and tree density/afforestation pattern. Therefore, the sensitivity of this receptor is severe, while the magnitude of impact is considered as Moderate. The parameter to be adopted for controlling the impact during construction time is “Spatial pattern of potential impact” due to the magnitude of impact on social amenities and tree density sites with “moderate” in magnitude as per Table-8, summarized in Table-12.

### **Residual Impact**

The residual impacts are likely to be occurred on existing public/underground utilities, if restitution is not undertaken timely. Moreover, lack of supervision may also lead to contribute this factor.

### 5.2.3. Assessment during Operation Phase

#### 5.2.3.1. Implementation of Road Safety Parameters

Potential accident may occur if the following road safety parameters are not implemented immediately after completion of physical works of underpasses:

- I. **Signage and Markings:** Adequate and visible road signs and pavement markings to guide and warn road users.
- II. **Lighting:** Proper illumination of roads, particularly at intersections and pedestrian crossings, to ensure visibility at night or in low-light conditions.
- III. **Traffic Control Devices:** Traffic signals, speed cameras, and other devices to regulate vehicle movement and speed.
- IV. **Pedestrian and Cyclist Infrastructure:** Safe pathways, crosswalks, bike lanes, and other facilities to protect non-motorized road users.
- V. **Vehicle Standards and Maintenance:** Ensuring vehicles are in good working condition, with regular inspections and adherence to safety standards.
- VI. **Driver Behavior:**
  - **Adherence to Traffic Laws:** Compliance with speed limits, traffic signals, and other regulations.
  - **Use of Safety Devices:** Seat belts, helmets, child restraints, etc.
  - **Avoidance of Impairments:** No driving under the influence of alcohol or drugs, and minimizing driver fatigue.
  - **Distraction Reduction:** Minimizing the use of mobile phones and other distractions while driving.
  - **Emergency Response:** Efficient systems for responding to accidents and providing timely medical assistance.

#### Residual Impact

Provided the proposed mitigative measures are implemented, the air and climatic impacts during operational phase will be short term and moderate. Therefore, no significant adverse residual environmental impacts are likely to occur.

#### 5.2.3.2. Potential Accident due to High Speed

While the proposed Serena and Convention Center intersections, the improvements will make the road safer in some respects, the increase in traffic movement in the next decade and the potential for higher speeds may result in more road accidents especially during night time where there is a potentially dangerous mix of non-motorized, two, three and four-wheel traffic using the road.

#### Mitigation Measures

Improved traffic signage and road markings will be used to warn motorists of impending changes in road standards and to advise appropriate speeds.

### **5.2.3.3. Infrastructure & Transportation Facilities**

The project is expected to have significant beneficial impacts to the commuters of the both Islamabad and Rawalpindi areas. The key benefits include:

- Improved access to health and education facilities-Improved road conditions will most likely result in increased traffic on the roads including transportation services. This will enable people to access health care and educational facilities more easily.
- Creation of Jobs -The community along the alignment of sub-project will have opportunities for temporary employment during construction. Although, this opportunity is temporary in nature, this will be beneficial.

## 6. PUBLIC CONSULTATION & PARTICIPATION

This chapter provides the details of the consultation process involving the stakeholders as part of the Environmental Impact Assessment (EIA) process requiring information disclosure and sharing. For this purpose, consultation meetings were held with Capital Development Authority at the outset for scoping the EIA study.

Public Participation in the inception stages is a mandatory requirement of the Environmental Impact Assessment, exercise under the Pakistan Environmental Assessment Procedures, Pakistan Environmental Assessment Protection Act 1997 and the rules & regulations framed thereunder.

Purpose of Public consultation and participation is to ensure that the EIA process is open, transparent and robust, characterized by defensible analysis to attain sustainability in the design, implementation, operation & management before the project interventions.

The key objectives of consultations are to:

- Share information with the stakeholders about the proposed project;
- Inform the stakeholders of the project features, relevant details and the environmental issues likely to emerge while the Project is in the pre-construction, construction and operation stages;
- Interact with the stakeholders to share information on significant physical, biological and socioeconomic environment that must be taken into consideration during the different stages of the Project, and measures to be adopted to minimize the severity of impact;
- Acquire the feedback of the stakeholders regarding the project including any concerns /suggestions that may need to be addressed/incorporated in the project plans.

### 6.1. CONSULTATION FRAMEWORK

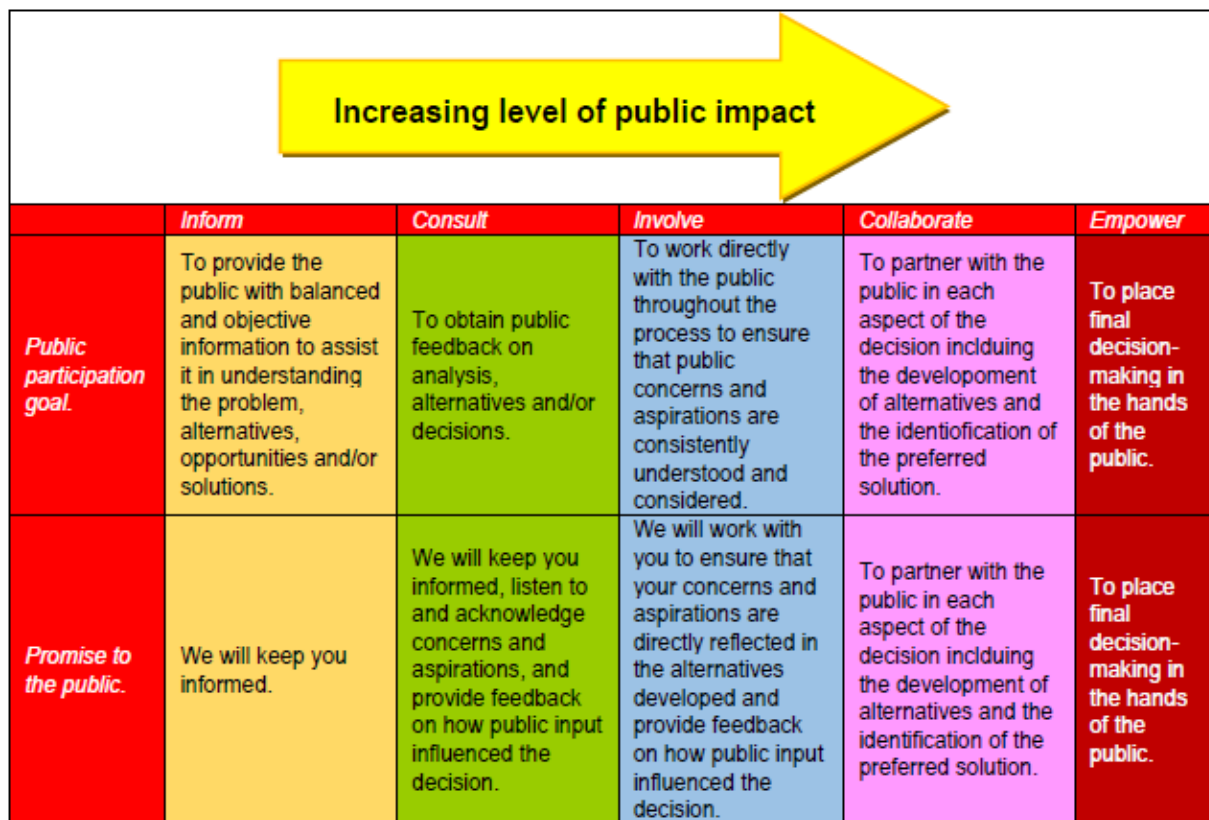
The consultation framework adopted for the Project is elaborated in the table below:

**Table 14: Consultation Framework**

Project Phase	Proposed Tool	Stakeholders Consulted/to be Consulted	Responsibility
Pre-Construction	Formal and informal meetings with stakeholders.	Institutional stakeholders; Grass root stakeholders, including communities in neighborhood likely to be involved during the Project Implementation Stage	Proponent

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<b>Construction</b>	i. Formal and informal contact and liaison with the community and other relevant stakeholders (e.g. Pak- EPA).	i. Institutional stakeholders ii. Grass root stakeholders, including communities in neighborhood involved during Project Implementation Stage;	Supervision Consultant, Proponent
	ii. Grievance Redress	Communities in neighborhood involved during Project Implementation Stage.	Supervision Consultant, Proponent
	iii. Consultations with communities during environmental compliance & Impacts monitoring		
	iv. during external monitoring/ site visits by EPA		
<b>Operation</b>	Liaison with nearby Communities.	Communities in neighborhood Involved during the Project Operation Stage.	Supervision Consultant, Proponent



**Figure 22: Public Participation Approach**

**6.2. IDENTIFICATION OF STAKEHOLDERS**

The range of stakeholders involved in an EIA typically includes the following groups:

- i.** Local Commuters: The commuters were get informed on what is proposed; what the likely impacts are; and how their concerns will be understood and taken cognizance thereof. They would be kept informed of the scope of work and changes that may occur when the construction and operation of project commences.
- ii.** Proponent: The main aim of involving the project proponent is to ensure they are part of the consultation process and that any concerns/feedbacks are directly shared with the CDA. This helps creating transparency and also increases public understanding and acceptance of the project through provision of basic information directly from the proponent.
- iii.** Government agencies: Involvement of government agencies /departments during the EIA process serves two purposes, (1) it ensures that their policy and regulatory requirements are addressed in the EIA (inception stages of the project) for impact analysis and mitigation measures, and (2) it enables their involvement to avoid the probability of the project becoming controversial in the later stages of the process.
- iv.** Other interested groups: Other interested groups include those who are experts in particular fields and can make a significant contribution to the EIA study. The advice and knowledge of government agencies and the industry sector most directly concerned with the proposal are often sought. In many cases, substantive information about the environmental setting and effects do come from some such intellectuals.

Onsite consultations were conducted with Institutional stakeholders. Following stakeholders have been engaged during consultation for the project:

- Capital Development Authority;
- Water and Sanitation Department;
- Islamabad Traffic Police.



Figure 23: Meeting with ITP Staff and Local Commuters

### 6.3. CONSULTATION PROCESS

The stakeholders were briefed during scoping meetings about the objectives of the project and the brief overview of the project activities including project area, location, construction activities, project duration, arrangements made by the proponent for utilities etc. Concerns and suggestions of the participants were noted and have been incorporated into the EIA document.

### 6.4. OUTCOME OF CONSULTATION

Table below provides summary of the entire consultation process initiated for the project.

Mr. Sajjad Haider  
Sub-Inspector (ITP)  
In charge of Serena Convention  
Centre Intersection.  
Contact# 0333-5212236.

Mr. Sarfraz Wirag  
SSP-Traffic Police

Mr. Waqas suggested that the EIA study should include the following key issues:

- Provide a safe and sperate route to facilitate the local commuters; Improve general standards of construction;
- The impact due to project related traffic should be assessed and addressed in the report.
- Provide proper diversions, where required, for the traffic during construction to avoid traffic congestion, related hazards, and dust emissions;
- Traffic Diversion Plan should be developed and approved by SSP-ITP, Faizabad.

---

Capital Development Authority.

- Traffic Diversion Plan should be developed before commencing project activities.
- Strict implementation of restoration and rehabilitation plan immediately after completion;

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Local Commuters in the project site's vicinity.

- The local commuters responded with positive feedback about the proposed development of underpasses.
  - Noise and dust issues For transport of Construction vehicles should transport materials during non-peak hours.
-

## **7. ENVIRONMENTAL MANAGEMENT PLAN**

### **7.1 INTRODUCTION**

The EMMP (Environmental Management and Monitoring Plan) has been designed to address how the proposed measures will be implemented. It defines the responsibilities of the project developer and contractor; develop a system of checks and balances proposed action that are to be taken by each role player, communication, and monitoring procedures.

Detailed Environmental Management Plan (EMP) attached as **Annexure-A** which ensures that the Project has less likely detrimental effect on the surrounding environment, particularly on identified environmental and social variables/sensitive receptors (Section-1, Subsection-1.7). The Plan shall act as a guideline for incorporating environmental measures to be carried out by CDA and contractors, as well as for other parties concerned for mitigating possible impacts. This Plan shall also act as the Environmental Monitoring Plan during construction and operational phase of the Project and will allow for prompt implementation of effective corrective measures.

### **7.2 SCOPE OF EMMP**

The EMMP provides mitigation and management measures for the following phases of the project:

#### **a). Design and Reconstruction Phase**

This section of EMP provides management principles for the construction phase of the project. Environmental actions, procedure and responsibilities as required with the construction phase are specified. These specifications of EMMP shall be included in the bidding/ contract documents and their implementation will be a contractual binding for the contractors. The document "contractor's guidelines" prepared by Capital Development Authority will also be handed over to Contractor for execution as per EMMP.

#### **b). Operation and Maintenance Phase**

This section of the EMP provides management principles for the operation and maintenance phase of the project. Environmental actions, procedures and responsibilities of technical /maintenance and supervisory staff to oversee the Environmental Actions as required from CDA within the operation and maintenance phase.

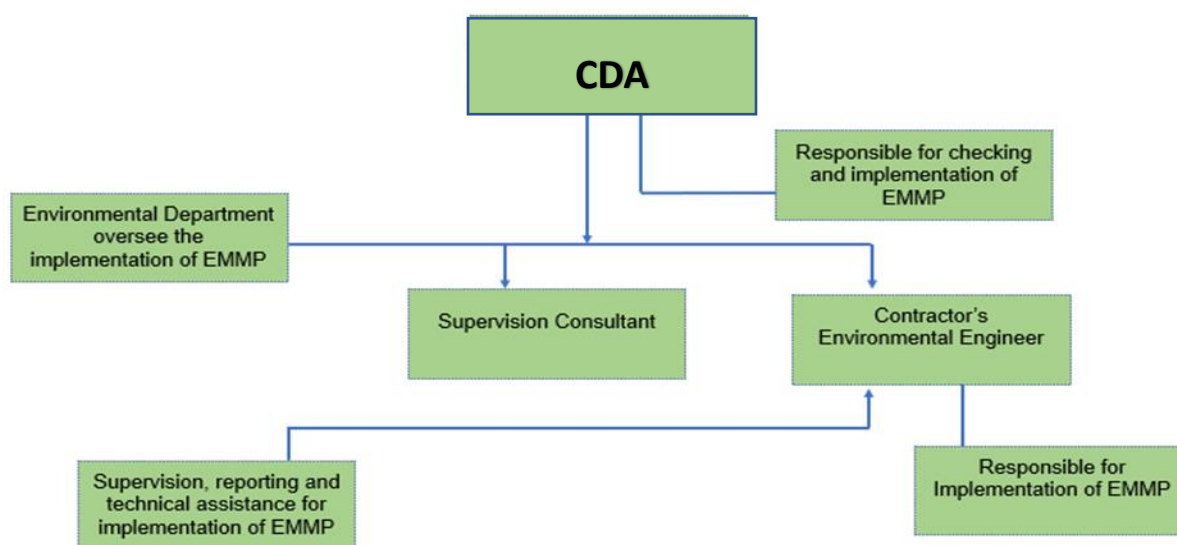
### **7.3 EMMP IMPLEMENTATION ARRANGEMENTS**

Capital Development Authority has the overall responsibility of implementation of Environmental Management and Monitoring Framework (EMMP).

The proposed site inspections by the Consultant's Environmentalist and the Environmental Section of CDA will be carried out on regular basis as per monitoring frequency to oversee the implementation during entire project completion cycle.

**Table 15: Monitoring Plan for Supervision Staff**

Contractor	The contractor will be responsible to implement the mitigation measures and other aspects of the EMMP as applicable. The contractor through his fulltime environmentalist for monitoring/inspection of environmental and social components, will provide training in implementation of EMMP to his qualified and technical staff.
Supervision Consultants	The Consultant through a fulltime environmental expert will be appointed at site for to entire exercises of the contractor in implementation of EMMP. He/She will ensure effective onsite implementation of SSEMP.
CDA (Environment Section)	The concerned staff of Environment as part of CDA will maintain top supervision to ensure effective the compliance of the EMMP.
General Assistance to all above agencies in their respective tasks	Resident Engineer of the Project will facilitate staff and convene meeting to address environmental and social constraints and non-compliances during physical progress.



**Figure 24: Management Hierarchy for Implementation of EMMP**

## **7.4 SPECIFIC IMPLEMENTATION RESPONSIBILITIES**

This section describes the implementation and supervision responsibilities of the personnel assigned for the implementation of EMMP.

### **a. Design Phase / Pre-Construction Phase**

The Director (Environment) and his staff with the assistance of SC (Design Supervision Consultant) will be responsible for ensuring that the proposed Project design and specifications adequately reflect the EMMP.

The responsibilities of the Director (Environment) may be briefly described as follows:

- To coordinate with regulatory agencies including Pak-EPA, that assist CDA in independent reviews of environmental compliance.
- To supervise environmental assessment reports and provide substantial inputs and guidance to Supervision Consultant.
- To ensure that the Design Consultant has incorporated all the mitigation measures proposed for the design phase and included in the contract documents.

### **b. Construction Phase**

- CDA will appoint Supervision Consultant, who along with the Environment Specialists and Director (Environment) will oversee the working of the Contractor.
- Supervision Consultant will liaise with the Project staff and the Director (Environment) of CDA to monitor environmental compliance during construction.
- SC will supervise the construction activities and get technical support, where necessary, from concerned environment staff of CDA to ensure compliance with the EMMP.

### **c. Federal Environmental Protection Agency**

PAK-EPA Team may be responsible for:

- Reviewing the status of implementation of EMMP.
- Conducting periodic site visits and supervision mission for detailed review for projects to deal with significant impacts.
- Reviewing of environmental management plan.
- Reviewing the periodic safeguard monitoring reports to ensure compliance as planned.
- Resolution of grievances, especially, directly received from residents and other concerned authorities.

## 7.5 REPORTING AND FEEDBACK MECHANISM

The contractor's environmental unit will manage the daily activities to be conducted in compliance with the EMMP and will be responsible for weekly reporting. While, SC would be responsible for monthly inspecting and monitoring report.

In response to contractor's reporting, the SC will draft the monthly, quarterly and semiannual environmental monitoring report and finalize with the CDA-Environment Department/section. The concerned staff of CDA, will submit progress reports to PAK-EPA as per conditions of environmental approval.

**Table 16: Environmental Management and Monitoring Report (EMMR) Requirements**

EMMR Responsibility	Reporting Requirement	Submission
Contractor	Weekly EMMR Report	SC
Construction Supervision Consultant (CSC)	Monthly EMMR Report Quarterly EMMR Report	CDA-Environmental Department
CDA-Environmental Department	Submission of Monthly and Quarterly EMMR Report	Pak-EPA

## 7.6 PROJECT SITE-SPECIFIC MANAGEMENT PLAN

These plans are site-specific and where applicable, contract-specific and will be prepared by the contractor(s) prior to the commencement of construction activities. The Plans to be prepared by the contractors for various aspects of the environmental management. The plans mainly include the detailing of the measures included in Mitigation Plans. A brief description of each of these plans is provided below:

**Drainage Control Plan** will be prepared by the contractor on the basis of the mitigation measures given in EMMP. The Plan will be submitted to consultant staff for review and approval before contractor mobilization.

**Pollution Prevention Plan** will be prepared and implemented by the Contractor on the basis of guidance and direction of Pak-EPA, as well as the mitigation plans given in EMMP. The Plan will be submitted to the CDA for review and approval before contractor mobilization.

**Waste Disposal and Effluent Management Plan** will be prepared and implemented by the Contractor on the basis of guidance and direction of Pak-EPA, as well as the mitigation plans given in EMMP. The Plan will be submitted to the CDA for review and approval before contractor mobilization.

**Traffic Management Plan** will be prepared by the Contractor, in accordance with guidance and direction of ITP. The Plan will be submitted to the CDA for review and approval before contractor mobilization.

**Borrow Area Management and Restoration Plan** for management and restoration of borrow areas will be prepared by the Contractor on the basis of requirements described in the mitigation plans. This Plan will aim at minimizing the environmental and social impacts during borrowing activities and restoring as much as possible the original natural situation of these sites by various measures (refill, leveling or smoothing). Restoration methodologies will be included in the Plan. The Plan will be approved by the CDA. The decision will be made on the basis of assessment which may include the parameters i.e., protection of local lives, protection of tree stands and nearby landscape context.

**Occupational Health and Safety Plan** will be prepared and implemented by the Contractor on the basis of relevant standards. The plan also includes management system of control hazards, safe system of work and engineering control measures to control HSE issues. The Plan will be submitted to the CDA for review and approval before contractor mobilization.

**Drinking Water Supply and Sanitation Plan:** Separate water supply and sanitation provisions will be needed for the temporary facilities, labor camps and workshops, in order prevent littering and surface water contamination. A plan will be prepared by the Contractor based on the guidance and direction of MCI and CDA Guidelines. The Plan will be submitted to the CDA for review and approval before contractor mobilization.

**Construction Camp Management Plan** will be prepared by the Contractor on the basis of the mitigation plans given in EMMP. The Plan will include the camp layout, details of various facilities including supplies, storage, and disposal. The Plan will be submitted to the CDA for review and approval before camp establishment.

**Fuel and Hazardous Substances Management Plan** will be prepared by the Contractor on the basis of the mitigation plans given in EMP and in accordance with the standard operating procedures, relevant guidelines, and where applicable, material safety data sheets. The Plan will include the procedures for handling oils and chemical spills. The Plan will be submitted to the CDA for review and approval before contractor mobilization.

**Emergency Preparedness Plan** will be prepared by the Contractor after assessing potential risks and hazards that could be encountered during construction of road.

**Site Restoration and Rehabilitation Plan:** The main areas to be considered for site restoration & rehabilitation include the construction area, campsite area, temporary tracks; land used for vehicles, material stores etc. A proper restitution will be required with the maximum possible effort. The restoration work comprises the removal of temporary construction works, removal of any precinct developed and levelling of the area (wherever required) etc. The following procedures will be adopted for the restoration of the project sites:

- All temporary construction built for the site development will be removed;
- Site for construction camps will be restored to its original (pre-construction) condition as much as possible;
- All the toxic and hazardous chemicals/materials will be completely removed from the site. It must be ensured that all oils and chemical spills which occurred during the construction stage are properly removed;

- Any debris from the construction site will be removed properly from the site and disposed of in an environmentally friendly manner;
- All fencing will be removed and pits will be backfilled; and
- Whole of the site will be covered with the original soil and plantation will be done, wherever required.
- To achieve the above objectives, the Contractor will prepare a Site Restoration & Rehabilitation Plan well before the completion of the construction activities and submit to CDA through the SC for approval.

**Disposal Area Management and Restoration Plan:** The plan for dumping sites of suitable and surplus material will be prepared by the Contractor and submit to SC for approval. The Plan will describe the procedures for spoil management, transportation and disposal at the selected site; the procedures for systematically disposing the spoil at the disposal site; further aiming at minimizing the environmental and social impacts during disposal activities and restoring as much as possible the original natural situation of these sites by various measures (landscaping, leveling or smoothing).

## 7.7 ENVIRONMENTAL TECHNICAL ASSISTANCE AND TRAINING PLAN

The Environmental Specialist of DSC with support of Construction contractor Environmental officer will be primarily responsible to provide all the necessary trainings to all Project personnel. The training modules will include air, noise and water pollution monitoring, social awareness, Environmental Laws, “National Environmental Quality Standards (NEQS)”, use of personal protection equipment, and health and safety related issues on the construction site. Moreover, the contractor will train all construction workers in basic sanitation and health care issues. The proposed training plan is tabulated below:

**Table 17: Environmental Training Plan on Bi-Annual Basis**

Sr.#	Participant	Contents	No. of Trainees/Duration	Cost
1.	Contractor Staff	Environmental Laws and Risks associated with construction phase	Three Seminars/3 Days	60,000/-
2.	Contractor Staff	Adherence of Occupational Health and Safety	Two seminars for Contractor’s Staff/2 days	60,000/-
3.	Managerial Staff	Environmental Mitigation Implementation of IEE on field.	One Seminar for Supervision staff of consultant and contractor/1 day	60,000
Total				180,000/-
In One Year				360,000/-
In Two Years				720,000/-

## 7.8 BUDGET ESTIMATION OF SSEMP

Budget for the Monitoring activities has been provided hereunder:

**Table 18: Budget Estimate for SSEMP Cost (For Construction of One Underpass)**

Items	Annual Unit Cost	No. of Years	Road Section	Remarks
			Underpass Site	
Training (Planned and Onsite)	360,000	1	360,000	During the complete project
Consultation, Reporting and Communication	200,000	1	200,000	--do--
Contractor's Environmental Engineer	720,000	1	720,000	--do--
HSE Supervisor	720,000	1	720,000	--do--
Drinking Water Quality Monitoring	72,000	1	72,000	2 samples, Biannually for 1 year
Surface Water Quality Monitoring	22,000	1	22,000	One time annually for 1 year.
Noise Monitoring	12,000	1	12,000	2 samples, Quarterly the 1 year construction period
Ambient Air Monitoring	180,000	1	180,000	2 samples, Quarterly the 1 year construction period
PPEs and Safety Arrangement for 120 persons approx.-replaced annually	1,234,000	1	1,234,000	Manageable as per staffing schedule
Tree Plantation	Yet to be decided	After Completion	Yet to be decided	With inclusion of Maintenance Cost
Total Estimated Cost			<b>520,000</b>	
Note: The Plan can be amended on the basis of changing in design and exceeding the project implementation schedule after one Year.				

A monitoring plan for the Project indicating environmental parameters, frequency, locations, and applicable standards is attached with this report at **Annexure-B**.

## 8. GRIEVANCE REDRESS MECHANISM

### 8.1 GENERAL

The Grievance Redress Mechanism is an institutional arrangement to provide a platform for primary stakeholders. The key aim is to address their grievances in response to construction works. Further, resolve grievances in a timely, transparent, and predictable manners. It will also provide a public forum to the aggrieved to raise their objections and through conflict resolution, address these issues adequately.

In the GRM process, it is, however necessary to ensure that procedure is gender responsive, culturally appropriate, and readily accessible to the stakeholders at no cost and without retribution

### 8.2 OBJECTIVE OF GRM

The main objective of GRM is to implement and develop a procedure for handling environmental and social concerns of the project stakeholders. The procedure will include a redressal mechanism with the aim to record and receive complaint through various means/modes. This may include placement of complaint register at project offices and GRM boxes at an accessible location (Passenger Points, camp offices, ITP office and project offices).

### 8.3 GRIEVANCE REDRESSAL COMMITTEE

CDA will constitute a Grievance Redress Committee (GRC) at project site. The committee will look into grievance cases related to social and environmental concerns. For effective implementation and possible resolution, GRC will consist of the following members:

**Table 19: Field Level Grievance Redressal Committee (GRC)**

Sr.#	Designation	Position in GRC
1.	Assistant Director-CDA	Chairman
2.	Resident Engineer	Secretary
3.	Affected Person/s	Member
4.	EE (DSC)	Member
5.	EE (CC)	Member

The Committee will locally resolve the grievance/complaints within seven days. If it fails to address the complaint within seven days, it will refer the complaint to the project level committee along with a brief report.

The following project level GRC will also be notified to promptly address the grievance.

**Table 20: Project Level Grievance Redressal Committee (GRC)**

Sr.#	Designation	Position in GRC
1.	Project Director-CDA	Chairman
2.	Deputy Director-CDA	Member
3.	Resident Engineer	Member
3.	Affected Person/s	Member
4.	EE (DSC)	Member
5.	EE (CC)	Member

#### 8.4 PROCEDURE OF COMPLAINT REGISTRATION

The procedure will include the following step wise process to resolve grievances:

**Stage 1:** When a grievance arises, the aggrieved person may contact directly with the CSC/RE to resolve the issue of concern. If the issue is successfully resolved, no further follow-up is required.

**Stage 2:** If the complaint not addressed adequately at Stage 1, the affected person(s) may proceed complaint to the GRC at site level. The designated person or GRM Focal Person/s note down the complaint along with relevant details in the community complaint register. The affected person(s) can also approach GRC without going through the Stage 1 described above. For each complaint, the GRC must investigate the complaint, ascertain its appropriateness/eligibility and identify an appropriate solution. It will provide formal acknowledgement within seven working days to the complainant. During the complaint investigation, the GRC will work in close consultation with the Contractor, SC, and higher management. The designated person should implement the redress solution and convey the outcome to the GRC within seven working days.

**Stage 3:** In case of dissatisfaction of the complainant at stage 2, he/she can approach to GRC stage 3 at project level. Here, the GRC is headed by the Project Director. The GRC at Project Management level will resolve the complaint/grievance and the agreed action thus determined should be implemented within twenty-one days (if additional time is needed to implement the corrective action, it should be discussed and decided during the meeting). In case of failure to address the complaint, the complainant can approach to final tier, stage 4.

**Stage 4:** If the affected person/complainant is still not satisfied with the reply in Stage-3, he or she can pursue judicial proceedings. In such cases, the PIU will also inform the Bank Team of persistent problems and/or where solutions need to be found at higher levels of government. Implementing the GRC's decision will be a contractual binding on the contractor.

#### 8.5 CREATING AWARENESS ABOUT GRM

All information about grievance procedures, grievance forms will be distributed through GRM sensitization sessions with the community. If there are several languages, then ensure that information is available in all of them.

## **8.6 TRANSPARENCY AND RECORD KEEPING**

The Project Director and Consultant office will maintain all complaint received from complaint register and Boxes.

## **8.7 ACCEPTABLE GRIEVANCE**

The following are some of the environmental issues could be subject for grievance from the affected people, concerned public and NGOs:

- Dust, noise, and air pollution from construction activities.
- Nuisance.
- Intensive schedule of construction activities.
- Inappropriate timing of construction vehicle flow.
- Traffic Movement.
- Water Pollution.
- Waste disposal.
- Disturbances to flora and fauna.
- Health and safety.
- Criminal activities.
- Failure to comply with standards or legal obligations.

## **8.8 UNACCEPTABLE GRIEVANCE**

The following type of complaint shall not be taken up for consideration as grievances:

- Anonymous Complaint.
- Issues not related to the project activities.
- Any type of complaint in which the complainant has been affected directly or indirectly.
- Complaints about corruption

The flow chart of the proposed redress mechanism is shown below:

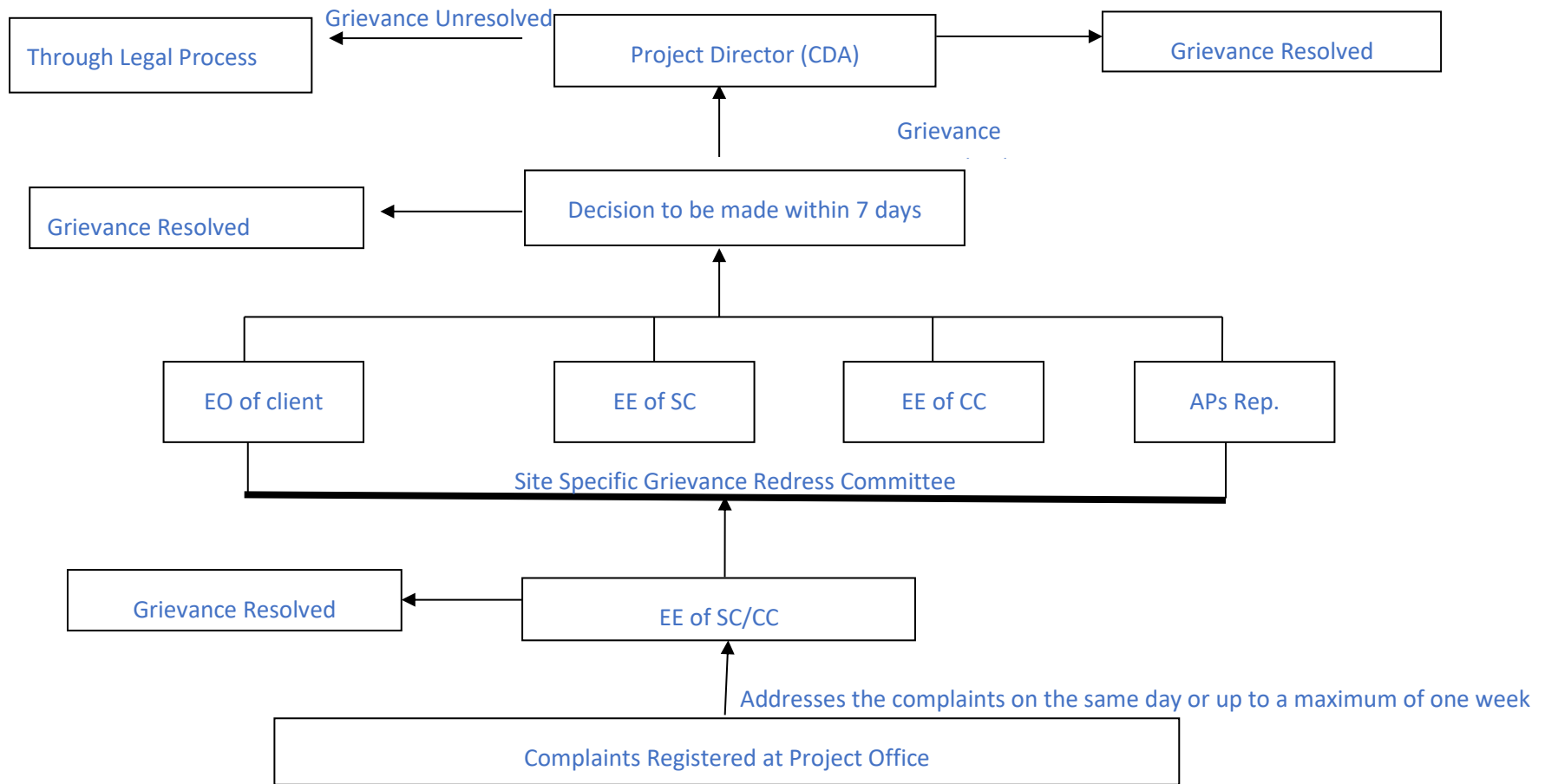


Figure 25: GRM Mechanism for effective Implementation

**Table 21: Grievance Redress Mechanism Form**

<b>Grievance Redress Mechanism Form</b>	
Contact Details	Name:
	Address:
	Contact Number:
	Email
Alternative Contact	Name:
	Relationship:
	Contact Number:
Written Documents Provided	List of Provided Documents:
What is the nature of your grievance (State the problem, impact scale, who are involved and other details)?	
Suggestion to resolve the grievance	

## 9. FINDINGS AND RECOMMENDATIONS

- The Environmental Impact Assessment (EIA) assessed the environmental impacts of all components proposed for the alleviation of traffic congestion at both intersection crossing areas.
- The potential adverse environmental impacts of the proposed underpasses are mainly related to the construction period, which can be minimized by the mitigating measures and environmentally sound engineering and construction practices.
- The frequent/notable impacts identified include: disturbance to the commuters; generation of dust and noise from construction activities and importantly afforestation patterns and temporary diversions, relocation & disturbance to utilities.
- These impacts are mostly localized, and can be effectively avoided or mitigated by observing the proposed mitigation measures, discussed under Chapter-5. The mitigation measures include traffic management plan, restricting construction work, providing safe system of work, and strict implementation of monitoring plans has been suggested in Chapter-7 (EMMP).

During onsite assessment, four different Land-Use types/sensitive receptors were taken for assessment within AOI Spatial Scale. These following four environmental/social variables are considered as strongly associated with the underpasses construction and allied works:

- v. Tree density/afforestation pattern along Srinagar Highway.
- vi. Nearby infrastructure/social amenities.
- vii. Abiotic environment.
- viii. Ecological dynamics/alterations.

In response to construction of civil design components (as described in Sub-section 3.6). The frequent envisaged negative impacts associated are given hereunder:

- Air pollution due to particulate material on account of dust, emissions from machinery, etc.
- Noise issues due to working of construction machinery on the project.
- Impacts related to Machinery Assembly area, material and equipment yard.
- Storage/stockpiling of construction material (Suitable and surplus material).
- Accident Risks; and Relocation of public utilities and effect on afforestation pattern; and
- Health and safety of workmen and neighbors etc.

Foregoing in view, Most of the Medium and High impacts identified in the study are temporary and manageable through:

- Implementing Environmental Management Plan; and
- Providing monitoring arrangements and resources during design, construction and operation stages of the project.

## **10. CONCLUSION**

- The proposed project will bring about a net-positive benefit in terms of alleviation traffic congestion and smooth traffic flow at Serena and Convention Centre Intersections. Environmental impacts of the project will be associated mostly with the construction phase. The impacts associated with social factors, particularly existing amenities will be temporary or reversible, phased over a period of time, localized, and manageable;
- The project will not have any significant impacts on ecological environment and archaeological sites, except inconvenience to local commuters and effect on afforestation pattern.
- Foregoing in view, the EIA concludes that if mitigation measures for all impacts identified in the EIA are affected as per the prescriptions of the EIA, no significant unacceptable changes in the baseline environmental conditions of the project area will occur. The operation will have a visible positive impact on the socio-economic conditions of the local commuters of the area.

# **Annexure- A**

## **Environmental Management Plan during Design and Construction Phase**

### Environmental Management Plan during Design and Construction Phase

Impacts Likely to Occur	Location	Mitigation Measures	Time/Schedule of Implementation	Implemented and Supervised By
<b>A. Pre-Construction Stage</b>				
Improper Designing of Proposed <b>4-lane and 2-Lane</b> Underpasses	Junction Crossing Point	<ul style="list-style-type: none"> <li>• Ensure that road has been designed in accordance with international standards and guidelines for road development (AASHTO).</li> <li>• Consideration has been given to the stability of the sub-base, the base system to make all weather road. The sub-grade and the base will be sufficiently stable as per international standards.</li> <li>• Minimize the impact on tree densities, within the centerline portion and along the outer shoulder at entire stretch.</li> <li>• Provision of appropriate length and width of retaining walls, water drains, barrel width etc., are to be given in the road design.</li> <li>• Provision of signages during the design phase through road safety audit.</li> </ul>	<ul style="list-style-type: none"> <li>• Prior to start of Construction works.</li> </ul>	EE of CC & Supervision Consultant
Improper selection of Ancillary Facilities.	Camp, asphalt plant site, and storage yards.	<ul style="list-style-type: none"> <li>• The use of proper planning while identifying locations for the labor camps will ensure there is minimal disturbance to all key receptors and the traffic is not disrupted by labor camps being set up roadside next to the construction sites.</li> </ul>	<ul style="list-style-type: none"> <li>• Prior to start of Construction works.</li> </ul>	EE of CC & Supervision Consultant

Impacts Likely to Occur	Location	Mitigation Measures	Time/Schedule of Implementation	Implemented and Supervised By
		<ul style="list-style-type: none"> <li>• Care must be taken to avoid tree densities and arable field, while selecting the area during SSEMP.</li> <li>• It shall be ensured that the labour camp, batching plant, asphalt plant is situated at lease 500m away from any populated area.</li> <li>• Site selection shall be based on guidance of Pak-EPA, and approval of RE/SC.</li> <li>• It shall be ensured that the batching plant and asphalt plant are equipped with pollution abatement technology (i.e., wet scrubber or dry scrubbers).</li> </ul>		
Lack of integration of IEE/EMP requirements into Construction bid Documents.	----	<ul style="list-style-type: none"> <li>• The bid documents must include the EMP and its implementation cost must be reflected in the BoQ.</li> <li>• IEE/EMP implementation and monitoring requirements must be part of bidding documents and necessary contractual binding must be agreed by project contractors before award of contract.</li> <li>• Project contractors shall have qualified and experienced environmental staff to plan, arrange, implement, monitor and report IEE/EMP requirements.</li> <li>• The Contractor will be required to define an Occupational and Environmental Health and Safety procedure for all work, including work</li> </ul>	Prior to start of Construction works.	EE of CC & Construction Supervision Consultant and CDA

Impacts Likely to Occur	Location	Mitigation Measures	Time/Schedule of Implementation	Implemented and Supervised By
		camp operation, management of cement dust, and use of Personal Safety Equipment. These procedures should be developed and approved by the CDA in collaboration with the CSC before the Contractor commences any physical works on ground.		
Waste / Construction Material Dumping Sites.	At identified Land use Type/Landscape Variables	<ul style="list-style-type: none"> <li>• Contractor shall submit and get approval for the waste management plan as well as the dumping site/s for construction waste disposal.</li> <li>• A Site-Specific waste management plan will be developed by the contractor prior to the start of construction. This plan will cater to sorting of hazardous and non-hazardous materials prior to disposal, placing of waste bins at the project sites for waste disposal and an onsite hazardous waste storage facility i.e., designated area with secondary containment.</li> </ul>	Prior to start of Construction works.	EE of CC & CDA/CSC
Natural Hazard Risks (Flooding, Earthquakes, etc.)	For entire Project Site	<ul style="list-style-type: none"> <li>• Similarly, design to be made in keeping in view seismic Zone 2-B requirements.</li> <li>• Required provisions in the project design, such as storm water drainage, shall be incorporated into the roads' design to cater to extreme weather events.</li> </ul>	Prior to start of Construction works.	Design Consultant
<b>B. Construction Phase</b>				

**Environmental Impact Assessment Report**  
**Resolving Traffic Congestion at Serena and Convention Centre Intersection**

Impacts Likely to Occur	Location	Mitigation Measures	Time/Schedule of Implementation	Implemented and Supervised By
Impact due to Traffic and Inconvenience to Local Commuters		<ul style="list-style-type: none"> <li>• An advance notice should provide to local communities about the schedule of construction activities.</li> <li>• Traffic regulations such as speed limits, time of transportation (especially night-time) should enforce during transportation of materials and equipment and machinery.</li> <li>• Condition of road to be surveyed and documented prior to activities.</li> <li>• Installation of traffic warning signs, temporary traffic lights or traffic control personnel where construction and associated traffic has created significant impacts;</li> </ul>	During implementation of civil works.	EE of CC & Construction Supervision Consultant
Degradation of Air Quality due to Proposed Scope of Works.	Active construction sites.	<ul style="list-style-type: none"> <li>• This impact will likely lead to an increase in Suspended Particulate Matter (SPM) within and around the intersection zones.</li> <li>• Potential sources of particulate matter emission include earthworks (dirt or debris pushing and grading), exposed surfaces, exposed storage piles, truck dumping, hauling, vehicle movement on unpaved roads, combustion of liquid fuel in equipment and vehicles, land excavation, and concrete mixing and batching plant.</li> </ul>	During implementation of civil works.	EE of CC & Construction Supervision Consultant

Impacts Likely to Occur	Location	Mitigation Measures	Time/Schedule of Implementation	Implemented and Supervised By
		<ul style="list-style-type: none"> <li>• Vehicles carrying construction material are expected to result in increased SPM levels near the haul roads.</li> <li>• At the construction yard, the dust levels are also expected to increase due to unloading of construction materials. It shall be ensured that most of the excavated material will be used within the project for barrel side walls and backfilling at underpass site areas.</li> <li>• Poor air quality due to the release of contaminants into the workplace can result in possible respiratory irritation, discomfort, or illness to workers, alteration in ecosystem. Construction/Site management should take appropriate measures to maintain air quality in the work area.</li> <li>• Due to the uncertainty in values of air quality parameters, it is not possible to calculate the quantity from a 'bottom-up' approach, that is, from adding PM<sub>10</sub> emissions from every activity on the construction site separately.</li> <li>• Stockpiled soil and sand shall be slightly wetted before loading, particularly in windy conditions.</li> </ul>		

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Impacts Likely to Occur	Location	Mitigation Measures	Time/Schedule of Implementation	Implemented and Supervised By
		<ul style="list-style-type: none"> <li>• Fuel-efficient and well-maintained haulage trucks shall be employed to minimize exhaust emissions.</li> <li>• Monitoring as per monitoring frequency shall be conducted and reporting to SC for analysis.</li> <li>• Vehicles transporting soil, sand and other construction materials shall be covered with tarpaulin.</li> <li>• Limitations to speeds of such vehicles as felt necessary. Transport through Srinagar Highway during peak hours should be avoided.</li> </ul>		
Noise level and vibration	Active construction sites	<ul style="list-style-type: none"> <li>• All the equipment and machinery used during construction phase should be well maintained and in compliance with NEQS.</li> <li>• Establish Grievance redress mechanism, right after the commencement of project.</li> <li>• Other sources of vibration at construction site are rollers, compactors or any loose part of machinery exposure which may cause serious injury or workplace sickness. No equipment and machinery with loose or vibratory parts will be allowed to work. Such issues will be fixed through maintenance of the machinery on periodic basis. Use of rollers for land grading</li> </ul>	During physical progress of civil/design components	EE of CC & Construction Supervision Consultant

Impacts Likely to Occur	Location	Mitigation Measures	Time/Schedule of Implementation	Implemented and Supervised By
		will be carried out during day times and with intermittent intervals to reduce the impacts of vibration on surrounding environment.		
Construction of Road not in Accordance with Climatic Design	Entire underpass and allied works construction.	<ul style="list-style-type: none"> <li>• Method statements must be prepared by the Contractor and approved by the Construction Supervision Consultant (CSC) prior to commencement of construction works.</li> <li>• The CSC must closely monitor the construction works being conducted by the Contractor to ensure the finalized design is implemented effectively in compliance of the approved finalized designs.</li> <li>• Any variation by the Contractor in the finalized design must be immediately highlighted and corrective measures must be implemented to ensure full compliance with the finalized design of the road.</li> <li>• The proponent shall ensure that construction activities are being carried out in compliance to project design following best international practices. It will closely review and monitor the activities of CSC and contractors involved in construction activities.</li> </ul>	During physical progress of civil/design components.	EE of CC & Construction Supervision Consultant

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Impacts Likely to Occur	Location	Mitigation Measures	Time/Schedule of Implementation	Implemented and Supervised By
Erosion/Soil Contamination	Entire underpass and allied works construction.	<ul style="list-style-type: none"> <li>Any drainage structures, culverts or pipes crossing the project site may need to be modified or protected and the detailed designs must make provisions to protect or re-provision all infrastructure that may be affected by the construction works.</li> <li>It will be ensured that spill prevention trays are provided and used during refueling.</li> <li>Regular inspections will be carried out to detect leakages in construction vehicles and equipment and all vehicles will be washed in external commercial facilities.</li> <li>Appropriate arrangements, including shovels, plastic bags and absorbent materials will be available near fuel and oil storage areas.</li> </ul>	During physical progress of civil/design components	EE of CC & Construction Supervision Consultant
Potential Accidents and Injuries to Communities in project area (Community Health & safety)	Active construction sites	<ul style="list-style-type: none"> <li>Work areas outside the project site, especially where machinery is involved, will be barricaded and will be constantly monitored to ensure that local residents, particularly children stay away while excavated areas being prepared for road.</li> <li>Road related infrastructure will be cordoned off. Also, no machinery will be left unattended, particularly in running condition.</li> <li>Local communities in the project area will be briefed on traffic safety.</li> </ul>	During physical progress of civil/design components	EE of CC & Construction Supervision Consultant

Impacts Likely to Occur	Location	Mitigation Measures	Time/Schedule of Implementation	Implemented and Supervised By
		<ul style="list-style-type: none"> <li>• Speed limit of 20 km/hr will be maintained by all project related vehicles and nighttime driving of project vehicles will be limited where possible.</li> <li>• Educate drivers on safe driving practices to minimize accidents and to prevent spill of hazardous substances and other construction materials during transport.</li> <li>• Contractor must take proper safety measures (placing warning tapes around excavations) to avoid people, especially children, accidentally falling into excavations.</li> <li>• All the working platforms must be cordon off with special care by well-trained skilled workers.</li> <li>• Contractor will prepare construction management plan which will include the hazard prevention and safety plan, which will address health and safety of the people in the project area.</li> <li>• The project In charge should ensure the contractor staff working in the project are well trained and educated in the Health, Safety and Environment (HSE) hazards associated with their duties, and that of the public, in the project area.</li> </ul>		

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Impacts Likely to Occur	Location	Mitigation Measures	Time/Schedule of Implementation	Implemented and Supervised By
Injuries to Workers from Lack of Necessary Training and/or Not Using PPEs (Occupational Health & Safety)	Active construction sites	<ul style="list-style-type: none"> <li>• The Contractor will be required to prepare and implement an effective Worker Health and Safety Plan that is supported by trained first aid personnel and emergency response facilities. Construction contracts will include standard Worker Health and Safety measures and contractors will be bound to implement these fully.</li> <li>• Monitoring will be required to ensure that the health and safety plan based on contract specifications is followed.</li> <li>• Cement feed hopper areas will be inspected daily to ensure compliance with the requirement of dust masks.</li> <li>• Surfaces (including flooring and work surfaces) in camps, kitchens, dining areas and workshops should be solid and easy to clean. Flooring for work camps must be float finished concrete or better.</li> <li>• The Contractor shall submit to the Engineer of CSC for approval a site layout plan, identifying work areas, accommodation, kitchen, dining area, sanitary facilities, location of generators, plant and vehicle parking, transport routes through the camp, pedestrian routes through the camp, evacuation routes, emergency exits,</li> </ul>	During physical progress of civil/design components.	EE of CC & Construction Supervision Consultant

Impacts Likely to Occur	Location	Mitigation Measures	Time/Schedule of Implementation	Implemented and Supervised By
		<p>batching plants, storage areas, waste facilities etc.</p> <ul style="list-style-type: none"> <li>• Fire extinguishers should be provided throughout camps and work sites. Fire extinguishers should be inspected monthly and maintained, as necessary.</li> <li>• An adequate and reliable supply of safe drinking water shall be made available at readily accessible and suitable places including at all camps.</li> <li>• The Contractor shall take samples from each supply of drinking water and arrange for analysis of these samples at Pak-EPA certified laboratory prior to its use by the Contractor's staff. The results of these tests for each supply must be submitted to the Engineer of CSC and must demonstrate that each water supply meets national and World Health Organization standards for drinking water.</li> <li>• Public sensitization training should be provided to workers to avoid social conflicts between residents and the construction contractor, Occurrence of any such impacts can be avoided by community sensitive project planning and implementation and through effective involvement of local administration.</li> </ul>		

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Impacts Likely to Occur	Location	Mitigation Measures	Time/Schedule of Implementation	Implemented and Supervised By
		<ul style="list-style-type: none"> <li>Site personnel will be provided appropriate type of personal protective equipment (PPEs). Contractor will ensure consistent use of PPEs.</li> <li></li> </ul>		
Hazardous and Non-hazardous Waste Management.	Active construction sites	<ul style="list-style-type: none"> <li>A waste management plan will be developed prior to the start of construction. This plan will cater to sorting of hazardous and non-hazardous materials prior to disposal, placing of waste bins at the project sites for waste disposal and an onsite hazardous waste storage facility i.e., designated area with secondary containment.</li> <li>Fuel and hazardous material storage points must be included in camp layout plan to be submitted for approval. Hazardous material storage areas shall include a concrete floor to prevent soil contamination in case of leaks or spills.</li> <li>Fuel tanks will be checked daily for leaks and all such leaks will be plugged immediately.</li> <li>Hazardous waste will be initially stored on site at designated area and then handed over to EPA certified contractor to final disposal.</li> </ul>	Throughout construction.	EE of CC & Construction Supervision Consultant
Untreated Disposal of Surplus/Suitable Material	Active construction sites	<ul style="list-style-type: none"> <li>A closed sewage treatment system including soak pits and septic tank will be constructed to</li> </ul>	Throughout construction.	EE of CC &

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Impacts Likely to Occur	Location	Mitigation Measures	Time/Schedule of Implementation	Implemented and Supervised By
		<p>treat the effluent from the construction/labor camps.</p> <ul style="list-style-type: none"> <li>• Sewage treatment system will be installed at each respective labor camp based on the number of laborers residing at the respective camp.</li> <li>• Sprinkling of grey water or sewage will not be allowed; in case the septic tank gets filled with sludge, septic tank shall be emptied through vacuum truck and material shall be transferred to treatment facility or approved municipal drain.</li> <li>• Water being released from any batching plant(s) must be treated as per requirements of NEQS prior to release to sewerage system/any other water body.</li> </ul>		Construction Supervision Consultant
Vegetation and Afforestation Loss	Active Construction sites.	<ul style="list-style-type: none"> <li>• Only trees falling within the proposed DED/Scope of works shall be allowed be cut. Remnant tree density areas at either side and median, must be conserved with strict supervision</li> </ul>	Throughout construction.	Construction Supervision Consultant
Disruption to public utilities	Active Construction sites.	<ul style="list-style-type: none"> <li>• Unnecessary excavation should be avoided.</li> </ul>	During physical progress of civil/design components.	EE of CC &

<b>Impacts Likely to Occur</b>	<b>Location</b>	<b>Mitigation Measures</b>	<b>Time/Schedule of Implementation</b>	<b>Implemented and Supervised By</b>
		<ul style="list-style-type: none"><li>• Excavations shall be carried out carefully to avoid damaging infrastructure in the surroundings of the project area.</li><li>• Restitution/Rehabilitation plan to be strictly implemented.</li><li>• Temporary retaining structures shall be provided; and</li><li>• NOCs from relevant departments should be arranged.</li></ul>		Construction Supervision Consultant

**Budget Estimate for Environmental Monitoring During the Underpass**

<b>Components</b>	<b>Parameters</b>	<b>No. of Samples (No. of Samples x Frequency x Year)</b>	<b>Frequency</b>	<b>Responsibility</b>	<b>One time Intervention Cost (Rs.)</b>	<b>Yearly Amount</b>
<b>ONE TIME MONITORING</b>						
<b>Air Quality</b>	CO, NO <sub>x</sub> , SO <sub>x</sub> , PM <sub>10</sub> , PM <sub>2.5</sub> , Lead (24hrs), CO (1 hr and 8hrs).	1x4x1= 4	Quarterly	EE of CC and SC	45,000	180,000
<b>Surface Water Quality</b>	As per SEQs and	1x1x1	Once During Reconstructio n Phase	EE of CC and SC	-	22,000
<b>Drinking Water Quality</b>	pH, Dissolved Oxygen, TSS, TDS, Alkalinity, BOD <sub>5</sub> , COD, Turbidity	2x2x1	Bi-annually	EE of CC and SC	18,000	36,000
<b>Noise Level</b>	-	2x4x1= 4	Quarterly	EE of CC and SC	1500	12,000
<b>1 YEAR COST OF MONITORING</b>						<b>250,000</b>
<b>Mobilization Sampling and Handling Charges @,000 for Each Visit &amp; Electricity Charges</b>						<b>60,000</b>
<b>Total Annual Cost</b>						<b>310,000</b>

# **Annexure- B**

## **Traffic Study**

## **TRAFFIC STUDY**

### **INTRODUCTION**

Traffic studies are intended to provide necessary input data for determination of the magnitude and pattern of the traffic at junction crossings. This entails collection, verification and analysis of the traffic data. From the collected data, the projected traffic for the design life of the proposed Junction shall be determined.

Traffic studies thereby would cover:

- Estimation of existing traffic volumes and pattern
- Estimation of generated traffic, due to upgraded facility
- Evaluation of factors influencing the traffic growth in the area of influence of proposed facility.
- Traffic projections based on relevant socioeconomic indicators and past data if available.
- Origin & destination survey (if required).

### **TRAFFIC FORECASTS:**

Traffic forecast for the project has been carried out on following basis:

- NESPAK took 24hrs Manual Classified Count (MCC).
- Total AADT is obtained after application of weekly variation factors and seasonal variation factors from National Transport and Research Centre (NTRC) study manual.
- Determination of Average Annual Daily Traffic (AADT) was carried out.

### **ESTIMATION OF EXISTING TRAFFIC:**

Proposed improvement, thereby in order to assess the volume and composition of traffic loads on the junction, traffic count surveys on the important points will be conducted as detailed below.

#### **➤ Traffic surveys:**

Traffic surveys are designed and shall be conducted along existing road segment (two way) as well as turning movements' traffic counts at important junctions. Overall, following surveys shall be conducted by NESPAK in the study area of the project:

- Manual Classified Counts (MCC);
- Origin / Destination Survey.

#### **A. Manual Classified Counts (MCC):**

##### **24-Hour Traffic Counts**

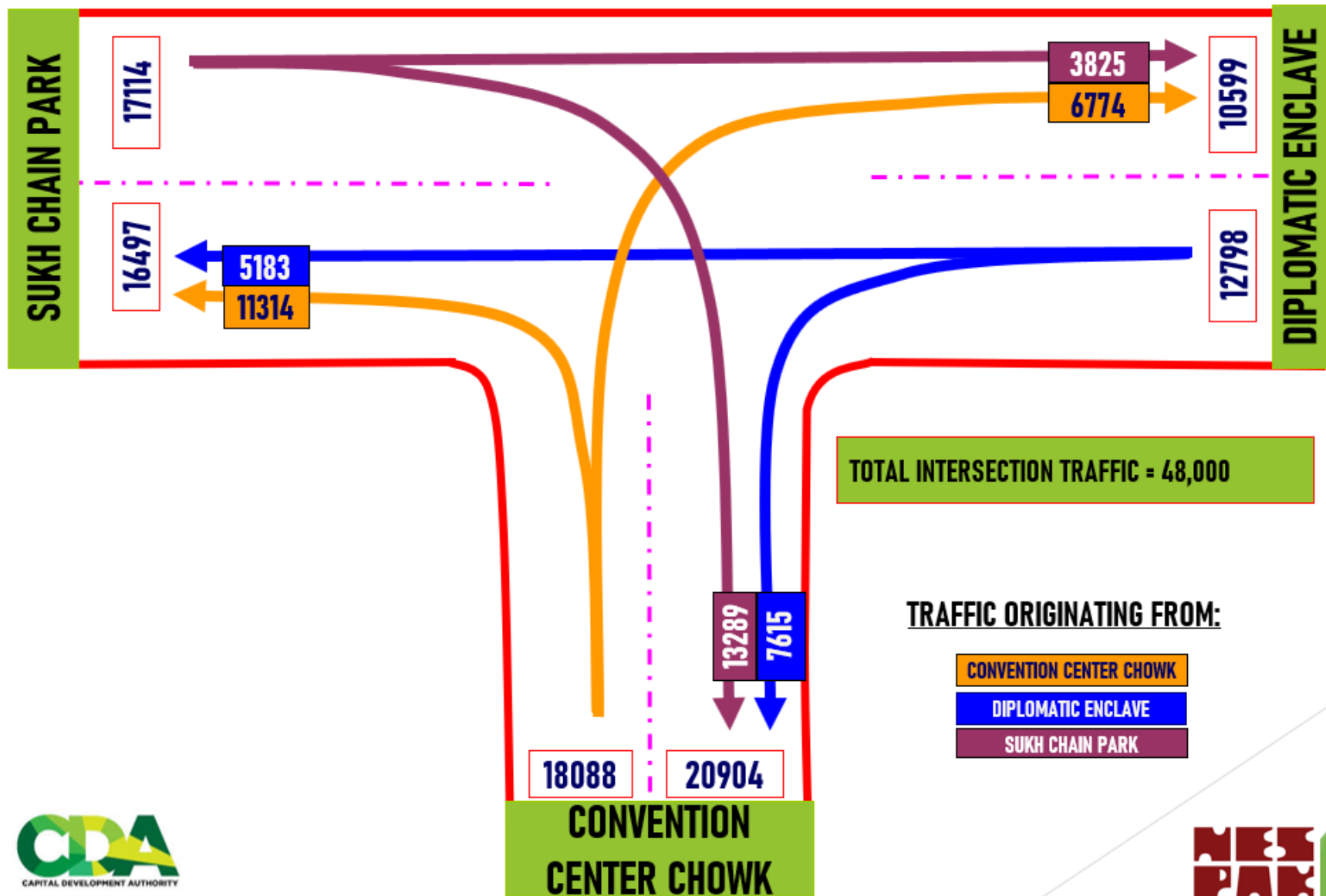
The Manual Classified Counts shall be conducted at selected locations on the existing road of the study area. The significance of the 24-hour period is that all the overnight freight and other traffic movements shall also be duly covered in these surveys. The purpose of 3-days count at Project Road is to yield the typical variations in the daily traffic volumes over the whole week for the

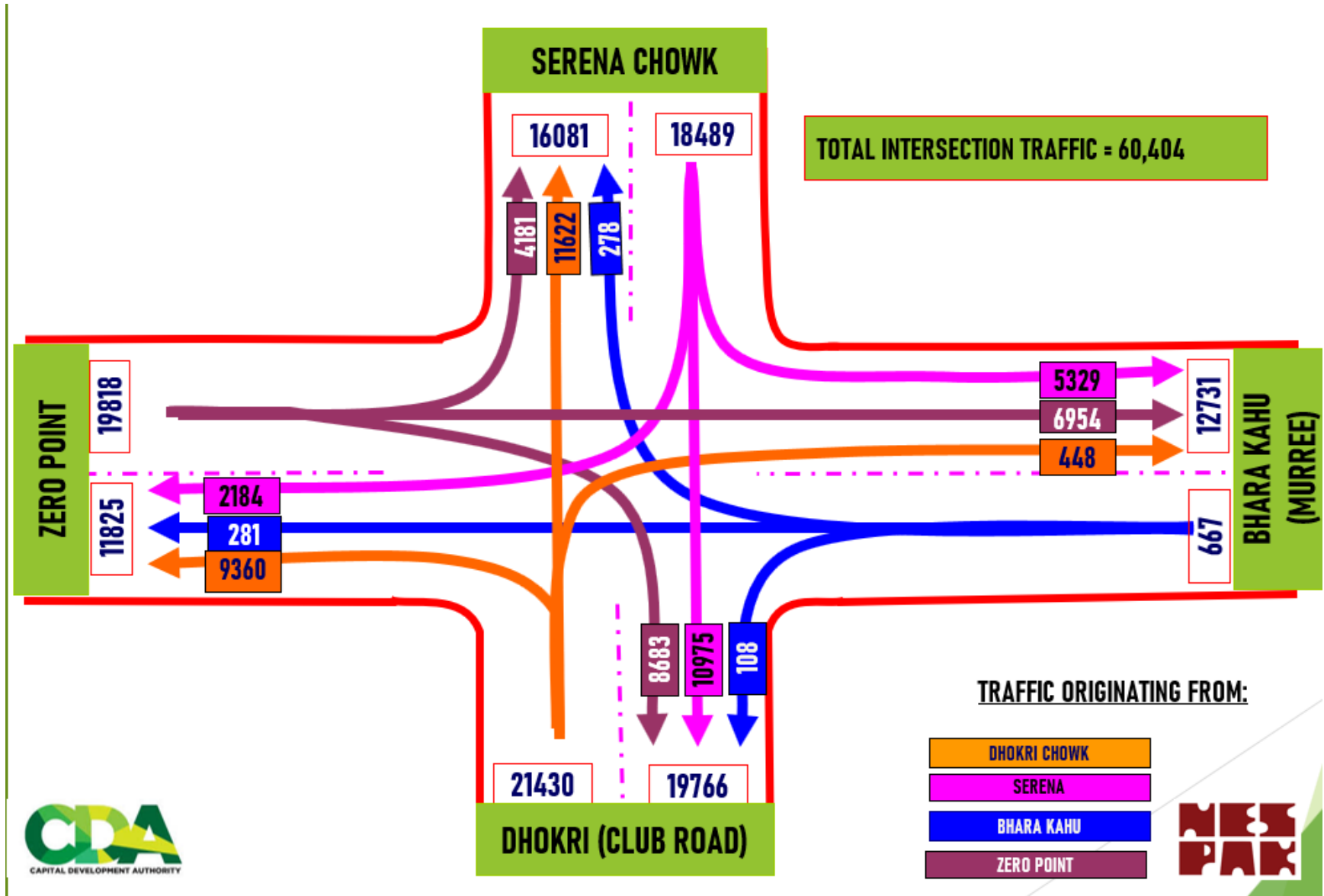
particular location. This in turn would be utilized in working out the Average Daily Traffic (ADT) volumes for a particular location, as well as for the adjoining locations.

The classified counts cover all the possible vehicle categories plying on the project road. These categories include motorized and non-motorized categories as follows:

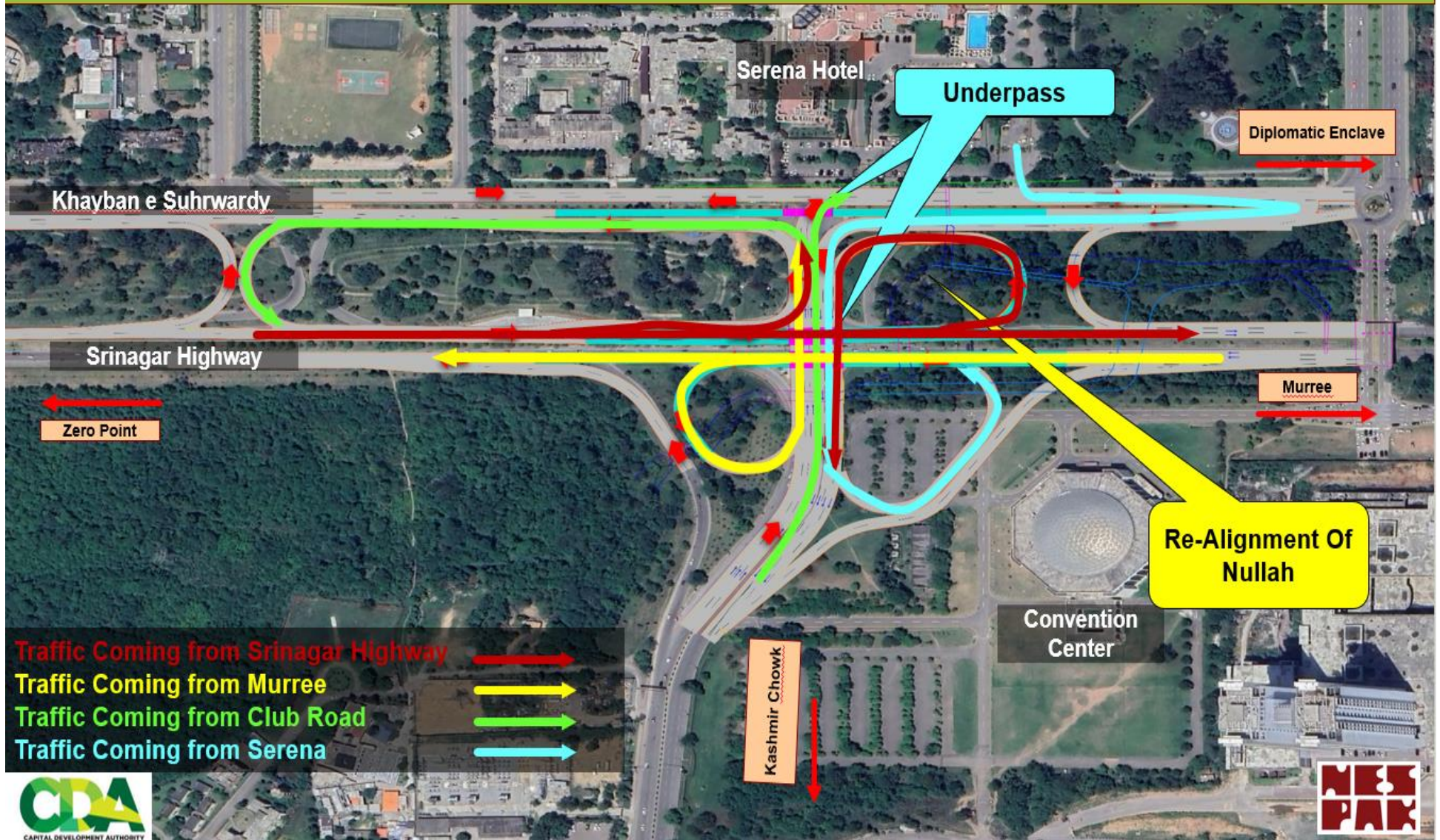
- Bicycles
- Motorcycles / Scooters
- Cars / Taxis / Suzuki (or other) Pick-ups
- Jeeps / Pajeros, etc.
- Wagons (Toyota Hiace / Transit Passenger vehicles with 12 – 18 seats)
- Coasters/Medium Buses/Flying Coaches (passenger vehicles with 24
- seats)
- Buses / Coaches with 42 – 60 seats
- Loader Pick-ups
- Truck 2-Axles
- Truck 3-Axles
- Truck – Trailers 4-Axles and above
- Tractors with Trolleys

Special traffic survey counting forms shall be used by the surveyors to record the traffic data. All the traffic surveyors shall be trained prior to the start of work, and the work shall be supervised on site by experienced staff.





# PROPOSED TRAFFIC CIRCULATION AT SERENA HOTEL INTERSECTION



# **Annexure- C**

## **References Material Used During Preparation of EIA**

**REFERENCES:**

- The Wild Birds and Animals Protection Act 1912 (Act No.VIII of 1912 dated 18.09.1912)
- Pakistan Penal Code (XLV of1860)6th October 1860
- The Land Acquisition Act 1894 (Act of 1894)  
<http://punjabelaws.gov.pk/laws/12.html>
- Assessment of Variation in Soil Parameters, For Design Of Lightly Loaded Structural Foundations, Life Science Journal, vol.10, no.12, 2013.
- Impact of Urbanization and Land Cover Dynamics
- Geotechnical Characteristics of Sub-soil for Different Sectors of Islamabad.
- Impacts of urbanization, LULC, LST, and NDVI changes on the static water table with possible solutions and water policy discussions: A case from Islamabad, Pakistan.