LIST OF ABBREVIATIONS

AOI	Area of Influence
BCL	Bestway Cement Limited
CDA	Capital Development Authority
DRR	Disaster Rehabilitation and Resilience
EIA	Environmental Impact Assessment
EMMP	Environmental Management and Monitoring Plan
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
GHG	Greenhouse Gases
GoP	Government of Pakistan
HAVC	High Ventilating And Air Conditioning
ICT	Islamabad Capital Territory
IUCN	International Union for Conservation of Nature
MCI	Metropolitan Corporation Islamabad
MSL	Mean Sea Level
NOC	No Objection Certificate
NCS	National Conservation Strategy
NESPAK	National Engineering Services Pakistan Private Limited
NEQS	National Environmental Quality Standards
NGOs	Non-Governmental Organizations
NPZ	Noise Perimeter Zone
PGA	Peak Ground Acceleration
Pak-EPA	Pakistan Environmental Protection Agency
PEPC	Pakistan Environmental Protection Council
PPE	Personal Protective Equipment
RCC	Reinforced Cement Concrete

EXECUTIVE SUMMARY

Title of Project: Construction of Bestway Tower

Location of Project: Plot No. B-2, Blue Area, Sector F-9/G9, Main Jinnah Avenue, Islamabad.

ES-1 Introduction

This executive summary of Environmental Impact Assessment (EIA) Report presents a detailed account of foreseeable environmental and social impacts likely to emanate from the project namely Construction of Bestway Tower by M/s Bestway Group, located at Plot No. B-2, Blue Area, Sector F-9/G9, Main Jinnah Avenue, Islamabad. The main purpose of proposed project is to construct Office building for the staff of Bestway Cement Limited, and facilities for business and corporate dealings in the capital city of Pakistan. Sustainability and Energy Efficiency are at the core of everything Bestway Group does. To this end, Bestway Cement has been a pioneer in bringing innovative solutions to the cement sector.

To comply with **Pakistan Environmental Protection Agency's Review of Initial Environmental Examination and Environmental Impact Assessment Regulations 2000 (**referred as Pak- EPA Review of IEE/EIA Regulations 2000 in this document**)**, BCL has entrusted Ecogreen Company (Pvt.) Limited with the assignment of carrying out an Environmental study of this proposed project.

This report describes the various actual and potential environmental impacts pertaining to both phases of the project i.e., construction phase and the operation phase with reference to their extent and magnitude. Environmental Impact Assessment (EIA) studies of the proposed project have been conducted in accordance with the Pakistan Environmental Protection Act, 1997 and the Rules, Regulations and Guidelines prescribed thereunder.

ES-2 Policy, Legal and Administrative

The Government of Pakistan (GOP) has promulgated laws/acts, regulations and standards for the protection, conservation, rehabilitation and improvement of the environment. The significant applicable laws/acts/regulations in this project are Pakistan Environmental Protection Act 1997; Pakistan Environmental Protection Agency (Review of IEE/EIA) Regulations 2000; Pakistan Environmental Assessment Procedures 1997; National Environmental Quality Standards (NEQS) 2010; Land Acquisition Act 1894 including later amendments; Building Code of Pakistan-Seismic Provisions 2007;

Disaster Management Act 2010 etc. The applicable plans and policies are National Conservation Strategy, National Environmental Policy (2005), National Climate Change Policy, 2012; Pakistan Labour Policy, 2010 etc.BCL will be responsible for the implementation of environmental mitigation measures at various stages of the project and the instant assessment is being undertaken for submission to Pakistan Environmental Protection Agency, for its review and decision regarding issuance of environmental approval.

Screening

The project falls in Schedule II ***Category I- Environmentally Sensitive Area i.e., Any other project likely to cause an adverse environmental effect,*** described in detail in **chapter 1 of this EIA report**. The process for conducting an environmental assessment and the results of EIA is described in this document.

ES-3 Description of Project

The proposed project involves the construction of office building for BCL's office staff that is planned to be constructed on Plot No. B-2, Blue Area, Sector F-9/G9, Main Jinnah Avenue, Islamabad. The area of proposed project will be 12000 Sft (2.2 kanals) and having following specifications:

Size of the Plot = 12000 sft (2.2 kanals)

No. of Floors = 5 Basements + Ground Floor+ 15 Floors

Max. Building Height = 226ft" •

Building Set Backs = left and right 5ft each and 20 ft on the front

Plot Area Ratio = 1:8

Schedule of Implementation = 34-36 months

Total Cost of Project = approximately PKR 2.0 Billion.

The detailed description of the project is given in **Chapter 3** of this report.

ES-4 Environmental Baseline

In order to assess and evaluate the impacts and related mitigation measures, in the project area, existing conditions of physical, biological and the socio-economic environment were studied as under:

Physical Environment:

Topography: Islamabad is located at 33.43°N 73.04°E at the northern edge of the Potohar Plateau and

at the foot of the Margalla Hills in Islamabad Capital Territory. The Potohar Plateau has an uneven table and land is gradually rising in elevation from 500 to 600 meters above the sea level, and the highest point is 1,600 meters above mean sea level. The land gradually slopes towards the South and it is composed either of alluvium (clay or silt) or of gravel caps. The plains are formed of alluvial deposits laid by the past and the present river systems of varying thickness. A large part of the area is undulating, and at various places, it is badly dissected by gullies and ravines.

The Korang stream has been dammed at a place named Rawal to form the Rawal Lake. Another dam has been built on the Soan River to form the Simly Lake. The Potohar plateau is a well-defined physiographic unit of Pakistan between the Indus basin plain and the foothills of Himalayas. It covers about 11,200 km2 area bounded by Kala Chitta and Margalla hills in the North and the Salt Range in the South, Indus River in the West and Jhelum River in the East[1].

Geology and Soil: The soil in Potohar region is shallow clayey of low productivity. Mostly, on the Southern and Western aspects of the Potohar plateau, the soil is thin and infertile. Streams and ravines cut the loose plain, affected by gully erosion and steep slopes. Such land is unsuitable for cultivation. However, large patches of deep, fertile soil are found in the depressions and sheltered localities supporting quality small forests (Rakh), and rain-fed agriculture. The soil of the project area is composed of clay/silt formed of alluvial deposits laid by the past and present river system in varying thickness. A large part of the area is undulating, and at various places, it is dissected by gullies and ravines[2].

Surface Water: Rawal Lake is a man-made water reservoir, located across Korang River at a distance of about 10 km from Rawalpindi. The Soan and Korang Rivers are the main streams draining in Islamabad area. Their primary tributaries are the Ling River, draining northwestward into the Soan; Gumreh Kas, draining westward into the Korang from the area between the Korang and Soan, and Lei Nullah, draining southward into the Soan from the mountain front and urban areas[3]. The Korang and Soan Rivers are dammed at Rawal and Simly Lakes, respectively, to supply water for the urban area. There is Nullah passing through Jinnah Avenue at the north-west of the project site.

Ground Water: The groundwater level ranges from approximately 65-85 ft. However, the main

[1] https://en.wikipedia.org/wiki/Geography_of_Islamabad
[2] https://gsp.gov.pk/Geology survey of islamabad
[3] https://pcrwr.gov.pk/

source of water supply is from CDA.

Land Use: Natural vegetation includes scrub, forest, and plantation which are about 38.15% in Islamabad in the year 2016. Bare soil covers more than 46%. The built-up area covers 15.14% of the total while water is only 0.44%.

Seismic Risk: Islamabad region can be divided into three major structural zones. Islamabad lies just at the edge of Hazara Fault Zone that consists of an arc of thrusted and folded rocks about 25km wide and 150 km long that is convex to the south and extends west-southward away from the Himalayan syntaxes. There are many thrust sheets in Islamabad area, some of these thrust faults are in front of Margalla Hills which extends north of Feteh Jang and form Kala Chita Range[4].

Climate: Islamabad has distinct seasons marked by the wide variation in temperature. The climate remains very salubrious from April to October, but the winters get very cold due to snowfall in surroundings. The coldest months are December, January and February. The hottest months are June and July. Rainfall in April and May is occasional, but the heaviest rain is in July and August.

The temperature of capital territory Islamabad ranges between -1 °C to 46 °C. The coldest month is January when the mean maximum temperature is 18.3 °C and mean minimum is 3.8 °C. From February to May the temperature rises at the rate of 5.0 °C per month. The highest temperature reached in May when the mean maximum temperature remains 39.1 °C[5].

Air Quality: A major anthropogenic source of air pollution in the project area is moderate to high traffic at Jinnah Avenue and Ibn-e-Sina Road. Continuous Ambient Air Quality monitoring was carried out at the project site for 24 hours[6]. The time-averaged (24h) concentrations of SO2, NO, NO2, CO, O3, PM 2.5, PM10 and SPM were found to be 12.4µg/m3, 15.94µg/m3, 26.9µg/m3, 1.9mg/m3, 32.3µg/m3, 41.2 µg/m3, 189µg/m3 and 527µg/m3 respectively. The ambient air quality for the parameters monitored at the project site meets the NEQS limits expects PM 2.5, PM10 and SPM.

[4] https://seismic.pmd.gov.pk/hazard-map.php
[5] https://en.wikipedia.org/wiki/Climate_of_Islamabad
[6] https://www.adb.org/sites/default/files/publication/357876/climate-change-profile-pakistan.pdf

Noise and Vibration: There is moderate to high traffic at the adjoining roads i.e., Jinnah Avenue and Ibn-e Sina Road. The noise level data at the project site for daytime was 54.95 dB(A) and 48.07 dB (A) at night time. The average sound level was noted as 51.51 dB for the 24 hours period. The Noise level measured at the project site was within commercial zone standards of NEQS.

Ecological Environment:

Flora: The vegetation of 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 (MulberryShahtoot); Dalbergia sissoo (Tahli-Shisham); Acacia nilotica (Kiker). In the undergrowth Cannabis sativa (Bhang), Calotropis procera (Desi Ak), Parthenium hysterophorous (Gandi Booti) and Ocimum bacilicum (Niazbo) are predominant. There are only 4 trees (2 are of Morus alba, and 2 are Dalbergia sissoo trees) at the project site.

Fauna: In its original form, the Dry Subtropical Scrub Forest constituted the habitat of wild fauna consisting of a host of animals and birds. As the disturbance increased to a maximum level with complete inhabitation, wildlife abundance and diversity decreased to a minimum degree. Mammals commonly found in the project area are Rat, Wild boar and Porcupine, birds include Quail, House Sparrow and House Crow and reptiles reported in the area are Monitor Lizard, and Spin tailed lizard.

Protected Areas/National Sanctuaries[7] Located in the north of the project site, at a distance of about 4 km is the Margalla Hills National Park which is the only Protected Area, in the vicinity. Margalla Hills National Park is rich in biodiversity, and many plants and animals are remnants of the community from the great Himalayan ecosystem comprising Subtropical Chir Pine Forest type and Dry-Subtropical Semi-evergreen Scrub Forest type.

ES-5 Stake Holder Consultation

The consultation was carried out in two stages for the project. In the first stage, a reconnaissance survey was conducted whereby all stakeholders that either reside or work in the project vicinity were identified in reference to the project location. Relevant public service institutions directly involved in service provision in the area were also identified. Based on these surveys and consultations, an overview of the

[7] https://www.mdpi.com/2073-445X/9/4/123

residential, commercial/ industrial and institutional stakeholders related to the project was recorded and analyzed, details are given **Chapter 5** of this report.

ES-6 Major Anticipated Impacts and Recommended Mitigation Measures

Environmental impact evaluation actually grows out of scoping and baseline study of the project. In principle, EIA assigns various quantified values to different levels of all the impacts affecting the project. This step is generally considered as the most technical in nature and therefore is the most difficult and controversial part of the EIA. Impacts anticipated during Construction may include noise, air emissions, water conservation and pollution, soil contamination (physical), community, workers' safety and employment conflicts (socio-economic). Detailed account of the anticipated impacts and their mitigation measures has been presented in **Chapter 5** of the EIA report.

Physical Environment Impacts:

The soil-related issues include soil erosion, slope stability, and soil contamination. The land clearing, levelling and grading, excavation and filling, construction activities and maintenance of equipment/vehicles may cause these issues. The quality of soil would be affected, as soil contamination would occur because of disposal of untreated wastewater or direct disposal of chemical and onsite preparation of materials. Oils, chemical spills and waste from campsites may also deteriorate the quality of the soil.

Dumping of construction wastes/excavated material, in the surrounding area, may limit the use of land in the project area. The solid waste may be generated due to different construction activities, and it will mainly include surplus excavated and construction material. Land use change is expected during the construction phase, one at the burrow areas and other where the spoil or mucking material will be disposed of.

Construction machinery, Generators and project vehicles will release exhaust emissions, containing Carbon Monoxide (CO), Oxides of Sulfur (SOx), Oxides of Nitrogen (NOx), and Particulate Matter (PM). These emissions can deteriorate the ambient air quality in the immediate vicinity of the project site. Furthermore, construction activities such as excavation, land levelling, filling and vehicular movement on unpaved tracks may also cause fugitive dust emissions. Noise and vibration will be

generated by construction machinery, from generators and vehicles. In case excavation is not done as per the mitigation plan, ground water may be impacted by the project activities. . Because of preparation of construction material on site, leachate may be produced and percolated through the soil.

Traffic Congestion ingress and egress of vehicles at site during construction activities may cause traffic congestion in peak hours. This may also increase air pollution and deteriorate the air quality of area.

Mitigations: Soil erosion can be minimized by appropriate land clearing, levelling and grading. Excavated slopes will not be left untreated/unattended for long durations, and appropriate slope stabilization measures will be taken as per the design. Septic tank with soaking pit will be constructed having adequate capacity. All recyclable waste including oils from the project site (such as cardboard, drums, broken/used parts, etc.) will be disposed of through recycling contractors, or where appropriate to reuse/recycle it. The hazardous waste will be kept separate and handled according to the nature of the waste. While storing, hazardous waste will be marked. Shade-loving plants will be planted to reduce the impacts of the shadows on the plants.

Ecological Environment Impacts: The project area has a limited natural vegetation cover. The site preparation and construction activities may necessitate removal of the wild growth. Damage and/or loss of vegetation and clearing of other indigenous and introduced species, as well as undergrowth species comprising bushes, grass, etc. may also be lost. Project activities like excavation, drilling, boring and movement of heavy vehicles / cranes etc will potentially have adverse impacts on the local fauna and habitats of the area as well. Noise generated by heavy machinery are a scaring factor for wildlife. Rodents, hedgehogs, porcupines may lose their abode. Similarly, natural population of wild boar, also considered a pest, is maximum due to lack of predators in the project area.

Mitigations: Although the selected site is declared commercial in nature and numerous similar projects are underway in the surrounding of the project site, all possible endeavors will be made to compensate for the loss by enhancing the environment, through a plantation of trees and ornamental plants. A plantation plan for Bestway Tower Project has been prepared. The plan has a mix of appropriate trees/bushes which will be raised within the available open spaces within the premises of proposed project e.g. a roof top garden is incorporated in the design. All preventive measures will be adopted to

control the spill-over of chemicals and other effluents on the ground to protect soil A record will be maintained for any tree cutting. Similarly, corridors will be provided for rodents, hedgehogs, porcupines to protect their habitat.

ES-7 Environmental Management and Monitoring Plan (EMMP)

An EMMP 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. Preparation of environmental management plan is required for formulation, implementation and monitoring of environmental protection measures during and after commissioning of projects. The plans should indicate the details as to how various measures have been or are proposed to be taken including cost components as may be required. Cost of measures for environmental safeguards should be treated as an integral component of the project cost and environmental aspects should be taken into account at various stages of the projects:

During construction, ambient air quality for dust level, in particular, vehicle and equipment exhaust, noise level (tests), solid waste management, sewerage water and soil contamination, and community and workers' safety (visual) need to be monitored. Monitoring Plan has been included in Chapter-7. During operation, noise level, ambient air quality (tests), solid waste management, and community and workers' safety need to be monitored. The plan has been included in **Chapter 7** of this Report.

ES-8 Conclusion

This EIA Report contains a description of the project, environmental baseline, potential environmental impacts and suggested mitigation measures. An implementation mechanism for mitigation measures in the form of an Environmental Management Plan for both construction and operational phase has also been included in this study. Appropriate mitigation measures as explained in the environmental study shall reduce (if not eliminate) the impacts so that these can be within acceptable limits. It is further concluded that ***all potential environmental concerns associated with the project have been adequately addressed, and detailed findings of the report are being submitted to the Agency for processing of application for grant of environmental approval.***

Recommendations

The intensity and severity of impacts expected to occur due to proposed project varies with a change in

the nature and magnitude of the project as well as depends upon the baseline environmental conditions of the area. The mitigation measures will require constant information flow and consultation with the stakeholders to ensure the least adverse social-economic impact to outweigh the "no project development" scenario.

- The adverse environmental impacts can be reduced significantly by adopting best management and monitoring practices as well as by implementation of EMP with true letter and spirit.
- Detailed Traffic Impact Assessment Study is suggested to be undertaken and proper traffic management plan should be implemented to reduce traffic congestion issues especially in peak hours.
- Ensure adoption of environmentally sustainable practices to maintain the natural beauty and values of project area
- Waste minimization practices should be introduced to workers by conducting lectures on the spot to spread awareness amongst the workers about the long-term benefits of the same in lieu of the surrounding environment.
- Water conservation practices should be adopted during construction and operation phases of the project.
- Emergency exits should be properly marked throughout the building and floor wise emergency evacuation plans should be displayed at conspicuous places.
- A proper tree plantation plan should also be developed in order to make the project environment friendly.
- Small domestic waste storage bins should be placed at different convenient locations for proper collection, segregation and disposal of solid waste.
- It is recommended that the Proponent should obtain an Environmental Approval (NOC) from the Pak-EPA before proceeding further.

LIST OF ANNEXURES

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CHAPTER 1: INTRODUCTION

1.1 PURPOSE OF REPORT

The main objectives of this EIA study are:

- To determine and document the state of the environment for establishing a baseline in order to assess the suitability of the project in that area.
- To identify pre-construction, construction and operational activities and assess their impacts on the environment.
- To provide assistance to the proponent for planning, designing and implementing the project in a way that would eliminate or minimize the negative impact on the biophysical and socio-economic environment and maximizing the benefits to all parties in cost effective manner.
- To present the Mitigation and Monitoring Plan for the smooth implementation of suggested mitigation measures and supervise their efficiency and effectiveness.
- To provide an opportunity for public consultation of the project and its impacts on the community and their environment in the context of sustainable development.
- Prepare an EIA Report for submittal to the Environmental Protection Agency, Punjab for according Environmental Approval.

1.2 NEED FOR EIA STUDY OF THE PROPOSED PROJECT

EIA/IEE is mandatory according to the Pakistan Environmental Protection Act, 1997. Section 12 (1) of the Act states that:

"No proponent of a project shall commence construction or operation unless he has filed with the Federal Agency an initial environmental examination or, where the project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained from the Federal Agency approval in respect thereof."

According to the Pak-EPA Review of IEE and EIA Regulations 2000, the proposed project falls under Schedule II – Category I – Environmentally Sensitive Area; Any other project likely to cause an adverse environmental effect. As the said proposed project is planned to be established/constructed in sensitive area of Islamabad and may impact the environment adversely. Hence, Environmental Impact Assessment (EIA) report will be submitted in Pak- EPA to obtain Environmental Approval.

1.3 IDENTIFICATION OF PROJECT & PROPONENT

1.3.1 Identification of Project

The proposed project is titled as Construction of Bestway Tower by M/s Bestway Group, located at Plot No. B-2, Blue Area, Sector F-9/G9, Main Jinnah Avenue, Islamabad.

1.3.2 The Proponent

The details of the proponent of the proposed project are given below:

Table 1: Details of Proponent

Sr#	Details of Proponent	
1	Name	Irshad Ali Ameer
2	Designation	Director (PP&C)
3	Company	Bestway Cement Limited
4	Contact No.	(051) 265 485 664

1.3.3 DETAILS OF CONSULTANT

BCL management has assigned the task of conducting the EIA study to Environmental Consultant; **M/s Ecogreen Company (Pvt.) Ltd**., Lahore. The EIA study of the project is conducted according to the prescribed procedures and guidelines envisaged under the **Pak-EPA, Review of IEE / EIA Regulations, 2000**. The details of the consultant are given below:

Table 2: Consultant Details

Sr#	Consultant Details	
1	**Consultant**	Ecogreen Company (Pvt) Ltd.
2	**Address**	Plot No. 2-A Block, Commercial Area, Canal View Housing Society, Lahore
3	**Contact No.**	042-35294297-98
Focal Person		
1	**Name**	Dr. Ambreen Lateef
2	**Designation**	Lead Environment Professional
3	**Contact No.**	+92-323-4169623

To prepare the instant EIA Report of the respective project, the Consultant has nominated the following personnel. The details of the focal experts are given below in Table 03:

Table 3: List of Experts

Sr. #	Name	Qualification
Team Leader		
1	Dr. Ambreen Lateef	Ph.D. Environmental Sciences
Team Members		
2	Ms. Kiran Irshad	M. Phil Environmental Sciences
3	Engr. Fareha Daud	BSc. Environmental Engineering
4	Engr. Hamna Shafique	B.Sc. Environmental Engineering
5	Engr. Tehreem Akhtar	B.Sc. Environmental Engineering
6	Engr. Salman Ahmed	B.Sc. Environmental Engineering

1.4 NATURE, SIZE AND LOCATION OF PROJECT

This proposed project i.e., Construction of Bestway Tower is a multistory building comprising of 5 Basements, Ground Floor and 15 Floors. The total area of the plot is 12000Sft (2.2 Kanals) schedule of Area and Area statement is given in below Table. 4 and Table 5 respectively.

Table 4: Schedule of Area

Total Area of Plot = 12000 Sft (2.2 Kanals)
FAR= 1:8= 12000 x 8= 96000 Sft
Total FAR Area=93382 Sft
Total Circulation Area=12642 10% Circulation = 1264.2 Sft
Total FAR AREA- 10% Circulation=92118 Sft
933382-1264 =32118 Sft
TOTAL AREA = 92117 Sft

Table 5: Area Statement of Project

Sr. No.	NO. of FLOORS	FOOT PRINT AREA	PERCENATGE	ATRIUM VOID	PUBLIC HEALTH SHAFT	FRESH AIR SHAFT	HVAC & TOILET SHAFT	ELECTRICAL, I.T & S.TOILET SHAFT	GARBAGE CHUTE SHAFT	LIFT PRESSURIZATION SHAFT	COVERED AREA	EMERGENCY STAIR EXIT	LIFTS	CARGO LIFT	FAR AREA	CIRCULATION AREA	NO OF CARS
					SFT	SFT	SFT	SFT	SFT	SFT	SFT	SFT	SFT	SFT	SFT	SFT	NO
1	5th BASEMENT	11,030.00	92%														19
2	4th BASEMENT	11,030.00	92%														16
3	3rd BASEMENT	11,030.00	92%														16
4	2nd BASEMENT	11,030.00	92%														16
5	1st BASEMENT	11,030.00	92%														12
6	Ground FLOOR	8,250.00	69%		25	20	47	40	14	28	8,076.00	230	386	209	7251	2125	11
7	First FLOOR	8,250.00	69%	1084	25	20	47	40	14	28	6,992.00	230	386	209	6167	726	
8	Second FLOOR	8,250.00	69%	1084	25	20	47	40	14	28	6,992.00	230	386	209	6167	726	
9	Third FLOOR	8,250.00	69%		25	20	47	40	14	28	8,076.00	230	386	209	7251	726	
10	Fourth FLOOR	7,050.00	59%		25	20	47	40	14	28	6,876.00	230	386	209	6051	726	
11	Fifth FLOOR	7,050.00	59%		25	20	47	40	14	28	6,876.00	230	386	209	6051	726	
12	Sixth FLOOR	7,050.00	59%		25	20	47	40	14	28	6,876.00	230	386	209	6051	726	
13	Seventh FLOOR	7,050.00	59%		25	20	47	40	14	28	6,876.00	230	386	209	6051	726	
14	Eighth FLOOR	7,050.00	59%		25	20	47	40	14	28	6,876.00	230	386	209	6051	726	
15	Ninth FLOOR	7,050.00	59%		25	20	47	40	14	28	6,876.00	230	386	209	6051	726	
16	Tenth FLOOR)	7,050.00	59%														
17	Eleventh FLOOR	7,050.00	59%		25	20	47	40	14	28	6,876.00	230	386	209	6051	726	
18	Twelveth FLOOR	7,050.00	59%		25	20	47	40	14	28	6,876.00	230	386	209	6051	726	
19	Thirteenth FLOOR	7,050.00	59%		25	20	47	40	14	28	6,876.00	230	386	209	6051	726	
20	Forteenth FLOOR	7,050.00	59%		25	20	47	40	14	28	6,876.00	230	386	209	6051	726	
21	Fifteenth FLOOR	7,050.00	59%		25	20	47	40	14	28	6,876.00	230	386	209	6051	726	
22	Roof TOP	1,460.00										230	386	209		512	
	Total AREA	**174,210.00**									**105,772.0**				**93397**	**12801**	90
														10% OF CIRCULATION		1280	
														GRAND TOTAL		**92117**	

This proposed project is planned to be constructed at Plot No. B-2, Blue Area, Sector F-9/G9, Main Jinnah Avenue, Islamabad. The coordinates of the site are **Latitude 33°41'28.7844''N** and **Longitude 73°1'17.6448''E**. The site layout map of proposed project and location is shown in Figure1, 2 & 3.

1.5 PURPOSE OF REPORT

The purpose of this EIA Report is to assess whether or not significant adverse environmental and social impacts are anticipated and to suggest mitigation and remedial measures to make the Project environment friendly and sustainable during the construction and operational stages of the Project and to initiate the process of Environmental Approval from the Pak-EPA.

1.6 STUDY APPROACH & METHODOLOGY

1.6.1 Study Approach

The study was conducted in accordance with Pak-EPA, Government of Pakistan (GOP) guidelines, 2000. The study was based on both primary and secondary data and information. Discussions were held with stakeholders including government officials, community representatives, local residents, shopkeepers and road users. The main purpose of this approach was to obtain a fair impression on the people's perceptions of the project and its environmental impacts.

1.6.2 Methodology

The following methodology was adopted for carrying out the EIA study of the proposed Project:

a) Orientation

Meetings and discussions were held among the members of the Environment Consulting Team. This activity was aimed to achieve a common ground of understanding of various issues of the study.

b) Planning for Data Collection

Subsequent to the concept clarification and understanding obtained in the preceding step, a detailed data acquisition plan was developed for the internal use of the Environment Consulting Team. The plan include; identification of specific data requirements and their sources; determination of time schedules and responsibilities for their collection; and indication of the logistics and other supporting needs for the execution of the data acquisition plan.

Figure 1: Site Plan of Proposed Project

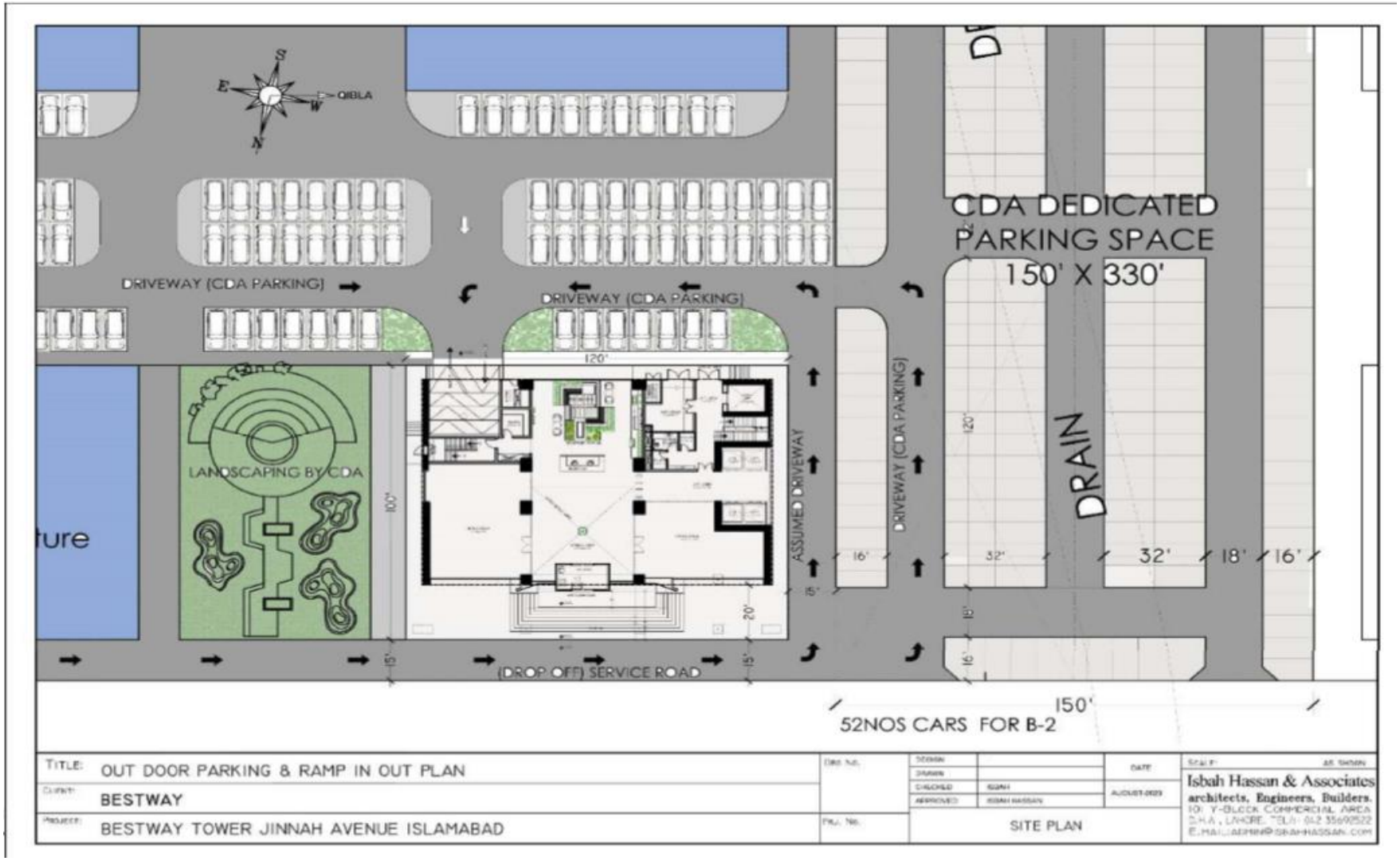


Figure 2: Site Layout Plan for Out Door Parking and Ramp In Out Plan

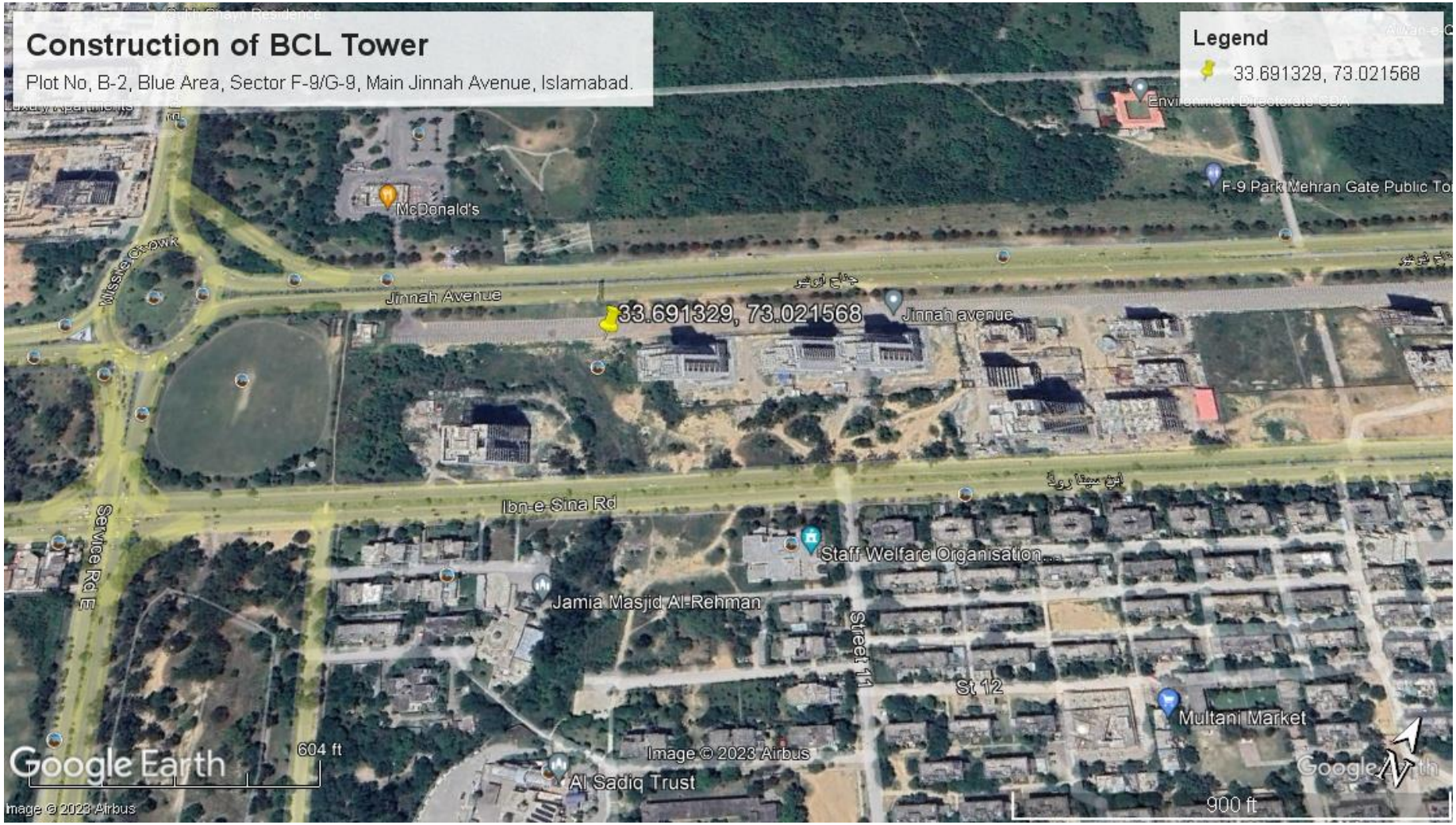


***Figure 3*: Project Location Map**

c) Planning for Data Collection

Subsequent to the concept clarification and understanding obtained in the preceding step, a detailed data acquisition plan was developed for the internal use of the Environment Consulting Team. The plan include; identification of specific data requirements and their sources; determination of time schedules and responsibilities for their collection; and indication of the logistics and other supporting needs for the execution of the data acquisition plan.

d) Data Collection

In this step, primary and secondary data was collected through field observations, environmental monitoring in the field, consultation with concerned departments and published materials to establish baseline profile for physical, biological and socio-economic conditions. These activities are as under:

- Site Reconnaissance;
- Analysis of Maps and Plans;
- Literature Review;
- Desk Research;
- Public Consultations;
- Field Observations & Studies; and
- Laboratory Analysis;

1.7 STRUCTURE OF EIA REPORT

The EIA Report predicts the possible impacts on the environment due to the project establishment. This EIA Report also proposes various environmental management measures to mitigate the associated adverse impacts up to the extent practically possible. Details of all background environmental quality, environmental impact/pollutant generating activities, pollution sources, predicted environmental quality and related aspects have been provided.

This report has been structured into following sections;

Section 1 "**Introduction**" briefly presents the project background, scope, methodology and need of the EIA study.

Section 2 "**Policy, Legal and Administrative Framework**" provides a brief about national environmental

policies, statutory obligations and roles of institutions concerning EIA study of the proposed Project.

Section 3 "**Description of the Project**" furnishes information about the location and components of the proposed Project, Project Implementation schedule and cost of the project.

Section 4 "**Baseline Data and Environmental Profile**" establishes baseline conditions for physical, biological and socio-economic conditions prevalent in the Project Area.

Section 5 "**Stakeholder Consultation**" identifies the main stakeholders and their concerns raised through scoping sessions, and presents 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 of the project and recommends the measures to mitigate potential environmental impacts of the proposed project.

Section 7 "**Environmental Management and Monitoring Plan**" provides an overall approach for managing and monitoring the environment related issues and describes the institutional framework and resource allocations to implement the EMMP along with the environmental monitoring plan.

Section 8 "**Conclusion and Recommendations**" presents the outcome of the study and major observations of EIA and suggestions for environmental management and pollution control.

CHAPTER 2: POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORKS

2.1.GENERAL

This section deals with the existing environmental policy as well as legal and administrative framework related to carry out Environmental Impact Assessment (EIA) Study of Bestway Tower proposed to be constructed at F-9/G-9, Jinnah Avenue, Islamabad. All the pertinent environmental policies and guidelines of Pak- EPA and legal frameworks have been duly conferred in this section. In addition, the roles and responsibility of the proponent as well as the Environmental Protection Agency Pakistan (EPA-Pak) have been discussed in this section.

2.2 POLICY FRAMEWORK

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

2.2.1 National Conservation Strategy (NCS), 1992

The Pakistan National Conservation Strategy (NCS) that was approved by the federal cabinet in March, 1992 is the principal policy document on environmental issues in the country (EUAD/IUCN, 1992). The NCS outlines for the country's primary approach towards encouraging sustainable development, conserving natural resources, and improving efficiency in the use and management of resources. The NCS has 68 specific programs in 14 core areas in which policy intervention is considered crucial for the preservation of Pakistan's natural and physical environment.

2.2.2 National Environment Policy, 2005

In March, 2005, the 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. It 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. With reference to housing and shelter, it includes measures such as the provision of water supply and waste management in notified slums, upgrading living standards in rural dwellings, in addition to the development of master plans for city towns and rural settlements.

2.2.3 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 affectees. It also explains the requirements and implementation of Resettlement Action Plan (RAP).

2.2.4 The National Housing Policy, 2001

The National Housing Policy, 2001 is the only existing housing specific policy. Given the failure of past policies and measures, the emphasis of the existing housing policy focuses on the fundamental requirements for creating a favourable environment in the country in order to promote and facilitate the housing sector. The policy is intended to evolve, implement and support measures in order to ensure adequate housing to all its citizens. The Ministry of Housing is responsible for implementation of National Housing Policy, 2001.

2.2.6 National Water Policy

The National Water Policy aims at efficient management and conservation of existing water resources, optimal development of potential water resources, steps to minimize time and cost overruns in completion of water sector projects, equitable water distribution in various areas and canal commands, measures to reverse rapidly declining groundwater levels in low-recharge areas, increased groundwater exploitation in high-recharge areas, effective drainage interventions to maximize crop production, improved flood control and protective measures, steps to ensure acceptable and safe quality of water, minimization of salt build-up and other environmental hazards in irrigated areas, institutional reforms to make the managing organizations more dynamic and responsive.

2.2.7 National Climate Change Policy, 2012

The National Climate Change Policy was approved by the Federal Cabinet on 26th September, 2012. With an overall goal, „to ensure that climate change is mainstreamed in the economically and socially vulnerable sectors of the economy and to steer Pakistan towards climate resilient development", the Policy puts forward comprehensive policy objectives of sustained economic growth, integration of climate change into inter-related national policies, pro-poor gender sensitive adaptation and cost-effective mitigation, water, food and energy security, DRR, effective decision making and coordination, creating awareness, building capacities, and conservation of natural resources and long term sustainability. It also seeks effective use of financial opportunities, and public and private sector investment in adaptation measures.

This policy emphasizes the need of taking necessary measures to integrate climate change concerns into Initial Environmental Assessment and Environmental Impact Assessment (EIA) processes; it further reinforce the need to ensure that IEE/EIA and other mechanisms are strictly observed in all development projects, particularly infrastructure projects, by the concerned agencies.

2.2.8 The Labour Policy, 2010

The Labour Policy envisages a harmonious working relationship between workers and employers for improving the performance and efficiency of the industry. The rights and obligations-based approach to labour issues is being followed also in accordance with the Constitution of the Islamic Republic of Pakistan.

2.3 LEGAL FRAMEWORK

GoP has promulgated laws/acts, regulations and standards for the protection, conservation, rehabilitation and improvement of the environment. In addition to this, GoP has also developed environmental assessment procedures governing developmental projects. Following are the excerpts of these laws and procedures relevant to the proposed project.

2.3.1 Pakistan Environmental Protection Act, 1997

Pakistan Environmental Protection Act (PEPA) was propagated on December 06, 1997 by repealing the Pakistan Environmental Protection Ordinance, 1983. It provides the framework for implementation of the NCS, 1992, establishment of provincial sustainable development funds, protection and conservation of species, conservation of renewable resources, establishment of Environmental Tribunals, appointment of Environmental Magistrates, Initial Environmental Examinations (IEE), and Environmental Impact Assessments (EIA).

2.3.2 Pakistan Environmental Protection Agency (Review of IEE/EIA) Regulations, 2000

These regulations provide lists of the projects requiring IEE and EIA. They also briefly describe the preparation and review of environmental reports. These regulations are accessible at official website of Pak-EPA, www.environment.gov.pk and www.mocc.gov.pk.

2.3.3 Pakistan Environmental Assessment Procedures, 1997

Pakistan Environmental Assessment Procedures (1997) is, in fact, a compendium, which contains the following sets of statistics and information significant to the proposed project.

a) Policy and Procedures for Filing, Review and Approval of Environmental Assessment Reports

It refers to environmental policy and administrative procedures to be followed for filing of environmental examination/assessment reports by the proponents and their review and authorization by the concerned environmental protection agencies.

b) Guidelines for the Preparation and Review of Environmental Reports

These guidelines are developed to facilitate both the proponents and decision makers to formulate reports (inclusive of all the information contained therein) and carry out their review so as to take cognizant decisions.

c) Sectoral Guidelines: Housing Estates and New Township Development

These guidelines embody issues/impacts commonly arising due to the housing estates and new township development, the mitigations to reduce/eliminate these impacts and the need for environmental management plan and monitoring plan to protect the environment.

d) Guidelines for Public Consultation

These guidelines deal with possible approaches to public consultation and techniques for designing an effective the programs of consultation that involves all major stakeholders and ensures that their concerns are incorporated in any impact assessment study.

2.3.4 National Environmental Quality Standards (NEQS), 2010

Pakistan Environmental Protection Council (PEPC) first approved these standards in 1993. They were later revised in 1995, 2000 and 2010. They endow information on the permissible limits for discharges of municipal and industrial effluent parameters and industrial gaseous emissions in order to regulate environmental pollution. The National Environmental Quality Standards (NEQS), 2010 are available at official website of Pak-EPA, www.environment.gov.pk and www.mocc.gov.pk.

2.4 OTHER RELEVANT LAWS

a) Islamabad Capital Territory Local Government Act, 2015

This act was formulated to rationalize and reorganize the local government system in the Federal Capital. Whereas it 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.
The Government may provide guidelines and render advice to a local government for achieving the objectives of Government policy and for promoting economic, social and environmental security of the Capital Territory.
The mayor leads the Metropolitan Corporation Islamabad (MCI); its functions include urban planning, road maintenance, environment control, building control, water supply, sanitation and other municipal services for the Islamabad Capital Territory. The mayor also chairs the Capital Development Authority (CDA), its scope is mainly confined to estate management, sector developments and project executions.

b) Land Acquisition Act, 1894 (Including Later Amendments)

The primary law for acquisition of land for public purposes in Pakistan is the “Land Acquisition Act, 1894”. The Land Acquisition Act, 1894, is a “law for the acquisition of land needed for public purposes

and for companies and for determining the amount of compensation to be paid on account of such acquisition". This act deals with the procurement of private properties for public purposes. There are 55 sections in this act mainly dealing with area notifications, surveys, acquisition, compensation, appointment awards, dispute resolution, penalties and exemptions.

Provided that in all cases where the court has directed that Collector shall pay interest on such excess at the rate of six per centum from the date on which possession was taken and the payment of compensation or a part thereof has not been made up to the commencement of the Land Acquisition (West Pakistan Amendment) Act, 1969, the rate of compound interest on such excess on balance shall be eight per centum.

c) Federal Local Government Ordinance, 2001

Environmental protection is federalized subject under Federal Local Government Ordinance (LGO), 2001. Despite any specific provisions, every local government may execute functions conferred by or under the Federal LGO, 2001 and in performance of such functions may implement such powers, which are necessary and appropriate. Until different provisions, rules, regulations or byelaws are made, the local governments may exercise such powers as are specified in the Sixth Schedule of Federal LGO, 2001. Environmental protection is sequential at 48 of the Sixth Schedule.

d) Standard Operating Procedure (SOP) for Management of Sanitation Services in Islamabad 2008

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 shall apply to waste generators (residential, commercial, hospital / clinical / hazardous / industrial, debris, green / garden waste etc.) and waste / sanitation service providers (collection, storage, transportation & disposal) or Standard Operating Procedure (SOP) for Management of Sanitation Services in Islamabad or any person / agency who is directly / indirectly involved in solid waste management business.

e) Ban on (Manufacturing, Import, Sale, Purchase, Storage and Usage) Polythene Bags Regulations), 2019 in ICT

According to the Ban on (Manufacturing, Import, Sale, Purchase, Storage and Usage) Polythene Bag Regulations 2019, there is a complete ban on making, buying or selling, and using single-use polythene bags in the ICT. However, permission has been granted for the use of large-sized polythene bags for dustbins and waste disposal. Under the law, the organizations wishing to use polythene flat bags will have to pay Rs 10,000 fee. While any manufacturer, importer or wholesaler found supplying polythene bags will be fined a sum ranging from Rs 50,000 to Rs 500,000. A shopkeeper or hawker violating the regulation will be fined Rs 10,000 for the first time. The fine may go up to Rs 50,000 for repeated violations.

f) Pakistan Occupational Health and Safety Act 2018

The main objective of this Act is to provide for a balanced and nationally consistent framework to secure the health and safety of workers and workplaces by: (1) protecting workers and other persons against harm to their health, safety and welfare through the elimination or minimization of risks arising from work or from specified types of substances or plant; (2) providing for fair and effective workplace representation, consultation, Co- operation and issue resolution in relation to work health and safety; (3) encouraging unions and employer organizations to take a constructive role in promoting improvements in health and safety practices at work and assisting persons conducting businesses or undertakings and workers to achieve a healthier and safer working environment; (4) promoting the provision of advice, information, education and training in relation to work health and safety;
(5) securing compliance with this Act through effective and appropriate compliance and enforcement measures; (6) ensuring appropriate scrutiny and review of actions taken by persons exercising powers and performing functions under this Act; (7) providing a framework for continuous improvement and progressively higher standards of health and safety at work and (8) Maintaining and strengthening the national harmonization of laws relating to work health and safety and to facilitate a consistent national approach to work health and safety in this jurisdiction.

g) Guideline for Solid Waste Management, 2005

Guidelines for Solid Waste Management have been issued as a draft by the Pakistan Environmental Protection Agency in coordination with JICA and UNDP. These guidelines explain the waste generation, discharge and composition. These guidelines will strictly be followed for safe handling and disposal of waste generated during construction and operational stages of the project.

h) Factories Act, 1934

This law governs the employment of labour, working hours, working conditions and facilities to be provided in the workplace. The Act deals primarily with matters related to labour relations, working conditions and health and safety in the work place. Sections 14 to 33 of the act specifically cover all the issues related to the work environment of labourers. This will be applicable during the construction and operational stages of the project. Contravention to any of the provisions of this act will lead to penalty against the concerned person.

i) Employment of Child Act, 1991

This Act prohibits the employment of children under fourteen year in any of the proposed project activities.

j) Pakistan Penal Code, 1860

This states the penalties for violations concerning pollution of air, water bodies and land.

k) The Islamabad Wildlife (Protection, Preservation, Conservation & Management) Ordinance, 1979

This act provides for the protection, preservation, conservation and management of wildlife in the Islamabad Capital Territory. This act defines the wildlife sanctuary, game reserves, protected areas and national parks. It also defines the rules and responsibilities of the relevant authorities and the relevant personnel to protect the ecological resources. It also describes the penalties and punishments on offenses against the sections given in the act.

l) Cutting of Trees (Prohibition) Act, 1975

This act forbids cutting of trees without acquiescence of the Forest Department.

m) National Disaster Management Act, 2010

National Disaster Management Act, 2010 was passed by Parliament of Pakistan in 2010. The Act applies to whole Pakistan including tribal areas of FATA. The Act was passed in backdrop of 2010 Floods in Pakistan and strengthens Disaster Management system. This act is applicable to the proposed project in case of the disaster. The proposed project will require special consideration of disaster and risk management strategies as per the Act.

n) National Clean Air Act, 2000

The Clean Air Act legislation aims to control vehicular emissions, pollution from industry and indoor air pollution in rural and urban areas. This act will trigger if vehicles and machinery used for construction activities emanates air pollutants above the permissible limit.

o) Building Code of Pakistan (Seismic Provisions-2007)

Building Code of Pakistan (Seismic Provisions-2007), established after devastating earthquake of 2005, prescribe the minimum requirements for the earthquake design and construction of buildings and building-like structures and/or their components subjected to earthquake ground motions. This Code is applicable to the subject project as it includes the formation of structures.

p) Islamabad Capital Territory Building Control Regulations, 2020

According to these regulations, only such types of buildings/structures can be constructed in Islamabad Capital Territory plots, which are in accordance with the Master Plan / Functional Plan / these regulations and/or as described in the terms and conditions of allotment of respective plot(s). Any construction that does not conform to the Building & Zoning Regulation shall be liable to be demolished at the risk and cost of owner/allottee /occupant after giving 15 days' notice. This Code is applicable to the subject project as involves construction of structures in F-9/G-9.

q) The Antiquities Act, 1975

The protection of cultural resources in Pakistan is ensured by the Antiquities Act of 1975. Antiquities have been defined in the Act as ancient products of human activity, historical sites, or sites of anthropological or cultural interest, national monuments etc. The act is designed to protect antiquities from destruction, theft, negligence, unlawful excavation, trade and export. The law prohibits new construction in the proximity (200 fts) of a protected antiquity and empowers the Government of Pakistan to prohibit excavation in any area, which may contain articles of archaeological significance.

2.5 ADMINISTRATIVE FRAMEWORK

2.5.1 Bestway Cement Limited (BCL)

The implementing agency of the proposed project is Bestway Cement Limited (BCL). The management of BCL will ensure that all the proposed measures are effectively implemented at the design, construction and operational stages of the project.

2.5.2 Environmental Protection Agency, Pakistan

Pakistan Environmental Protection Council is the apex inter-ministerial and multi- stakeholders decision-making body, which is headed by Prime Minister. While Pakistan Environmental Protection Agency is meant for the putting into practice of environmental laws in Pakistan. They have vicarious powers to provincial environmental protection agencies for review, approval and monitoring of environmental examination/assessment projects. Pak- EPA will be liable for reviewing the report, issuing Environmental Approval and overall/broad based monitoring of the proposed project actions.

2.5.3 The Capital Development Authority (CDA) Islamabad

The Capital Development Authority (CDA) is a public benefit corporation responsible for providing municipal services in Islamabad Capital Territory. The CDA was established on 14 June, 1960 by executive order entitled Pakistan Capital Regulation. As of 2016, most of CDA‟s municipal services and departments have been transferred to the newly created Islamabad Metropolitan Corporation, although CDA is still in charge of estate management, project execution and sector developments.

CHAPTER 3: DESCRIPTION OF THE PROJECT

3.1 GENERAL

This section of the study renders a detailed account of the project and its salient features; such as location and various phases. Inputs and discharges relevant to different phases of the project, such as electricity & materials etc. have also been examined as a response to possible environmental concerns.

3.2 TYPE AND CATEGORY OF PROJECT

The proposed project is Construction of Bestway Tower located at Plot No. B-2, Blue Area, Sector F-9/G9, Main Jinnah Avenue, Islamabad. This proposed project involves the construction of office building consisting of 5 Basements, Ground Floor and 15 Floors with modern style infra structure with all basic facilities for BCL offices. The proposed project is going to be established in sensitive area Islamabad and 15 Floors above ground. As per **Pak- EPA Review of IEE/EIA Regulations, 2000** the project falls in **Schedule II** under **Category I- Environmentally Sensitive Areas**: A*ny other project likely to cause an adverse environmental effect.*

3.3 PROJECT OBJECTIVES

The objectives of the project are:

- To provide a modern styled and sustainable building for offices of BCL staff that will enhance the business activities.
- To provide employment opportunities as a part of the project activities scope to local people.

3.4 SITE AND PROJECT LAYOUT MAP

3.4.1 Location Map

This proposed project is located in Blue Area, Sub Sector F-9/G9, Plot No. B-2, Main Jinnah Avenue, Islamabad. The coordinates of the site are 33°41’28.7844"N and 73°1’17.6448"E. The project site is located in sensitive area and surrounded by different commercial buildings and lies on Main Jinnah Avenue Road. The project location is shown in Figure 4.

Figure 4: Google View of the Project Site

3.4.2 Project Layout Map

The layout map of the proposed project showing floor wise plan is attached in Annex IV at the end of this EIA Report.

3.5 LAND OWNERSHIP

The land selected for the proposed project is under the undisputed ownership of the Bestway Group. The property allotment documents and possession certificate are attached in Annex II.

3.6 PROJECT ADMINISTRATIVE JURISDICITON

The proposed project lies in Islamabad, Capital Territory of Pakistan.

3.7 COST OF PROJECT

The total cost of project is approximately PKR 2.0 billion including environmental budget of 4.0 million.

3.8 LAND USE ON SITE

The land for the proposed project is an open plot covered by road side grass, bushes and surrounded by Jinnah Avenue (Front), Empty Plot (Back), Grey Structure Building (Right) and Drain (Left) as

mentioned in Site Layout Map Figure 1 and Pictorial are Below in figure 5. The project area has urban settlement comprising commercial area, health and educational institutions, residential area, parks and playground and religious places like Faisal Mosque.

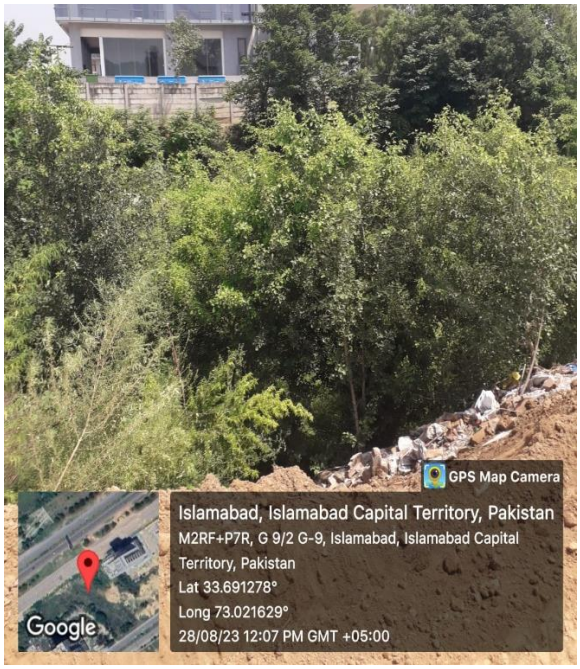
Front Side	Back Side
	
Grey structure Building (Right Side)	**Drain (Left Side)**
	

Figure 3: Land Use on Project Site

Due to construction activities, grass, Bushes and few trees will be removed. To mitigate BCL has proper plan for plantation at project site and surrounding of project to maintain and improve the aesthetic view of area (details of Tree Plantation is attached as Annex-V).

3.9 PROJECT DESCRIPTION

The proposed project i.e; Bestway tower will be constructed in Sector F-9/G-9 Blue Area on a plot No. 2 that covers an area of 12000 Sft. It will be state of the art premium and international style building for offices and comprising of 5 basement, Ground Floor and 15 Floors with covered area of 19227 Sft. The height of building is 226ft. The 5 basement will be used as parking area for staff member's cars having adequate capacity at each (layout of Parking plan is attached as Annex-IV). Each floor will have specific floor plan with emergency exist (details are attached in Annex- IV). The proposed project will be going to accommodate the offices load of Bestway Head office and Other one established in UBL tower that are located at G-6 and G-7 sector respectively. Both offices are present at the places that are very busy and over crowded. Therefore, in peak hour there is always traffic congestion problem that will impact the environment. These already established offices of Bestway will be shifted to this proposed project i.e Bestway Tower that will reduce traffic load and also provide modern style building with all basic facilities to staff members. A better and sound work environment enhance the working efficiency of staff members.

In this said project, there will be two different working timing for staff. The workers will be move in and out at different time slots accordingly and proposed building has 5 basements for parking of vehicles. Therefore, there will be no issues of traffic congestion. The proponent has undertaken the Traffic Impact Study of project area.

The design of building is modern and have glass structure with one main entrance as shown in Figure 4 which represents 3D view of proposed building. The glass used in front of building has the capacity of solar energy collection that will help in maintaining the temperature of proposed building as Shown in Figure 5. That will not only improve the efficiency of HAVC system but also reduce the burden on energy. In this proposed project, energy efficient LED light will be used, rainwater will be collected and used for plantation purpose to conserve resources.

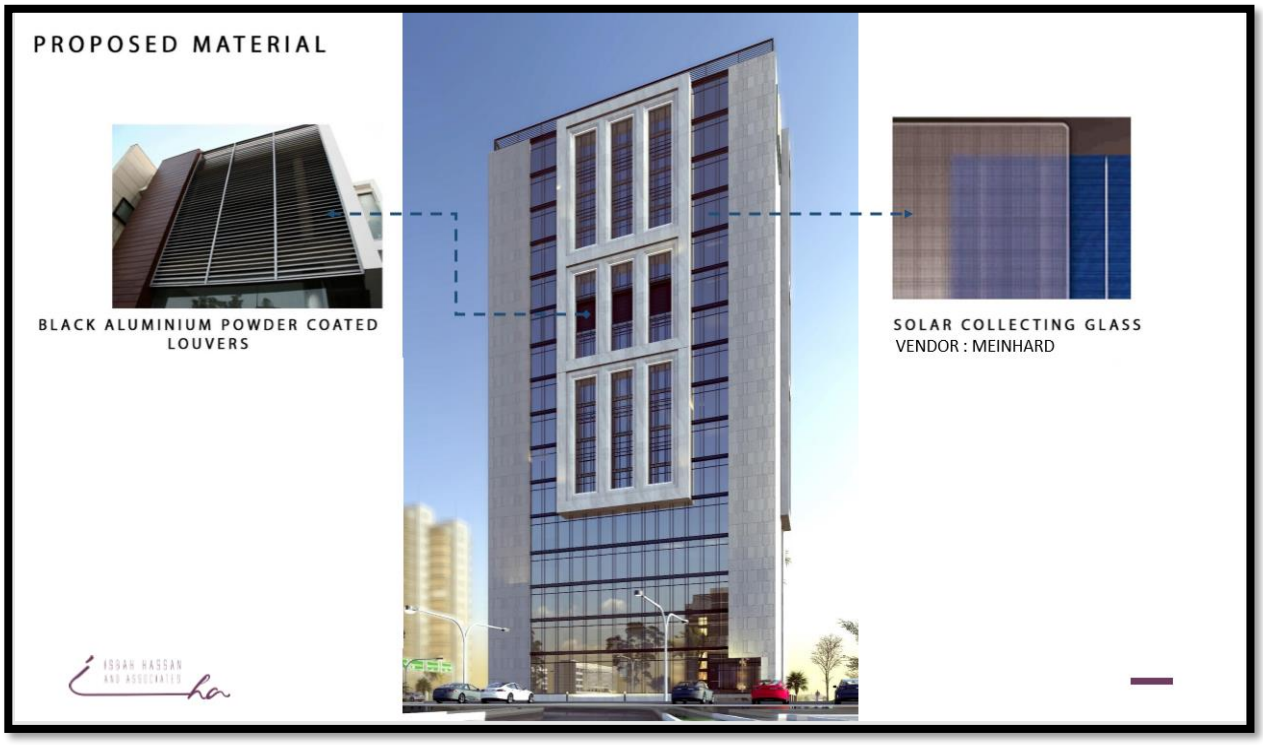
	
Front View	**Back View**
	
Right View	**Left View**

Figure 4: 3D view of Proposed Building from Different Sides

3.10 CONSTRUCTION MATERIAL

The materials used in construction of the proposed project would include cement, sand, aggregates, reinforced cement concrete frame (RCC Frame), brick infill, brick cladding coarse aggregates (crush), fine aggregates (sand), water, asphalt and reinforcement cement for grey structure. The cement will be transported to project site from nearby Farooqia Plant of Bestway Cement plant. That will reduce the transportation cost. While for outer finishing of building thermal break curtain wall PN series, black aluminum powder coated louvers, different kind of marble like Vitnam white-marble, Plaris white marble, Armani grey marble and Solar Collecting glass vendor: meinhard will be used as shown in below figure which makes the building's aesthetic look very appealing and environmentally sustainable. All these construction materials will be purchased from local market which reduce the carbon foot print of proposed project.

The glass used in front of building has the capacity of solar energy collection that will help in maintaining the temperature of proposed building as Shown in Figure 5. That will not only improve the efficiency of HAVC system but also reduce the burden on energy. Hence, this proposed building has energy efficient design as well as sustainable use of resources and have proper plantation to improve the environment.



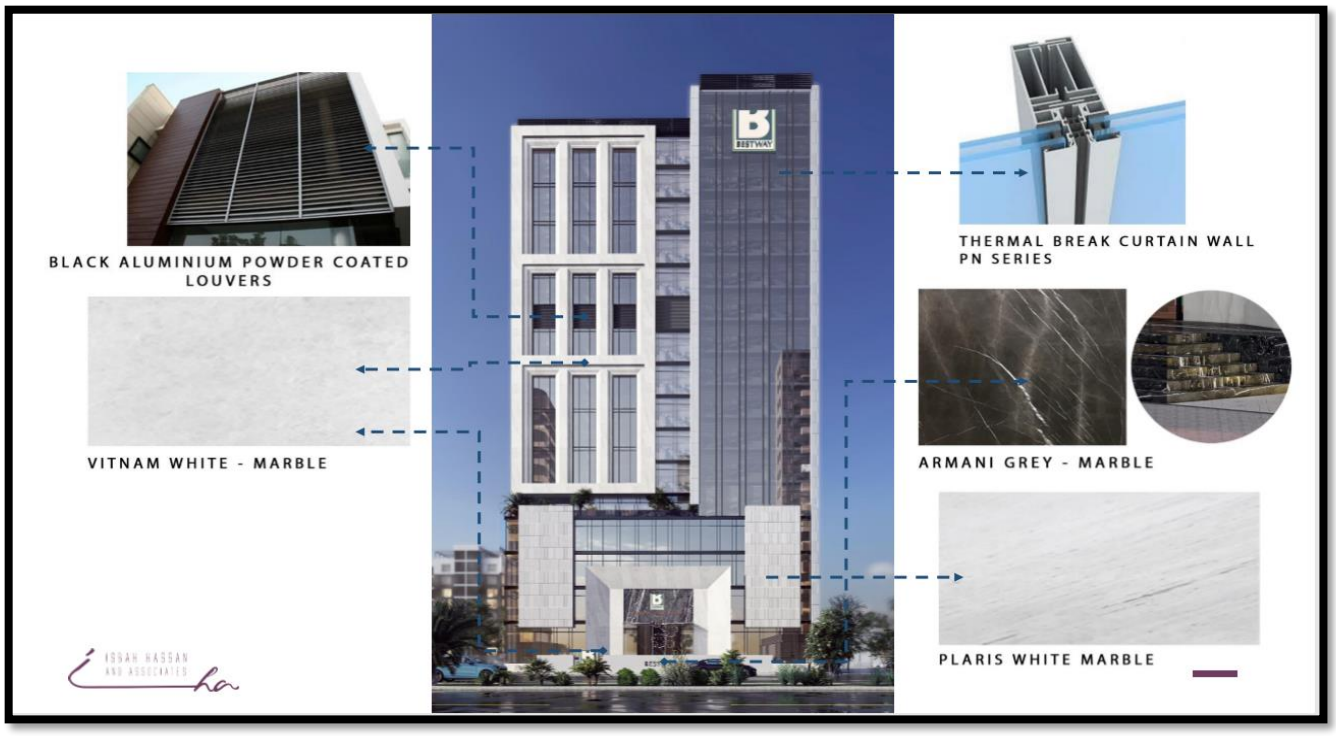


*Figure 5**: Proposed Material used for Bestway Tower***

3.11 PROJECT IMPLEMENTATION SCHEDULE

The proposed project expected to be completed in 34-36 months. The details implementation schedule is given in below Table 6.

Table 6: Proposed Project Implementation Schedule			
	Work Description	**Time**	**Observations/Rationale**
Substructure	Excavation (with 2 chain excavators)	25	With footprint area of 11000sft at each of the 5 basements, and an assumed height of 10' for each basement, excavation volume is approximately 600,000cft. 1 chain excavator excavates around 15,000 cft per day, hence by employing 2 excavators, complete excavation can be done in 15-20 days. Secant piling, of 30" dia, on an assumed plot dimension of 90'x123', can be done in 60 days
	Secant Piling	45	
	Raft concreting	20	Superstructure includes only Grey structure, involving only slab concreting, masonry.
	Basement 5 slab concreting	20	
	Basement 4 slab concreting	20	
	Basement 3 slab concreting	20	
	Basement 2 slab concreting	20	
	Basement 1 slab concreting	20	
	Total time for substructure in days	**190**	
Superstructure	Superstructure includes only Grey structure		Superstructure includes only Grey structure, involving only slab concreting, masonry.
	Ground Floor	20	
	1st floor	20	
	2nd floor	20	
	3rd floor	20	
	4th floor	20	
	5th floor	20	
	6th floor	20	
	7th floor	20	
	8th floor	20	
	9th floor	20	
	10th floor	20	
	11th floor	20	
	12th floor	20	
	13th floor	20	
	14th floor	20	
	15th floor	20	
	Total time for superstructure in days	**320**	
Total time in days for shell & core		**510**	=320+190=510 days
Total time in years becomes		**1.4**	Finishing works can be conveniently overlapped with the completion of each floor, as one floor gets
Finis	Basement 5	15	

	Basement 4	15	constructed, its finishing works can begin while the construction of top floor begins.
	Basement 3	15	
	Basement 2	15	
	Basement 1	15	
	Ground Floor	15	
	1st floor	15	
	2nd floor	15	
	3rd floor	15	
	4th floor	15	
	5th floor	15	
	6th floor	15	
	7th floor	15	
	8th floor	15	
	9th floor	15	
	10th floor	15	
	11th floor	15	
	12th floor	15	
	13th floor	15	
	14th floor	15	
	15th floor	15	
	Total No. of days required for finishing	**315**	
Total days for project completion		**1015**	
Total years required for project completion		**2.78**	34-36 months

3.12 EQUIPMENTS USED FOR CONSTRUCTION

During construction phase different kind of machinery and equipment will be used. The details are provided in Table 7;

Table 7: Machinery and Equipment Requirement for the Proposed Project

No	Description
1	Batching Plant
2	Concrete Pump
3	Crane Mobile
4	Crane Tower
5	Dumper Trucks

6	Loader
7	Concrete Transit Mixer
8	Cabin Hoist
9	Air Compressor
10	Form Work & Scaffolding Pipe (Quick form/cup lock propping mechanism and marine plywood shuttering)
11	Mobile Concrete Pump
12	Excavators
13	Bulldozers
14	Steel Cutting & Bending Machine
15	Generators

3.13 CONSTRUCTION CAMPS

Camp sites will be selected keeping in view the availability of adequate area including parking areas for machinery, stores and workshops, access to communication and local markets and an appropriate distance from sensitive areas in the vicinity. Keeping in view the following criteria guidelines, the contractor has to identify the construction camp sites before start of the construction i.e.:

- ✓ There should be no or minimum resettlement issues for the location of the camps;
- ✓ Camp site should be away from the residential areas and sensitive receptors;
- ✓ Selection of sites for construction camps shall be near the project area having proper access to the nearby main/link road;
- ✓ The camps must be located in a place where the drainage from and through the camps will not threaten any domestic or public water supply;
- ✓ Camp site must be adequate in size to prevent overcrowding of necessary structures;
- ✓ The camp site should consider avoiding any damage of property, vegetation, irrigation, and drinking water supply systems;
- ✓ The camp site must not be subject to periodic flooding;
- ✓ There should not be any ecological sensitive areas e.g. wildlife sanctuaries, game reserves, national parks, forest areas, etc. near to the construction camp site; and
- ✓ Final location will be selected by the contractor with the assistance of supervision consultant which will be finalized after approval from BCL.

3.14 MANPOWER

Man power demand estimation is an essential component to facilitate deployment of manpower. Total man power required for the proposed project will be estimated by the contractor at construction stage are approximately between 100-150 workers.

3.15 SOURCE OF WATER

The water requirement for the new facility will be supplied by the Capital Development Authority (CDA) with water servers as existing facilities for drinking and sanitation purpose.

3.16 WATER REQUIREMENT

The water consumption will be 8,000 gallons/day for 100 construction workers during construction phase of the proposed project. While during Operation Phase estimated water consumption will be 22,000 gallons/day.

3.17 WASTEWATER GENERATION

During Construction Phase, wastewater generated is domestic in nature and estimated to be 6,400 gallons/day[8] for 100 construction workers. During Operational Phase, approximately 16,400 gallons/day domestic wastewater will be generated that will be treated through septic tank and then disposed off in sewerage system of CDA.

3.18 SOLID WASTE

The solid waste generation will be approximately 61.6 kg/day[9] for 100 construction workers during Construction phase of the proposed project. The construction waste like excavation material, soil will be reused for earth filling and will be disposed off as per area practices. While the recyclable like cement bags, plastic bags, paint container etc collected, sold and recycled. During operational phase, solid waste will be generated approximately 180,000 kg/ day and will be domestic / kitchen waste in nature.

3.19 POWER REQUIREMENT/ POWER SOURCE

The main source of electricity/electric power during construction phase will be diesel generators for

[8] Design Criteria of Public Health Engineering for Water Supply, Sewerage and Storm Water Drain (Domestic sewage generation = 80% of water consumed/day)

[9] Pakistan – Waste Management Report, 2018 (Islamabad: 0.616 kg/capita/day)

construction camps and construction machinery. The source of Power during Operation phase will be IESCO and standby generators.

3.20 FIRE FIGHTING ARRANGEMENTS

The proposed project will have modern and automatic Firefighting system (details are attached as Annex-VI). In case of fire accident, fire alarm will be run and small leakages in system will be catered with jockey/pressure maintenance pump. In case of fire, sprinklers' bulb will break upon thermal action which will cause pressure drop in main line, upon reaching set pressure value, control panel will send command to electric pump and pump will start automatically. Upon failure of electric/duty pump activation pressure will drop further and reaching the set value diesel engine will start, getting signal from control panel.

3.21 AIR EMISSIONS

During construction phase, dust will be generated due to excavation of soil and dumping. To reduce this impact water will be sprinkled during construction activities and construction material will be properly covered to avoid spread of particulate matter and dust. The generator will also be a source of air pollution during construction. Generators will be equipped with catalytic converter, properly maintained and placed in separate and close place to reduce associated impacts. To reduce the public nuisance indigenous trees will be planted around the boundary to reduce air pollution. Workers will be provided with proper PPEs and trained well for use of construction equipment to reduce occurrence of accident.

3.22 NOISE

The noise generated during construction phase from generator and other construction activities. The generator will be equipped with silencer and place in sound proof canopy to reduce the noise pollution. Similarly, workers will be provided with Ear plugs to protect their hearing sense from sound problems.

3.23 TRAFFIC CONGESTION PROBLEM

The project site is located on Jinnah Avenue which is one of the most commuted roads in the Capital City and it is also one of the broader road. During construction phase, there will be movement of heavy vehicles that may cause traffic congestion on the roads. To avoid and mitigate traffic congestion problems, construction material will be transported at project site after peak hours (Internal Parking layout plan is

attached as Annex-VII). The traffic surveys and traffic counts have been conducted on adjoining intersections and roads during baseline survey of project area[10]. The traffic was counted at two different points in morning, noon and evening (as shown in Figure 6).

*Figure 6**: Traffic Count on Adjoining Intersection of the Project Area***

The results of study depicted graphical from in Figure 7 that at peak time there be heavy traffic on this road and to mitigate this impact there should be proper implementation of traffic management plan.

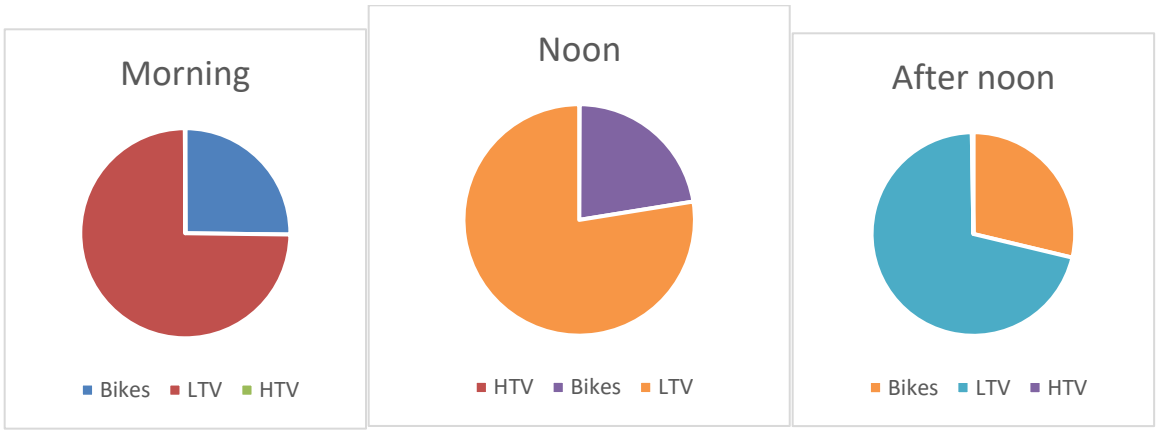


*Figure 7**: Traffic Count Survey on Project Site Roads (Jinnah Avenue and Ibne Sina Road)***

[10] https://openjicareport.jica.go.jp/pdf/11996774_03.pdf

3.24 RELOCATION & REHABILITATION PLAN

No human population resides within proposed project area as it is a commercial area. Significant structure such as cultural, religious, archaeological, recreational or any other are not present on the land selected for the project requiring dismantling or relocation. No flora or fauna; especially belonging to endangered species is found within a safe distance from the site which is to be removed or moved to some other part. Hence, no relocation and resettlement are required.

3.25 TREE PLANTATION PLAN

Plantation will be done during the construction work immediately to maintain the esthetic values of project. Plantation of indigenous trees species is highly important to maintain the biodiversity and ecological balance. It is also important to prevent global warming, soil erosion and pollution. Afforestation purifies the environment and helps in reducing the carbon dioxide level. Along with the importance of roads construction, the afforestation activity will further help in enhancing the socio-economic condition of the area and project sustainability.

A detailed site survey was conducted of the project area and the trees identification process was done according to the proposed design which was later verified by the design team (layout plan for tree plantation is attached as Annex- V).

The present area supports a large variety of indigenous trees species having low water requirements/behaviour. It is favored as an erosion-control plant, with its easy spreading and resilience, some varieties of acacia, are potentially an invasive species. One of the most globally significant invasive Acacias is Black Wattle, which is taking over grasslands and abandoned agricultural areas worldwide, especially in moderate coastal and island regions where mild climate promotes its spread. In many areas Weed Risk Assessment gives it a "high risk, score of 15" rating and it is considered one of the world's 100 most invasive species. Extensive ecological studies should be performed before further introduction of acacia varieties as this fast-growing Genus, once introduced, spreads fast and is extremely difficult to eradicate.

3.26 GOVERNMENT APPROVAL

The Bestway management will apply for other government approvals, after obtaining Environmental Approval from Pak-EPA.

3 CHAPTER 4: BASELINE DATA & ENVIRONMENTAL PROFILE

4.1 GENERAL

This section covenants with the prevailing environmental conditions of the project area. Information that has been collected from different sources, including public literature, reports of other studies conducted in this area, knowledge with the proponent and the concerned government departments and the first- hand surveys and field measurements has been presented in this section. This chapter of Environmental Impact Assessment (EIA) encompasses all the important aspects of local environment; such as biological resources, socioeconomic development and quality of living values. A Social survey in the Project Area was also carried out through consultation with the various communities. Local residents living in the Project Area were interviewed to obtain their feedback regarding the construction of the Project and its impacts on their daily life/future in the short and long term.

4.2 PHYSICAL ENVIRONMENT

This part examines the physical resources such as topography, soil, climate, surface and ground water resources and quality, ambient air quality and geology of not only the Project site but also the city as a whole to assess whether the project under assessment can or does have any impacts on any of these parameters. The description of physical environment of Islamabad city and the project site is presented in the following sub sections.

4.2.1 Physiography and Topography

Islamabad is located at 33.43°N 73.04°E at the northern edge of the Pothohar Plateau, along Rawalpindi District and at the foot of the Margalla Hills in Islamabad Capital Territory with general height of 540 m (1,770 ft.) above the mean sea level (MSL). The terrain in Islamabad consists of plains and mountains whose total relief exceeds 1,600 m. The modern capital and the ancient Gakhar city of Rawalpindi form a conurbation, and are commonly known as the Twin Cities. The city is divided into four physiographic[11] zones i.e.:

i) Margalla Hills;

ii) Higher Plain;

iii) Lower Plain; and

[11] JICA (2003) The Study on Comprehensive Flood Mitigation and Environmental Improvement Plan of Lai Nullah Basin in The Islamic Republic of Pakistan, Final Report, CTI Engineering International Co., Ltd., Pacific Consultants International

iv) Valley Area.

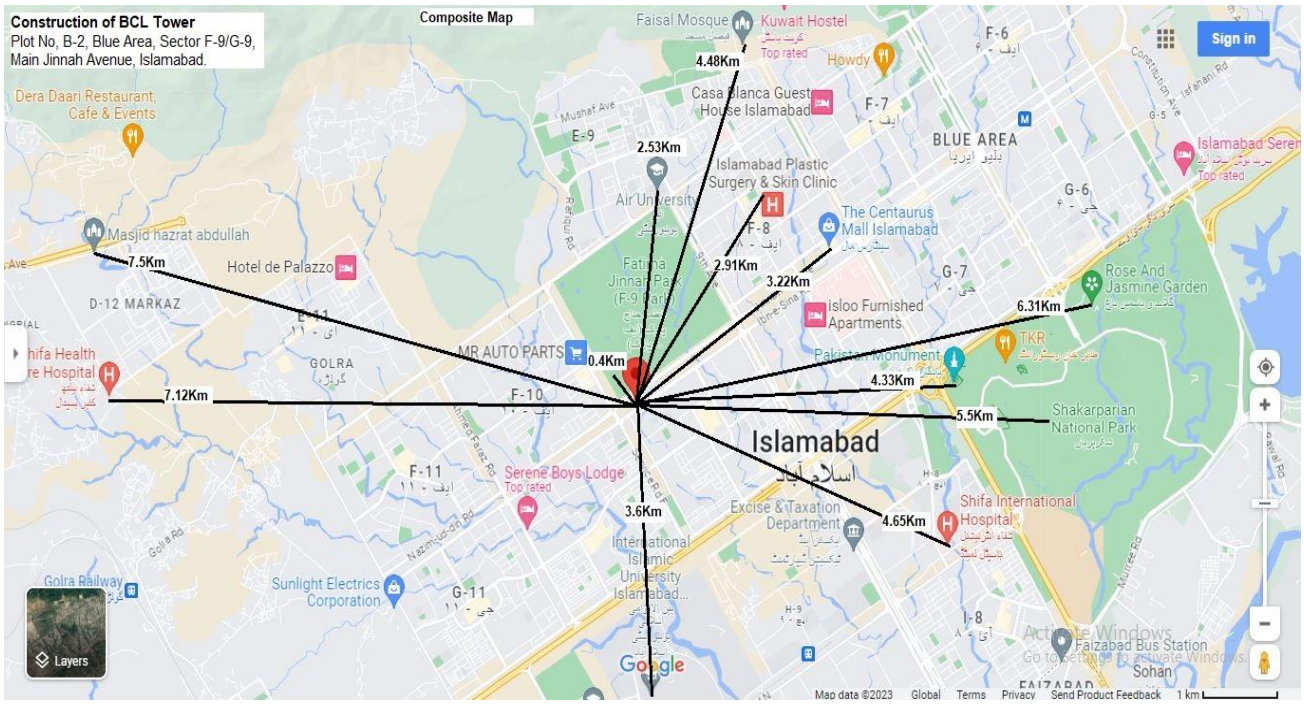


*Figure 8**: View of Project Site***

i) **Margalla Hills:** It is located in the north of the area. The dominant formations are composed of sandstone, siltstone, shale, and lenses of conglomerates and are covered with permanent mixed scrub and coniferous forest. The ground elevation is up to 1,240 m at the upstream end. There are three major tributaries of Lai Nullah namely Saidpur Kas, Tenawali Kas and Bedarawali Kas, which originate from the Margalla Hills forming a very steep channel bed slope of about 1/10.

ii) **The higher plain:** It expands over the built-up area of Islamabad City with a gradual slope from North to South. Saidpur Kas, Tenawali Kas and Bedarawali Kas run southward in the plain and finally flow into Lai Nullah just upstream of Kattarian Bridge.

iii) **The lower plain:** It is the upper part of the Rawalpindi area above Chaklala Bridge. This area is flatter than the upper Higher Plain and the lower Valley Area forming a bowl shaped topography. Rawalpindi city area is covered with alluvium and eolian deposits and is part of dissected basin plain formed by Lai Nullah and its tributaries.

iv) **The valley area:** It is located downstream of Chaklala Bridge. The valley area, falling down to the Soan River, a tributary of the River Indus is composed of gravel/boulder and sand/silt.

4.2.2 Geography and Geology

The geological structure and Stratigraphic of the Islamabad-Rawalpindi area is very complex due to the convergence of the Pakistan-India and Eurasian tectonic plates and their collision that began about 20 million years ago. The geological history records a long period of gentle geological fluctuations and slow deposition in the study area while the Pakistan-India plate drifted northward. This period is followed by more vigorous tectonic processes and rapid deposition since the convergence of the Pakistan-India and Eurasian plates. Therefore, the period from the Middle Jurassic to the Lower Miocene (150 million years) is represented by only 675 m of primarily marine sedimentary rocks, whereas the last 20 million years are represented by more than 7,572 m of continental sedimentary rock[12].

The sedimentary rocks exposed in the Islamabad area date from the Middle Jurassic to the Quaternary. Three structural zones can be pointed out in Islamabad:

- **Mountainous Margalla Hills in the north**: Jurassic through Eocene limestone and shale complexly folded and thrust along the Hazara fault zone;
- **South of the Margalla Hills**: the southward-sloping piedmont bench (piedmont fold belt) is underlain mainly by truncated folds in the sandstone and shale of the Rawalpindi Group;
- **Southernmost area**: fluvial sandstone, clay stone and conglomerate deposits along the axis of the Soan syncline west-southwestward.

The **Hazara fault zone** is located in the north of the Islamabad-Rawalpindi area and affects a scope of about 25 km of width and 150 km of length. The area is convex to the south and extends west-southwestward away from the Himalayan syntaxis. Hence, the thrust and fold structure of the Margalla Hills immediately north of Islamabad is complex: there are at least five principal thrust sheets repeating the pre-Miocene marine section.

In the **piedmont fold belt area**, Pleistocene conglomerate, overlying sandstone of the lower Miocene, is folded in the broad anticline at Shakar Parian Park in Islamabad.

[12] [4]Iqbal M. Sheikh, Mustafa K. Pasha, Van S. Williams, S. Qamer Raza, and Kanwar S.A. Khan (2007), Environmental Geology of the Islamabad-Rawalpindi Area, Northern Pakistan, Study by Geological Survey of Pakistan, under the auspices of the U.S. Agency for International Development, U.S. Department of State, and the Government of Pakistan

The **Soan syncline** is an asymmetric, faulted fold of regional extent, plunging west- southwestward where fluvial sandstone, clay stone and conglomerate were deposited. The maximum width of the synclinal in the study area is about 11 km, but the fold extends 100 km to the southwest.

The **quaternary deposits** are generally heterogeneous. The subsurface mainly presents silt and clay deposits. The gravel beds are present in discontinuous layers with silty clay. Their thickness decreases in the south and west. The average thickness of the alluvium is more than 200 m, and can even be 300 m in some areas.

Four different main lithological units are present in the Islamabad-Rawalpindi area: (i) Sandstone and limestone of Cretaceous age, (ii) Margalla Hill limestone of Eocene age, (iii) Nimadrics of Miocene to Lower Pleistocene, and (iv) Deposits of Pleistocene and Quaternary age.

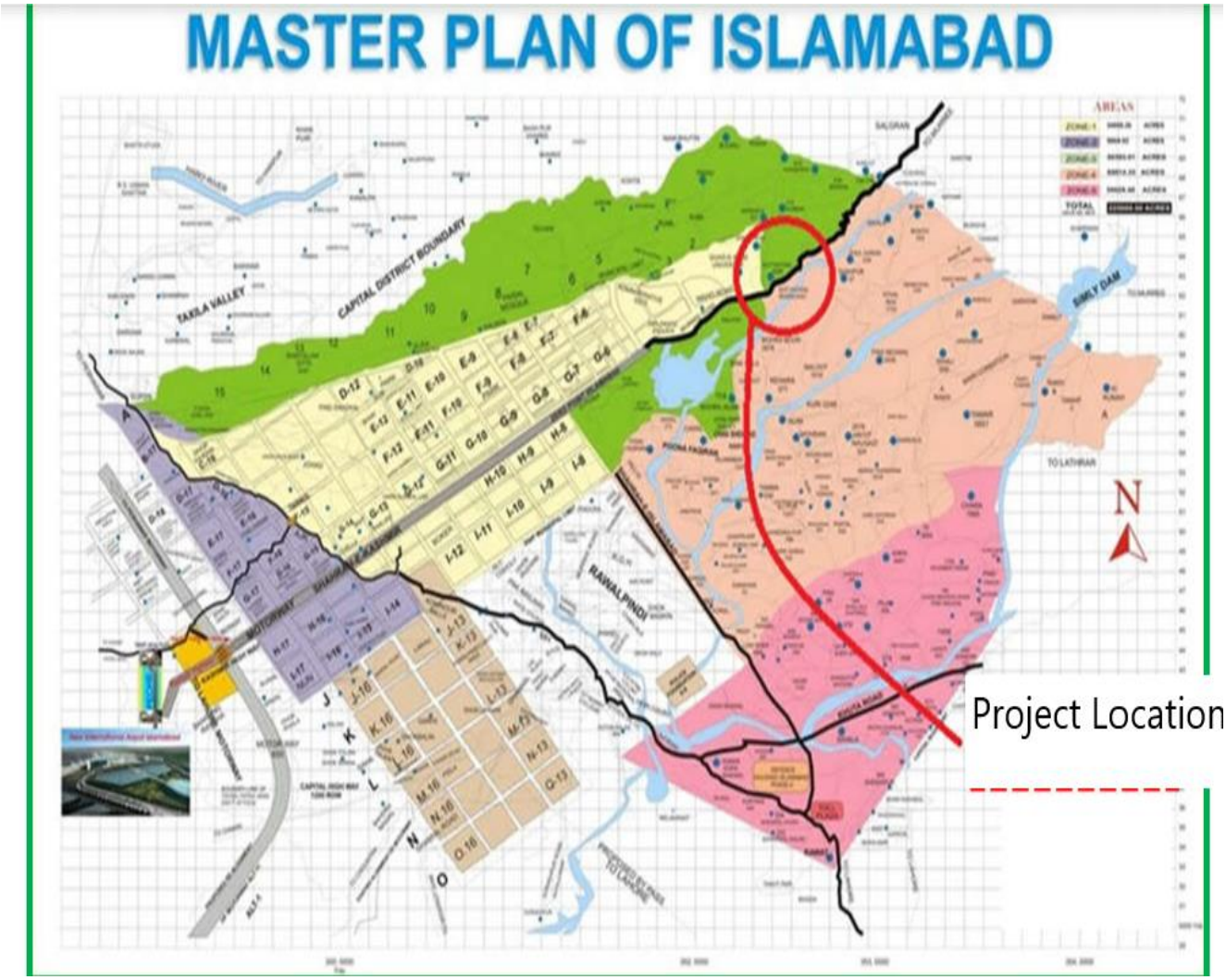


Figure 9:Master Plan of Islamabad

4.2.3 Seismic Map

The project site falls in the Punjab plain, which has low to moderate level of seismicity. The project region has been subjected to severe shaking in the past due to earthquakes in the

Himalayas. The known main active fault of the Himalayas is the Main Boundary Thrust (MBT). The epicenters of low to moderate magnitude earthquakes, recorded in the Punjab plain are associated with the subsurface fractures in the basement rocks, which are concealed by thick alluvial deposits.

According to Building code of Pakistan, (Revised Seismic Provisions-2007) prepared by NESPAK, the project area falls in Seismic Zone 2B of Pakistan (low to moderate damage), and peak ground acceleration (PGA) from 0.16 to 0.24 g. Figure 4-5 shows the seismic zoning map of Islamabad with the project area falling under Seismic Zone-2B.

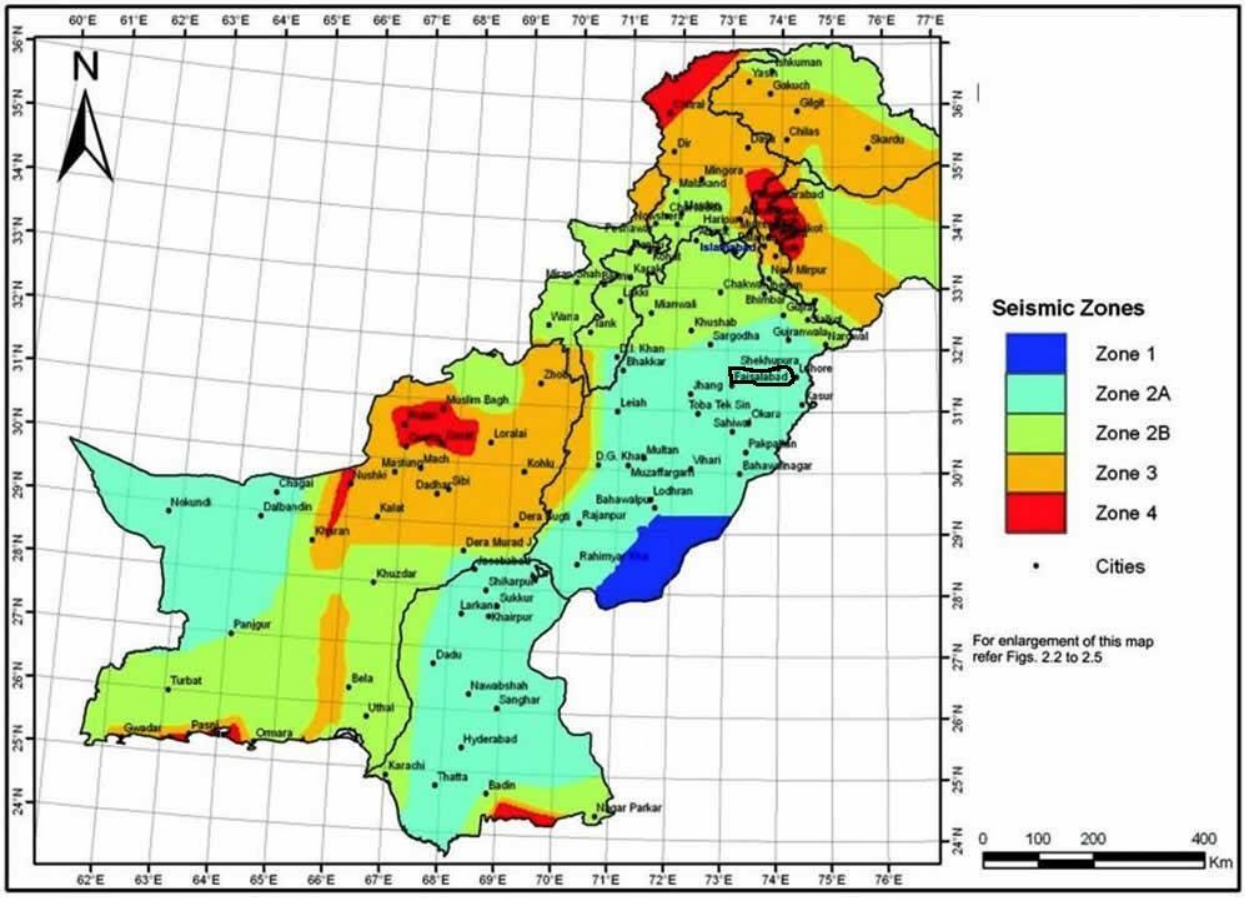


Figure 10: Seismic Zoning of the Area

Seismic Zoning Map of Pakistan showing Proposed Project site area is presented as Figure, indicating zones according to the Building Code of Pakistan - 2007. The project site falls in Seismic Zone 2A/minor to moderate damage zone according to the Seismic Zoning Map of Pakistan

4.2.4 Climate

The seasonal climatic conditions must be considered for the design and execution of the developmental projects. The climate including air, temperature, precipitation, humidity and evaporation are an influencing factor, affecting the construction of engineering structures. However, to determine the overall effect of the climatic stresses, daily and seasonal temperature changes, site altitude, direct solar radiation, and precipitation must be considered.

A) Temperature

The climate of Islamabad is a humid subtropical climate (Köppen climate classification) with four seasons: a pleasant Spring (March–April), a hot Summer (May–August), a warm dry Autumn (September—October), and a cold Winter (November—February). The hottest month is June, where average highs routinely exceed 37 °C (98.6 °F). The wettest month is July, with heavy rainfall and evening thunderstorms with the possibility of cloudburst. The coldest month is January, with temperatures variable by location. In Islamabad, temperatures vary from cold to mild, routinely dropping below zero. In the hills there is sparse snowfall. The weather ranges from a minimum of −6.0 °C (21.2 °F) in January to a maximum of 46.1 °C (115.0 °F) in June. The average low is 2 °C (35.6 °F) in January, while the average high is 38.1 °C (100.6 °F) in June. The highest temperature recorded was 46.5 °C (115.7 °F) in June, while the lowest temperature was −6.0 °C (21.2 °F) in January.[3] On 23 July 2001, Islamabad received a record breaking 620 millimetres (24 in) of rainfall in just 10 hours. It was the heaviest rainfall in Pakistan during the past 100 years.[13] Following is the weather observed over Islamabad Airport, which is actually located in Rawalpindi.

b) Rainfall

The average annual rainfall of Islamabad is 1,457 millimetres (57.4 in).Monsoon season starts by the end of June and prevails till the end of September. In 2009, Islamabad saw below normal monsoon rainfalls due to the presence of El Niño over Pakistan. It just recorded 354 millimetres (13.9 in) of rain during the Monsoon season in 2009.[17] The highest rainfall of 620 millimetres (24 in) was recorded in Islamabad

[13] *"Pakistan - Climate". countrystudies.us. Retrieved 10 May 2022*

on 23 July 2010. The record breaking rain fell in just 10 hours. It was the heaviest rainfall in Pakistan during the past 100 years. The following is the Monsoon rainfall in Islamabad since 2016 based on the data from Pakistan Meteorological Department[14].

c) Wind pattern and Solar Elevation

The predominant average hourly wind direction in Islamabad varies throughout the year.The wind is most often from the west for 2.1 months, from April 22 to June 26, with a peak percentage of 35% on June 11. The wind is most often from the south for 1.7 months, from June 26 to August 16, with a peak percentage of 44% on July 23. The wind is most often from the east for 3.5 months, from August 16 to November 30 and for 4.1 months, from December 20 to April 22, with a peak percentage of 41% on September 6.

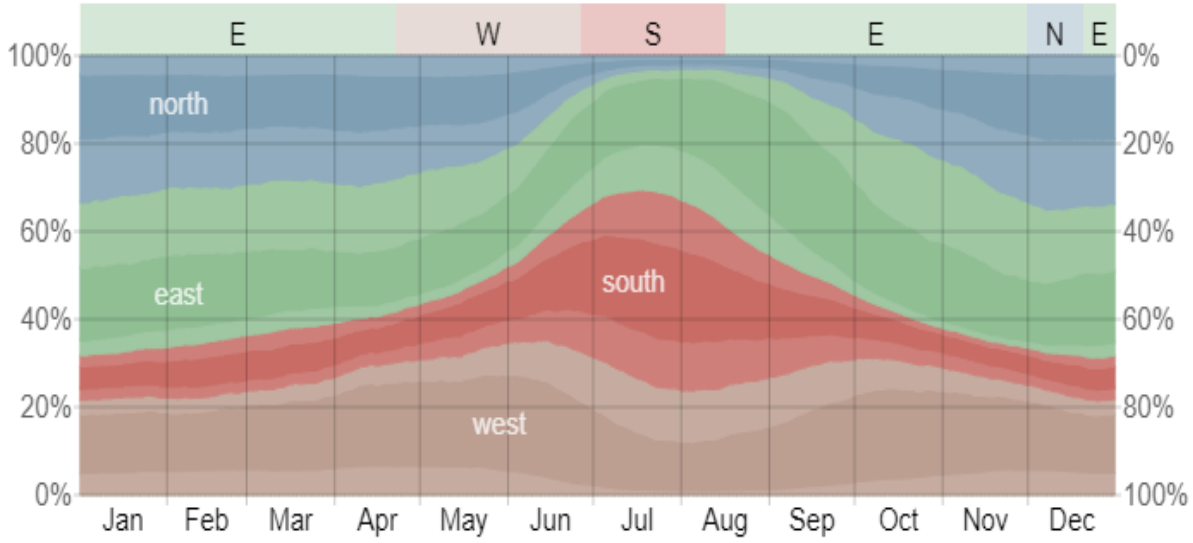


Figure 11: Wind Pattern of Islamabad City

The percentage of hours in which the mean wind direction is from each of the four cardinal wind directions, excluding hours in which the mean wind speed is less than 1.0mph.The lightly tinted areas at the boundaries are the percentage of hours spent in the implied intermediate directions (northeast, southeast, southwest, and northwest).

The Figure 12 (below) presents a compact representation of the sun's elevation (the angle of the sun above the horizon) and azimuth (its compass bearing) for every hour of every day in the reporting period. The horizontal axis is the day of the year and the vertical axis is the hour of the day. For a given day and hour of that day, the background color indicates the azimuth of the sun at that moment. The black isolines are

[14] https://web.archive.org/web/20100901073841/http://www.pakmet.com.pk/

contours of constant solar elevation[15].

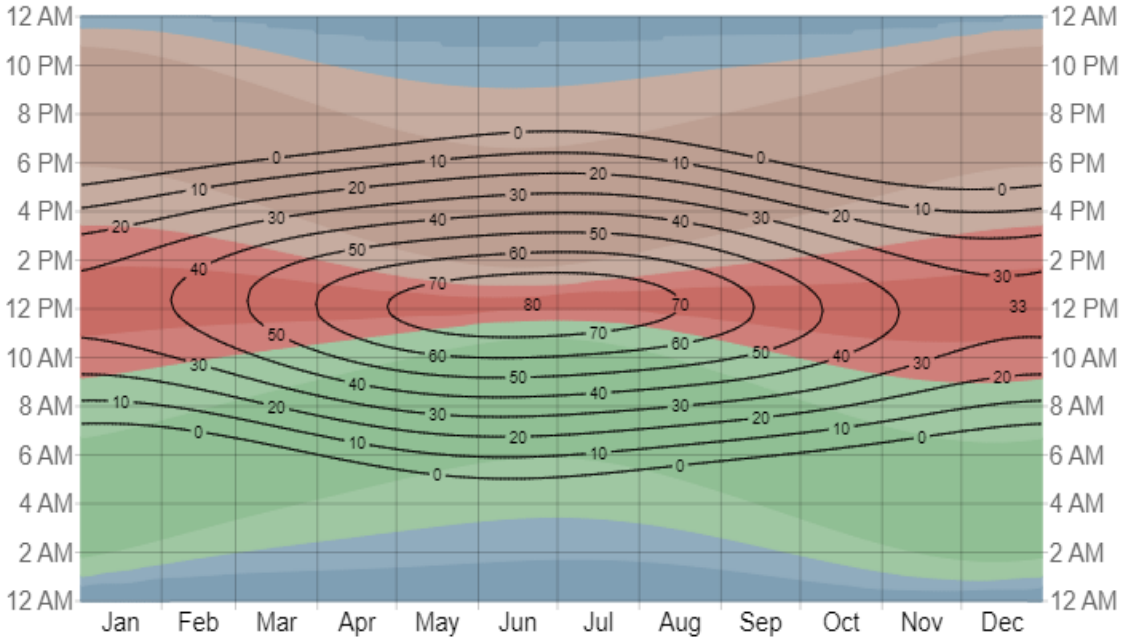


Figure 12: Compact Representation Of The Sun's Elevation Of Islamabad

The Figure 13 gives a clear picture about summer and winter winds as well as about summer and winter Sun around proposed project site.

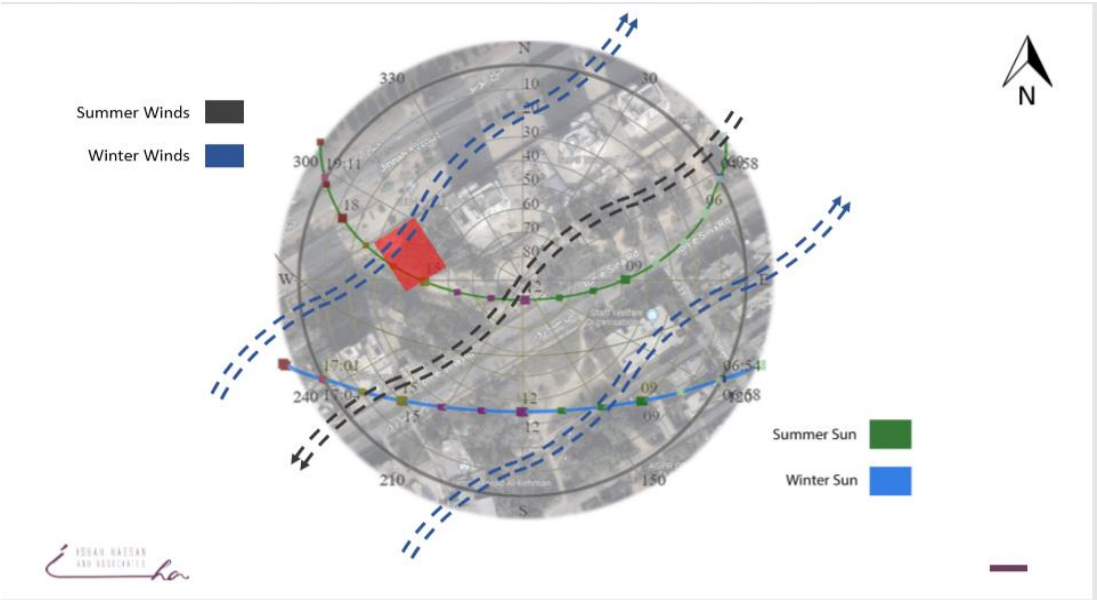


Figure 13: Summer & Winter Sun alongwith Summer & Winter Winds direction around the Proposed Project Site

[15] https://weatherspark.com/y/107761/Average-Weather-in-Islamabad-Pakistan-Year-Round#Figures-WindDirection

4.2.5 Ground Water

Groundwater resources in the Islamabad-Rawalpindi area are mainly contained in and discharged from the recent Quaternary alluvium deposits. Recharge is principally due to precipitation and supplied by nearby streams.

The amount of the available groundwater in Islamabad is not exactly known. Former reports assumed availability of 86 MGD (HESC, 2014). Capital Development Authority (CDA) is supplying the ground water of 180 tube wells to Islamabad. Private and municipal wells are also used to fulfill the water requirements. However, the amount of private wells is difficult to estimate, but NESPAK study (2007) identified 129 tube wells in Islamabad and their total daily discharge of about 63 MGD. The extraction of groundwater is also comprehended by a public bore well network which consists of about 200 bore wells.

Groundwater in Islamabad is being depleted on a gradual pace due to the unsustainable use of water, increased ground water extraction and reduced water percolation in soil due to urban expansion and increasing population. On average, groundwater is depleting at the rate of 1.7 meters per year[7].

4.2.6 Surface Water Hydrology and Drainage

Due to the location of Islamabad at the foot of the Margalla Hills on the north and the Murree and Kotli Sattian Hills on the east, the area benefits from the natural slope in terms of surface water resources. In the jurisdiction of Islamabad, the river system is composed of three major tributaries, namely; (i) Saidpur Kas, (ii) Tenawali Kas, and (iii) Bedarawali Kas. They originate from the Margalla Hills and flows into the mainstream of Nullah Lai just upstream from Kattarian Bridge, at I.J. Principal Road forming the administrative boundary between Islamabad and Rawalpindi.

Below Kattarian Bridge, in the jurisdiction of Rawalpindi, the mainstream meets other major tributaries; namely (i) Nikki Lai, (ii) Pir Wadhai Kas, and (iii) Dhok Ratta Nullah one after another, then flows down through the center of Rawalpindi City and finally pours into Soan River.

In addition to these major tributaries, there are other six (06) tributaries or drainage channels /sewerage channels, which join the mainstream between the confluences of Dhok Ratta Nullah and Soan River. The various surface water resources[8] present in and around the Islamabad jurisdictions are discussed below.

A) Soan River

Soan River rises near the small village Bun in the foothills of Patriata and Murree and drains much of the water of the Potohar region. Its water is stored in the Simly Dam. After treading a long path of 250 km, this relatively small stream falls into the Indus River near by the Kalabagh Dam close to Pirpiyahi.

B) Kurang River

Kurang River is the main stream draining the area of Islamabad. It's main tributary is Gumrah Kas which drains westward into the Kurang River from the area between Kurang and Soan River.

C) Rawal Lake or Rawal Dam

Rawal Lake is an artificial reservoir located in an isolated section of the Margalla Hills National Park. It is fed by water from Kurang River and other small streams coming from the Margalla Hills like the Jinnah Stream. Its storage capacity is about 58,600,000 m^3; the discharge capacity of its spillway is about 2,300m^3/s. It provides drinking water for the population of Islamabad and Rawalpindi. Mean annual water available is 72 MGD (million gallons per day).

D) Simly Dam

Simly dam is located on the Soan River at some 30 km east of Islamabad and fed by melting snow and natural springs of Murree Hills. It is the largest reservoir of drinking water for the population of Islamabad. The storage capacity of the dam is about 35,463,000 m^3 with a spillway of discharge capacity of 1,275 m^3 /s. Mean annual water available is 68 MGD.

E) Khanpur Dam

Khanpur Dam is located on the Haro River in the north of the Margalla Hills at about 40 km of Islamabad. Its stored water provides domestic water to Rawalpindi and Islamabad as well as irrigation water for agriculture and industries in the surroundings of these cities. The storage capacity of the dam is about 140,000,000 m^3. Mean annual water available is 198 MGD.

F) Headwork

Headwork water is diverted from springs located at Saidpur, Nurpur and Shahdara**.** The capacity of the

four headwork sources is as follows: (i) Kurang River: 4 MGD, (ii) Saidpur: 0.8 MGD, (iii) Nurpur: 0.7 MGD, and (iv) Shahdara: 1.6 MGD.

G) Nullah Lai

The Lai Nullah Basin is located between 33º 33´ and 33º 46´ North and 72º 55´ and 73º 07´ East. It has a catchment area of 234.8 Km² (161.2 Km² in Islamabad and 73.6 Km² in Rawalpindi) and a length of about 30 Km, stretching from the Margalla hills in Federal Capital City Islamabad at the Northwestern edge until Soan River at the South-eastern edge in District Rawalpindi of Punjab Province. The principal surface water sources in Lai Nullah basin come from Simly Dam on Soan River, Khanpur Dam on Haro River and Rawal Dam on Kurang River and the current land use in the Lai Nullah basin is 38.6 % of residential and 14.2 % of agricultural areas, 14.8 % of forest and the rest are grass and bare land surfaces.

The present water supply capacity in the Lai Nullah Basin area is about 785 million liters per day in total. Out of the total water supply, the service area of Capital Development Authority in federal Capital, Islamabad shares 507.33 million liters per day, while the service area of Water & Sanitation Agency (WASA) of Rawalpindi city and its Cantonment share 122.74[9] million liters per day and 155.48 million liter per day respectively.

4.2.7 Solid Waste System

Metropolitan Corporation Islamabad (MCI) is the responsible authority to ensure efficient collection, transportation, recovery, treatment and disposal of waste generation in Islamabad.

The total waste generation of Islamabad is approximately 500–600 tons per day (200,750 tons per year) [10]. Sixty percent of the waste is collected and the rest is contracted out to private contractors.

4.3 Ecological Resources

Islamabad is rich with biological and ecological resources. However, the flora and fauna of the includes; shrubs, herbs, mammals, birds, reptiles, amphibians and insects are found. They are discussed in detail below:

4.3.1 Flora

As climate of study area is subtropical, the vegetation of the area falls under subtropical broad leaved

evergreen scrub forest type as per phyto-geographical classification of the area. The tract, in which the project site exists, was once covered with native vegetation consisting of trees and thick cover of bushy vegetation. With the onslaught of civilization, this vegetation was cleared for agricultural purposes.

The present condition of the project area is almost fallen in the category of degraded and barren land. The project area is designated as residential area as per master planning so, no green developmental activities were considered in the past to improve its ecological balance in the targeted area. Limited number of trees exist in the area which are mostly near the road and considered as CDA property. The table below shows that some mature and sub-mature Eucalyptus (Eucalyptus camaldulensis), Phulai (Acacia modesta), ziziphus (Ziziphus *mauritiana*), Citrus Spp Mulberry (*Morus alba*), Shisham (*Dalbergia sissoo*), Dharek (*Melia azedarach*), Sumbal (*Bombax ceiba)* and Jaman (*Syzygium cumini*) were presently found in the Project Area and vicinity. **Table 8** shows the trees observed and recorded in the Project site.

Table 8: Names of Trees (wood and fruit) of the Project Area

Sr. No.	Common Name	Scientific Name
1	Eucalyptus	*Eucalyptus camaldulensis*
2	Dharek	*Melia azedarach*
3	Shisham	*Dalbergia sisso*
4	Mulberry	*Morus alba*
5	Ziziphus	*Ziziphus mauritiana*
6	Phulai	*Acacia modesta*
7	Jaman	*Syzygium cumini)*
8	Citrus	*Citrus Spp*
9	Paper mulberry	*Broussonetia papyrifera*
10	Mesquit-Bushy	*Prosopis glandulosa*
11	Sumbal	*Bombax ceiba*

a) Fauna/Wildlife

Different areas in Islamabad are home to various species of wildlife, including monkeys, exotic birds and carnivores such as the rare and presently Margalla common leopard, but the project area is found degraded and almost barren and not supporting any designated habitats.

Much less common are Leopards, which occasionally come down from the Murree area but usually remain high up in the hills. Villagers dwelling in the Margalla do report sighting of leopards off and on but these habitats are far away from the project site as per expert's filed observations and in consultation with Worldwide Funds for Nature (WWF).

b) Mammals

Margalla Hills is a habitat to all kinds of animals, exotic birds, monkeys, grey gorals, barking deer, jungle cats, porcupines, cape hares, Himalayan palm civets, red foxes, Asiatic jackals, white crested kalij pheasants, golden orioles, paradise flycatchers, grey shrikes, spotted doves and others.

However, there is no wild mammalian specie observed in the project area except some domesticated animals including cats, dogs, etc. However, the following **Table 9** shows the list of mammalian species present in Islamabad region, as the project area is to be considered highly degraded in terms of wild fauna.

Table 9: List of Indigenous Mammals

Sr. No.	Mammals	Scientific Name
1	Jackal	*Canis aureus*
2.	Fox	*Vulpes vulpes*
3.	Jungle Cat	*Felis chaus*
4.	Palm Squirrel	*Funambulus palmarum*
5	Mongoose	*Herpestes auropunctatus*
6	Indian mole rat	*Rattus rattus*
7	Field mouse	*Funambulus pennant*
8	Porcupine	*Hystrix indica*
9	Rabbit	*Oryctolagus cuniculus*
10	Cape hare	*Lepus capensis*
11	Masked palm civet	*Paguma larvata*
12	Wild boar	*Sus scrofa*

c) Amphibians

The amphibians that are found near or around the project area are given in the **Table 10** below.

*Table 10**: Amphibians of the Study Area***

Sr.	Local/ English Name	Scientific Name

No.		
1	Common frog	*Rana tigrine*
2	Common toad	*Bufo bufo*
3	Marble frog	*Uperodon systoma*

d) Reptiles

Islamabad region supports a good variety of reptiles. In Islamabad, the most common reptile that is worth mentioning and is occasionally witnessed by the hikers is Monitor Lizard. These are generally large reptiles, although some can be as small as 12 centimeters in length. They have long necks, powerful tails and claws, and well-developed limbs.The reptiles that are found near or around the study area are given in the **Table 11.**

Table 11: Reptiles of the Study Area

Sr. No.	Local/ English Name	Scientific Name
1	Fringed toed Lizard	*Acanthodactylus cantoris*
2	Spiny tailed Lizard	*Uromastyx hardwickii*
3	Common Krait	*Bungarus caeruleus*
4	King Cobra	*Ophiophagus Hannah*
5	Viper	*Vipera xanthina*

e) Birds – Avifauna

Many bird species have been reported in and around the study area. These include passage migrants, vagrant, resident, breeding and irregular visitors. The migratory birds descend from higher altitudes during the winter months. The common birds observed and reported in the study area are given in **Table 12** below:

*Table 12**: Birds Found in Study Area***

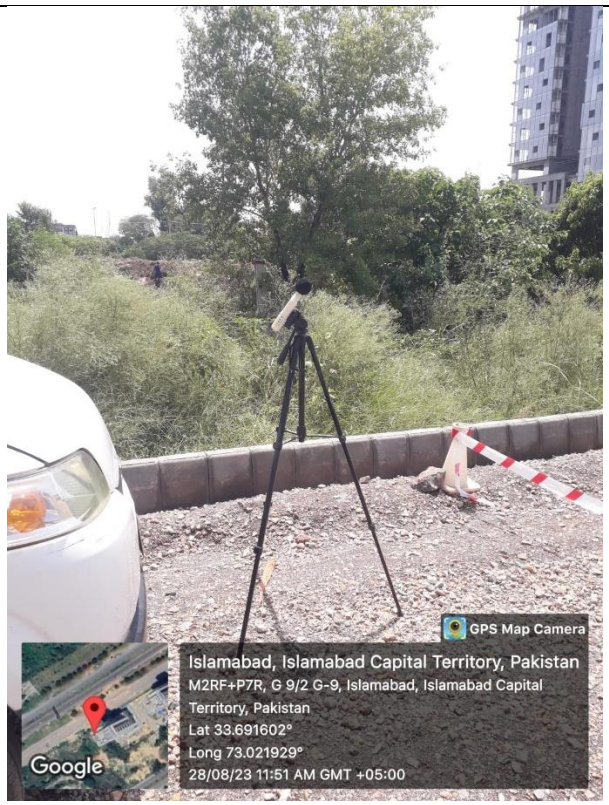
Sr. No.	Common Name	*Scientific Name*
1	Rock Pigeon	*Columba livia*
2	Myna	*Acrido therestritis*
3	Grey Partridge	*Perdix perdix*
4	House Sparrow	*Passer domesticus*
5	Red-billed chough	*Pyrrhocorax pyrrhocorax*
6	Magpie	*Pica pica*

7	Alpine Chough	*Pyrrhocorax graculus*
8	Grey shrikes	*Lanius excubitor*
9	Spotted doves	*Spilopelia chinensis*

4.4 Environmental Monitoring Through Laboratory

Laboratory analysis for environmental monitoring of proposed project area is done in order to check the baseline conditions and pollution load. In this connection **M/s Environmental Services of Pakistan (ESPAK) an EPA Certified Laboratory**, was engaged to carry out environmental monitoring of wind speed, air quality, drinking water quality, noise level and particulate matter concentration in the project area. Ecogreen has facilitated Monitoring Team to collect the ambient air samples from project site located at Jinnah Avenue, Islamabad Pictorial are given in Below Figure 14.

Ambient Air Monitoring



Noise Level

Figure 14: Pictorial of Environmental Monitoring of Project Area

Detail laboratory report of ambient air quality, ambient noise and ground water analysis results is annexed

at Annex-VIII of this EIA Report and the detail information related to the testing is given below:

4.4.1 Sampling Sites

Following localities were identified to collect samples of water, noise and air for testing according to the testing guidelines of Punjab-EPA. It also defines number of samples as well as the number of sites from where samples were collected.

Table 13: Sampling Sites Details

	Particulars	Details
1	Number of Samples	Three (03)
2	Kind of Monitoring	Ambient Noise, Ambient Air and Ground Water
3	Sampling Sites	One (01)

4.4.2 Ambient Air Quality

The primary source of air pollution at the project sites is the vehicular emissions and the key pollutants likely to be found at project proposed locations are Carbon Monoxide (CO), Oxides of Nitrogen (NOx), Sulphur Dioxide (SOx), and Particulate Matter (PM). In order to determine the air quality of the area, Laboratory had the requisite air sampling device and expertise for collection of samples. Ambient air quality of the project area was monitored for 24hs within the project area and results of the monitoring are given below:

Table 12: Ambient Air Quality

S. No	Parameters	Limit Values (NEQS-24 Hours)	Concentration	Method/ Equipment Used	Remarks
1.	**Carbon Monoxide (CO)**	5 mg/m^3 (8 hours)	1.9 mg/m^3	Non Dispersive Infrared Absorption (NDIR)	Within Prescribed Limits
2.	**Sulfur Dioxide (SO_2)**	120 µg/m^3	12.4 µg/m^3	UV Fluorescence (UVF)	Within Prescribed Limits
3.	**Ozone (O_3)**	130 µg/m^3 (1 hour)	32.3 µg/m^3	Non Dispersive UV Absorption	Within Prescribed Limits
4.	**Oxides of Nitrogen as NO**	40 µg/m^3	15.9 µg/m^3	Chemiluminescence Detection	Within Prescribed Limits

5.	**Oxides of Nitrogen as NO_2**	80 µg/m^3	26.9 µg/m^3	Chemiluminescence Detection	Within Prescribed Limits
6.	**Particulate Matter $PM_{2.5}$**	35 µg/m^3	41.2 µg/m^3	Particulate Sensor	Exceeding Prescribed Limits
7.	**Particulate Matter PM_{10}**	150 µg/m^3	189 µg/m^3	Particulate Sensor	Exceeding Prescribed Limits
8.	**Suspended Particulate Matter (SPM)**	500 µg/m^3	527 µg/m^3	Particulate Sensor	Exceeding Prescribed Limits

4.4.3 Noise

Noise level of the project area was monitored at project site using digital sound meter and results of the same are given below:

Table 14: Noise Level Monitoring

Measurement Point	Limit values (NEQS)	Noise level in dB(A) Leq	Remarks
In Front of the Site (GPS: 33°41´29.68"N, 73°1´18.66"E)- Day Time	65 dB(A)	79 dB(A)	Exceeding Prescribed Limits
In Front of the Site (GPS: 33°41´29.68"N, 73°1´18.66"E)- Night Time	55 dB(A)	68 dB(A)	Exceeding Prescribed Limits

The above results show that the average noise values at all locations are exceeding the NEQS limits due to traffic/ vehicular movement, commercial activities, generators etc.

4.4.4 Water Resource

The main source of the water consumption is the ground water which is being pumped by CDA from 200-520 ft and its being used in the study area for domestic purposes. To check the quality of the water in the area, ground water was collected and analyzed. The ground water was collected from bore hole adjacent to the project area. The detail of the water quality of the project area is given below:

Table 14: Water Quality Results

Sr. #	Parameters	Limit Values (PEQS)	Concentrations	Method Used	Remarks

1.	**Total Coliform**	---	11 CFU/100ML	SMWW 9221 B	---
2.	**Fecal Coliform Bacteria**	Must not be detectable in any 100mLsample	Detected	SMWW 9221 F	Exceeding Limits
3.	**E.Coli**	Must not be detectable in any 100mLsample	ND	SMWW 9221 F	Within Limits
4.	**Color**	≤15 TCU	ND	SMWW 2120 C	Within Limits
5.	**Taste**	Non Objectionable/ Acceptable	Acceptable	Organoleptic	Within Limits
6.	**Odor**	Non Objectionable/ Acceptable	Acceptable	Organoleptic	Within Limits
7.	**Turbidity**	5 NTU	ND	SMWW 2130 B	Within Limits
8.	**Total Hardness as $CaCO_3$**	<500 mg/L	412 mg/L	SMWW 2340 C	Within Limits
9.	**Total Dissolved Solids (TDS)**	<1000 mg/L	513 mg/L	SMWW 2540C	Within Limits
10.	**pH**	6.5-8.5	7.1	SMWW 4500H^+B	Within Limits
11.	**Chloride (as Cl-)**	<250 mg/L	20 mg/L	SMWW 4500 Cl^- B	Within Limits
12.	**Cyanide (CN^-)**	≤0.05 mg/L	ND	SMWW 4500 CN^- F	Within Limits
13.	**Nitrate (NO_3^-)**	≤50mg/L	19 mg/L	SMWW 4500NO_3^- B	Within Limits
14.	**Nitrite (NO_2^-)**	≤3mg/l	ND	SMWW 4500NO_2^- B	Within Limits
15.	**Residual Chlorine**	0.2-0.5 mg/L	ND	SMWW 4500-Cl B	----
16.	**Phenolic Compounds (As Phenols)**	NGVS	ND	SMWW 5530 C	----

17.	**Aluminum(Al)**	≤0.2 mg/L	ND	U.S. EPA-200.7	Within Limits
18.	**Chromium(Cr)**	≤0.05 mg/L	ND	U.S. EPA-200.7	Within Limits
19.	**Copper (Cu)**	2.0mg/L	ND	U.S. EPA-200.7	Within Limits
20.	**Antimony (Sb)**	≤0.005 mg/L	ND	U.S. EPA-200.7	Within Limits
21.	**Fluoride (F-)**	≤1.5 mg/L	0.5 mg/L	U.S. EPA 9214	Within Limits
22.	**Lead(Pb)**	≤0.05 mg/L	ND	U.S. EPA-200.7	Within Limits
23.	**Manganese (Mn)**	≤0.5 mg/L	ND	U.S. EPA-200.7	Within Limits
24.	**Mercury(Hg)**	≤0.001 mg/L	ND	U.S. EPA-200.7	Within Limits
25.	**Nickel(Ni)**	≤0.02 mg/L	ND	U.S. EPA-200.7	Within Limits
26.	**Arsenic (As)**	≤0.05 mg/L	ND	U.S. EPA-200.7	Within Limits
27.	**Barium (Ba)**	0.7 mg/L	0.1 mg/L	U.S. EPA-200.7	Within Limits
28.	**Selenium (Se)**	0.01mg/L	ND	U.S. EPA-200.7	Within Limits
29.	**Boron (B)**	0.3 mg/L	ND	U.S. EPA-200.7	Within Limits
30.	**Zinc (Zn)**	5.0 mg/L	ND	U.S. EPA-200.7	Within Limits
31.	**Cadmium(Cd)**	0.01 mg/L	ND	U.S. EPA-200.7	Within Limits

4.5 Socio-Economic Resources

This section provides collective information about the existing socio-economic and environmental condition of the project area within the Area of Influence (AOI). The different types of socio-economic aspects were covered such as demographic profile, occupation, education and health facilities. This data helped in identifying major interventions for the development of Environmental Management Plan (EMP). The study also helped to assess the positive or adverse impacts on local community.

4.5.1 Human and Economic Development

a) Human Development

i. Population Composition and Demographics of the Project Area

According to the results of 2017 census report, the total population of Pakistan is estimated as 207,774,520 persons with annual growth rate of 2.40% and the total population of Islamabad District is 2,006,572, with urban population of 1,014,825 which is around 50.58% of the total population. The average annual growth rate of population in the district during this period was 4.91 percent. The total area of district is 906 kilometers which gives population density of 1,165 persons per square kilometers The total population of Islamabad Capital Territory (ICT) was 8,05,235 as enumerated in March, 1998 with an intercensal percentage of 136.8 since March, 1981 when it was 3,40,286 souls. The average growth rate was 5.19 percent, which gives population density of 889 persons per square kilometers as against 375 persons observed in 1981 indicating a very fast growth rate of ICT.

ii. Rural and Urban Distributions

According to the census 2017, the urban population is 1,014,825 which is around 50.58% of the total population with an annual growth rate 3.48. The rural population is 991,747 which is around 49.42% of the total population of Islamabad with an annual growth rate 6.95. The urban population was 529,180 or 65.7 per cent of the total population of the district which grew at an average rate of 5.7 per cent during 1981-98 which had decreased from 12.3 per cent observed during 1972-81. There is no Municipal Corporation/Committee, Cantonment, Town Committee etc. except Capital Development Authority (CDA) created for development of the capital city.There were 132 Mauzas (a smallest revenue unit) in 1998, of which 14 had population over five thousand, 23 had two to five thousand, 30 had one to two thousand, 37 had under one thousand but more than two hundred persons and 12 were un-inhabited.

iii. Religion

The population of district is predominantly Muslims i.e. 95.5 percent. The next higher percentage is of Christians with 4.1 percent, followed by Ahmadis as 3 percent. While other minorities like Hindus (jati), scheduled castes etc. are very small in number. The proportion of Muslims is higher in rural areas (98.8 per cent), as compared to their counterparts in urban area (93.8 per cent). Christians are mostly living in urban areas representing 5.7 per cent as compared to just 0.9 per cent in rural areas. Similarly, Ahmadis are more in urban area as compared to their proportion in rural areas.

iv. Ethnic Structure

For the study of ethnography Islamabad can be divided into two parts i.e. urban and rural. In Islamabad

City people belonging to almost all possible races and tribes of Pakistan are living. Regarding people living in rural area, they are mostly Rajput. The important sub-divisions are Bhatti, Rawal, Janjua and Chohan. Besides, Gujjar, Awan, Mughal, Qureshi, Syed and Satti are also living there. Some of the other minor tribes are the Jat, Malyar and Pathan and some Khattar.

v. Mother Tongue

The mother tongue refers to the language used for communication between parents and their children in any household. Pothohari is the predominantly language being spoken in Islamabad Capital Territory, representing 71.6 per cent of population followed by Urdu spoken by 10.1 per cent, Pushto 9.5 per cent and Siraiki1.1 per cent while others speak Sindhi Balochi, Bravi, Dari etc. The proportions of people speaking Urdu, Sindhi, Pushto, Siraiki and other languages except Punjabi are more in urban area than in rural areas.

vi. Sex Ratio

Sex ratio, i.e. proportion of males for every 100 females, according to the census of 2017 the sex ratio is 111.04, that is 108.41 in rural and 113.68 in urban area which was 117 per cent recorded in 1998 Census which had decreased from 119 in 1981. The ratio was 118 per cent in rural area and 122 in urban area.

vii. Migration

The total number of life time in-migrants in Islamabad Capital Territory was 3, 97,731 or 9.4 per cent of population of the district. Of total life time in-migrants 312,640 persons were settled in capital city. Of total district migrants 88.1 per cent came from Punjab, Sindh, Baluchistan and KPK, 6.6 per cent from Azad Kashmir and Northern areas while remaining 5.4 per cent Pakistani repatriated from other countries. There is no single case of migrant whose birth place is not reported.

b) Economic Development

i. Economically Active Population

The economically active population is defined here as the persons working, most of the time during the year preceding the census date i.e. 5th March, 1998, looking for work, laid off and un-paid family helpers assisting their family. The economically active population as enumerated in the last census was 23.0 per cent of the total population or 30.7 percent of the population 10 years and over i.e., the population exposed

to the risk of entering the economically active life at any time. Of the total male population 39.5 per cent were economically active, while 77 per cent not economically active, 25 per cent children under 10 years, 13 per cent students, 33 per cent domestic workers while 6 per cent were land lords, property owners, retired persons, disabled etc. the participation rate is higher in the urban area as compared to people living in rural area.

ii. Unemployment

Unemployment rate is measured as ratio of looking for work and laid off in total employed population comprising those looking for work, laid off and un-paid family helpers, generally representing in percentage. The unemployment rate in Islamabad Capital Territory was 15.7 per cent which was mainly due to unemployment among male representing 16.8 per cent. Female employment rate was just 1.7 per cent. This is because of their small proportion in their total proportion. The unemployment rate was almost three times higher in rural as compared to urban areas representing 28.7 and 10.1 per cent respectively.

iii. Occupations

Majority of the population of the project area is working in different government departments such as Agricultural department, Passport office, Higher Education Commission office, etc. as well as private offices like Banks, mobile offices, some people are also running their own small level businesses like hotels & restaurants, medical stores, health clinics, departmental stores, etc.

3.5.1 Industrial and Commercial Development

In order to meet local requirement, C.D.A., has allotted 450 industrial plots in I-9, I-10 Sectors of Islamabad and Kahuta Triangle. The city has 11 main markets in addition to Industrial and Trade Centre as well as Blue area. Fecto Cement Factory is also situated near the Margallah Hills and 9 stone crusher units are also functioning within the limits of Islamabad.

4.5.3 Infrastructure

a) Communication

The road network in the urban area of Islamabad is designed to provide an effective transportation system to serve of all sectors of city. It consists of various specifications, such as highways, main roads and service roads. Islamabad is linked to the NWD /STD systems and gate-way exchange system for rapid and quick

internal as well as external communication. Tourism complex (project area) is located around the well-connected road network of the **Islamabad City.**

b) Railways

Islamabad has also been linked by railway line at Margalah, situated between Sector I-9 and H-9.

c) Airport

Islamabad has an international airport with good domestic and international connections. It is directly linked with Middle East, Europe and China.

4.5.4 Institutions

a) Education

Islamabad has three public universities Quaid–e-Azam University, Allama Iqbal Open University and International Islamic University. There are two campuses of Hamdarad University, Karachi, Sindh and Al-Khair University Muzaffarabad, AJK.

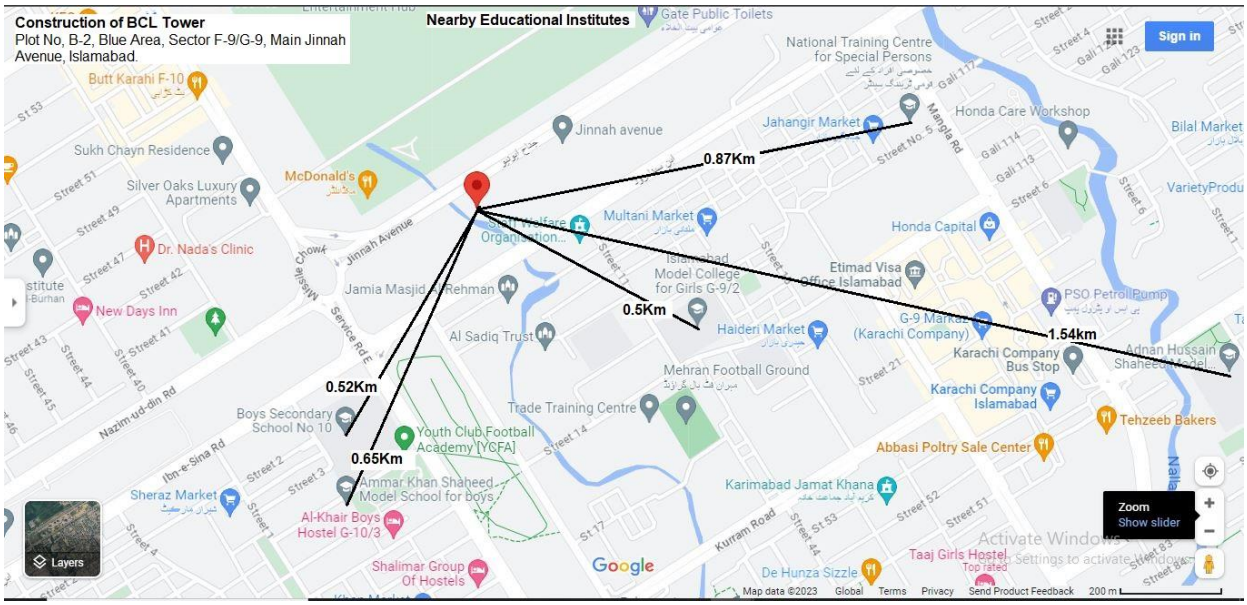


Figure 15: Nearby Educational Institutes

b) Health

The major health facilities available in the District are Federal Government Services Hospital, Capital Hospital, Pakistan Institute of Medical Sciences (PIMS), Children Hospital, National Institute of Health and Shifa International Hospital. Besides, 35 (ICT) Dispensaries, Maternal Child Hospital (MCH), 03

Rural Health Centers and 13 Basic Health Units in rural area are functioning day and night. The health network of ICT seems to be satisfactory as compared with other areas of the country. Likewise, PIMS hospital and basic level private health facilities are also available in the communities around the project area.

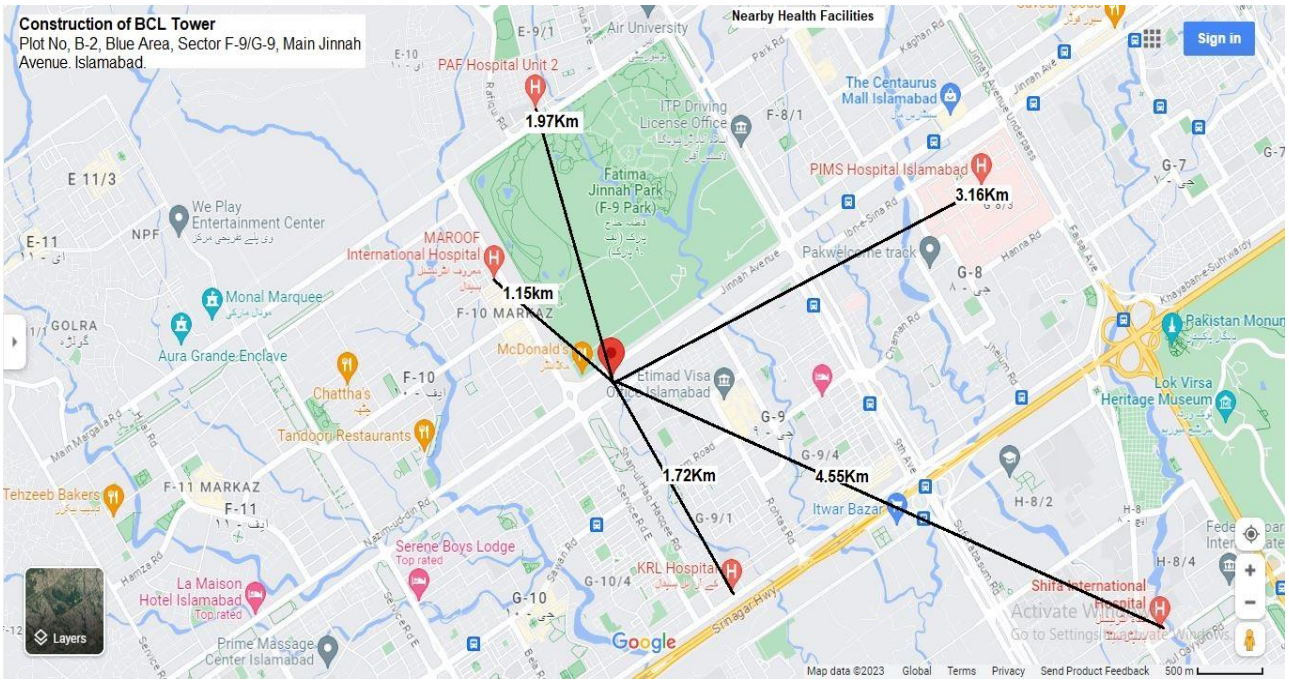


Figure 16: Nearby Hospitals/ Health Facilities

4.5.5 Socio- Economic Values

As mentioned earlier, Punjabi is the predominant language being spoken in the Islamabad Capital Territory (ICT). The population of the ICT is predominantly Muslims. The next higher percentage is of Christians and Ahmadis. The family system common is joint family system in which parents and children live with other combination of family members. The staple food of the people is wheat and rice. The people usually take meal thrice a day. Cultivation is the main occupation of the people. The majority of people of ICT are working in different government departments as well as private offices as their occupation. Female are also engaged in the government/ private sector for their job purpose. The main castes of the people are Bhatti, Rawal, Janjua and Chohan. Besides, Gujjar, Awan, Mughal, Qureshi, Syed and Satti are also living there. Some of the other minor tribes are the Jat, Malyar and Pathan and some Khattar.

4.5.6 Public Health

Access to safe drinking water and insufficient fulfillment of nutritional requirements has a significant influence on the health status of the population. Mostly people use government supply/tap water for drinking purpose. Drinking water is not good and its quality is unsatisfactory. People use filtration plants or boiled water for the dinking purpose. Most common diseases are hyper tension, sugar, allergy and skin diseases etc.[16] The sewerage system and solid waste management is being looked after by the Metropolitan Corporation Islamabad (MCI).

4.5.7 Recreational, Archeological and Historical Resources

The recreational place near the project area is the sector parks. Pakistan Monument elevation makes the monument visible from across the Islamabad and is popular tourist destination and adjoining the monument is the Pakistan Monument Museum. In addition, the other places of interest include the Margallah Hills National Park, Damn-e-Koh, Saidpur Village, Supreme Court of Pakistan, parliament House, Jinnah Sports Stadium, Saudi Pak Tower Building etc.

4.5.8 Mosques and Shrines

There is beautiful Shah Faisal Mosque and it was designed by a renowned Turkish Architect, Vedat Dalokay and named after late King Faisal of Saudi Arabia.In Sector E-11 of Islamabad, the shrine of Syed Mehar Ali Shah of Golra Sharif is located. Devotees assemble here on the occasion of annual Urs. Another famous shrine is Shah Abdul Latif Kazmiis, popularly known as Bari Imam. The death anniversary (Urs) of Bari Imam is observed in the first week of May beginning Monday through Thursday with lot of festivities representing the Potohar culture and attracts people from all over the country.

[16] **District Census Report of Islamabad, 1998**

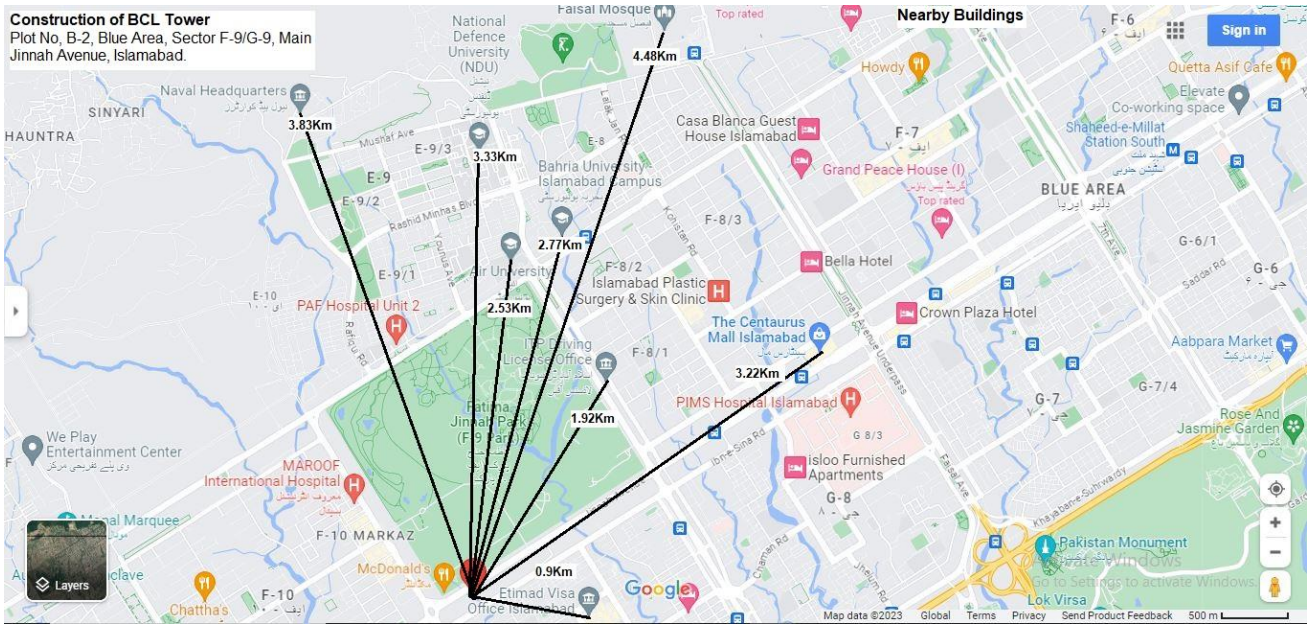


Figure 17: Nearby Buildings of Project Area

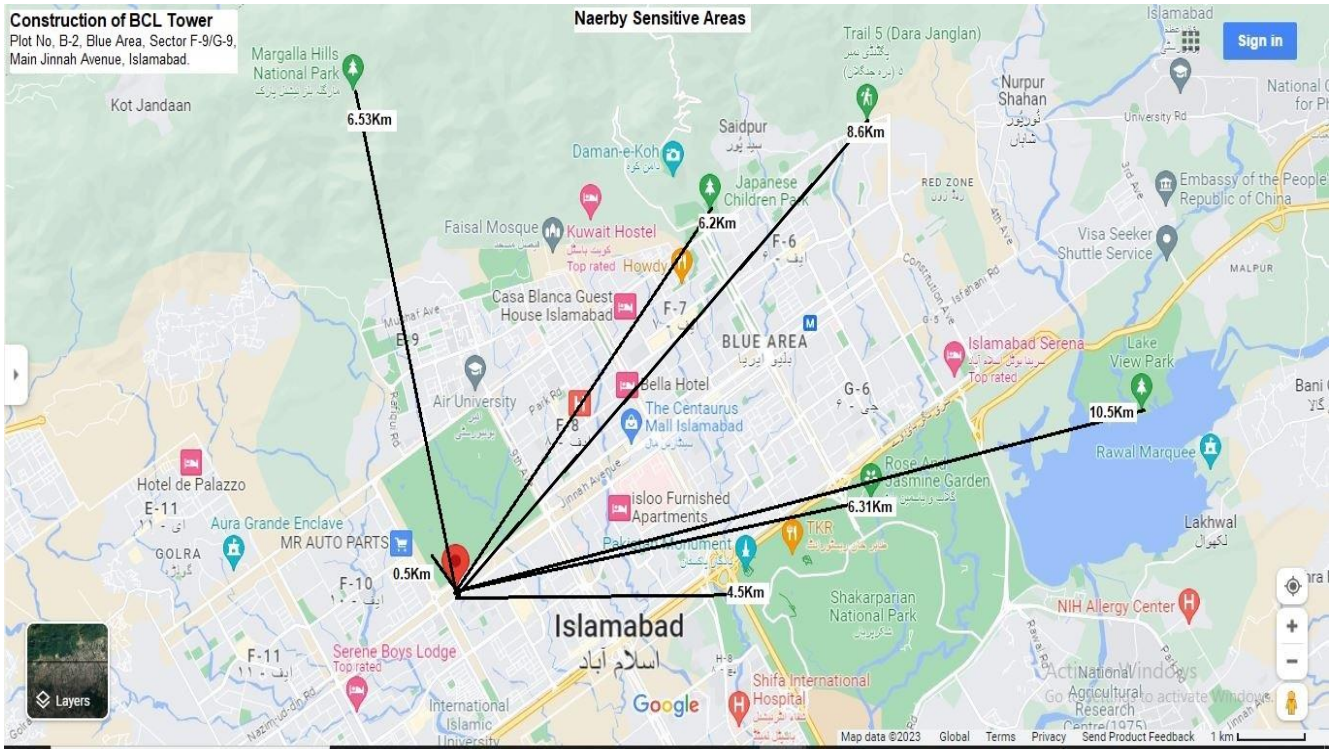


Figure 18: Nearest Sensitive Receptors

4.5.9 Socio-economic baseline Survey of the Project Area

The information regarding socio-economic base line is derived from primary data collection. A social survey was carried out in the project area so as to determine the socio-economic condition prevailing in

the project area, and to assess the impacts and their magnitudes on the affected population. A sample of 60 respondents was taken on the basis of simple random sampling technique, which included residents, shop keepers, pedestrians, drivers, govt employees and students etc.

4.5.10 Residential Areas

As the project site is located in commercial zone, however, residential are located around project site. Following residential areas are located near proposed project site as shown in Figure-14**.**

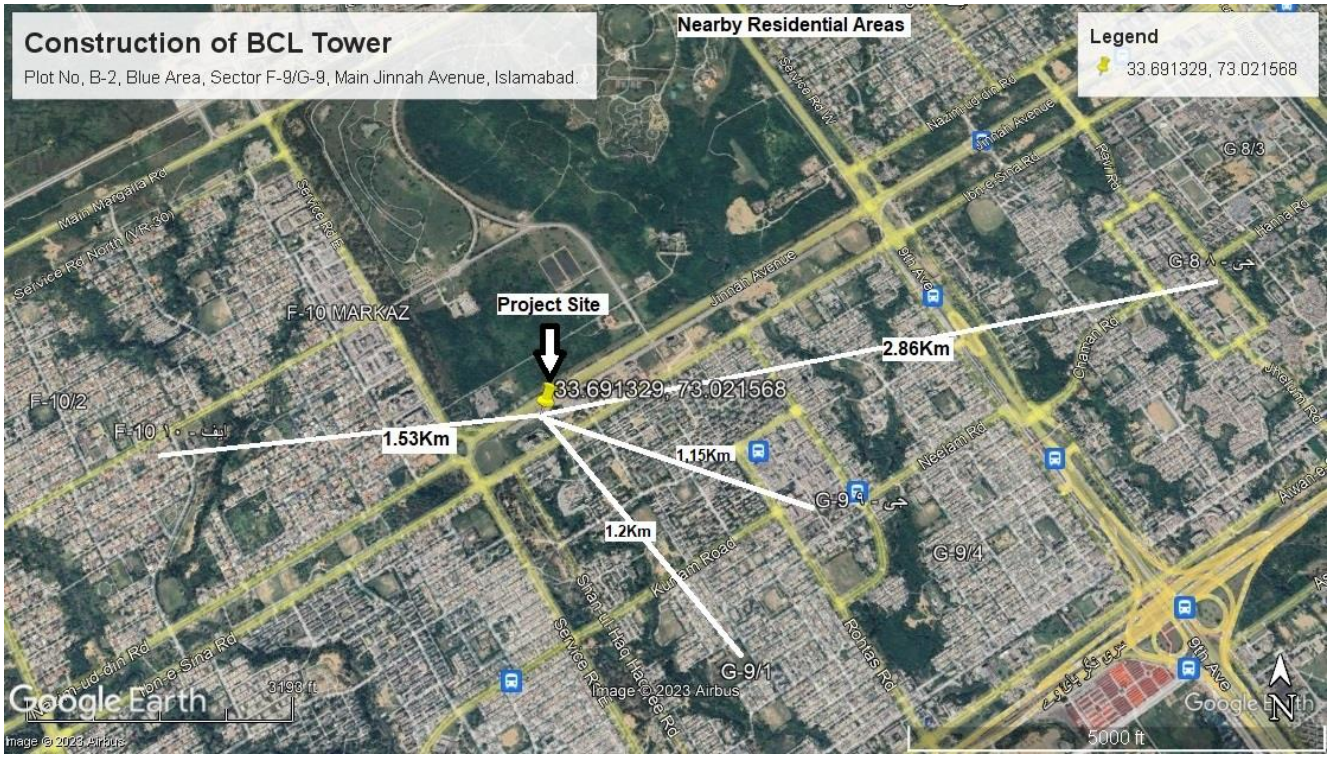


Figure 19: Nearby Residential Areas

4.6 Quality of Life Values

Socio-Economic Questionnaire and Environmental Checklist were used as survey tools by the Ecogreen survey team to collect desired information. Graphical representation of results of Socio-Economic Survey is given below:

4.6.1 Occupation of Respondents

Majority of the respondents (38%) attached with job, 27% belongs to the business, 15% are labour, 13% daily wagers, 7% shopkeepers. During survey, efforts were made to interact with people representing all walks of life.

4.6.2 Personal Income

It is clear that majority of the respondents 27% fall in the income group of above 50,000, 16% belong to income group of 20,001 to 30,000 and 15% of the respondents were earning their monthly income between Rs.30, 001 to 40,000. 22% respondents were earning 40,001-50000 and 12% were those whose income level was less than 20,000 and 08% give no response in this regard. Figure 4.20 depicts the income groups of various respondents in the form of Pie chart.

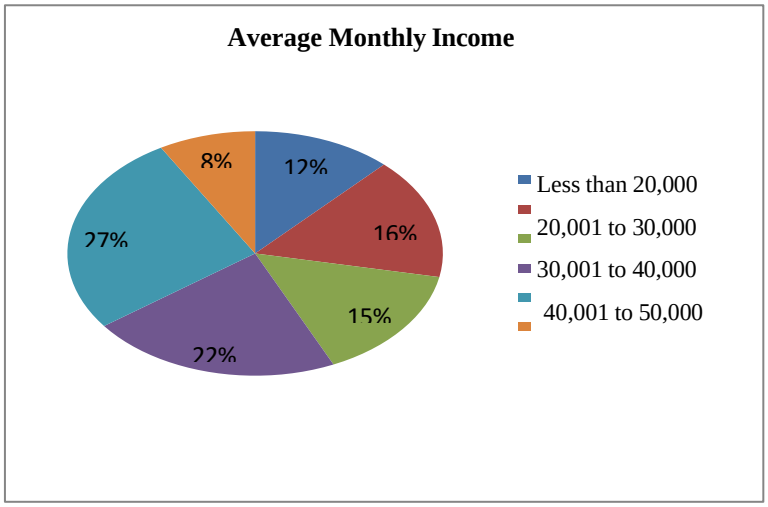


Figure 20: Personal Income

4.6.3 Literacy Rate

From survey results, it was found that 56% of the studied population was illiterate, 43% studied up to middle level and only 7% of the respondents studied up to higher secondary level.

4.6.4 Common Diseases

According to the survey the common diseases recorded in the project area were, Diabetes, Fever, Hepatitis, Hypertension, stomach problems, Malaria, Typhoid, Nephritis and Diarrhea.

4.6.5 Response of People about Project

During the survey, 55% respondents were not in favor of the construction of the propose project due to loss of their property, destroy environmental condition and business while 45% respondents were in the favor of the construction of the proposed project keeping in view of its importance.

Table 15: Acceptability of the Proposed Project

Implementation of the proposed project

Sr. No.	Response	Number	Percentage
1	Yes	27	45
2	No	33	55
Total		**60**	**100**

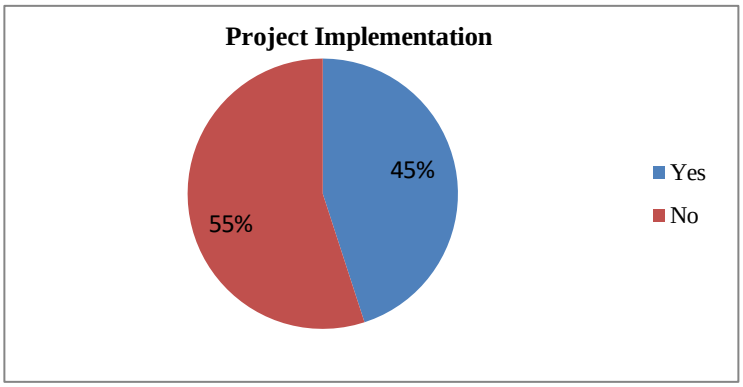


Figure 21: Perceived Frequency of Project Acceptability by Respondents

4.7 LAB REPORTS OF ENVIRONMENTAL ANALYSIS

Testing of different parameters was done from a certified laboratory to check the quality of different environmental parameters. The copy of the lab reports of these parameters (ambient air analysis, water quality analysis) is given in Annex VII.

CHAPTER 5: STAKEHOLDER CONSULTATION

5.1 GENERAL

Stakeholder's consultancy refers to a process through which the public/stakeholders can influence decisions and share control over development proposals which may affect them. In a participation exercise, the shared analysis, agenda setting and decision making are normally reached through consensus on the main issues between the public and the proponent. The PEPA 1997 (Amended 2012) makes the participation of the local communities mandatory in the planning and design of a development project. United Nations Conference on Environment and Development (UNCED) in 1992 endorsed the process of stakeholders' participation and consultation as one of the key documents of the Conference-Agenda 21. It is obligatory not only to satisfy the legal requirements of the EIA process in Pakistan but also to improve and enhance the social and environmental design of the Project.

5.2 OBJECTIVE OF THE STAKEHOLDER CONSULTATION

The aims and objectives of public involvement and consultation of this project include:

- To provide information related to Project activities to stakeholders.
- Allowing the public to express their views on the scope and content of EIA (and the proposed development action).
- Obtaining local and traditional knowledge (corrective and creative) before decision-making.
- To seek for the participation of all interested parties and to identify stakeholders' interests and issues.
- Ensuring that important impacts are not overlooked.
- Reducing conflict through the early identification of contentious issues.
- Influencing project design in a positive manner.

5.3 METHODOLGY

The methodology adopted for the purpose of socio-economic and heath assessment was based on general observation, interviews, questionnaires and recording of various parameters for the baseline information. Stakeholders were selected randomly for this process. Secondary data includes mode of transportation, education level and facilities, health facilities, water and sanitation facilities etc. Views of the people about the proposed project were collected by interviewing them using a semi structured questionnaire.

5.4 CLASSIFICATION OF STAKEHOLDERS

Primary stakeholders were consulted during informal and formal meetings held in the project area. The consultation process was carried out in Urdu and native language. During these meetings, a simple, non-technical, description of the project was given, with the overview of the project's likely human and environmental impacts. This was followed by an open discussion allowing participants to voice their concerns and opinion. In addition to providing communities with information on the project, their feedback was documented during the primary stakeholder consultation. The issues and the suggestions raised were recorded in field notes for analysis and interpretation.

By reaching out a wider segment of population and using various communication tools such as participatory needs assessment, community consultation meetings, focus group discussions, in-depth interviews and participatory rural appraisal. EIA involved the community in important decision making. This process will continue even after the EIA has been submitted, as well as during future EIAs in which similar tools will be used to create consensus among the stakeholders on specific environmental and social issues in context of the project**.**

Secondary stakeholder consultations were more formal as they involved government representatives and local welfare organization, NGOs consulted during face-to-face meetings and through telephonic conversations. They were briefed in the EIA process about the potential negative and positive impacts of the project on the area's environment and communities.

It is important not to raise community expectation unnecessarily or unrealistically during the stakeholder consultation meetings in order to avoid undue conflicts with tribal leaders or local administrators. The issues recorded in the consultation were examined, validated, and addressed in EIA report.

5.5 STAKEHOLDER CONSULTATION TECHNIQUES

In recognition of diversity of views within any community, it is very important to obtain a clear understanding of the different stakeholders' views and concerns regarding the project and to analyze their capacity and willingness to be involved in some or all of the project and its planning process. It is important to be aware of how different power relations can distort the participation. It is also important to know that how community skills, resources and knowledge can be applied to improve the project implementation.

All of this can be achieved by careful use of various tools of stakeholder consultation. Therefore, the following participatory techniques were employed during stakeholders' consultation:

- Informal meeting with the communities in neighborhood areas; men and elders attended these meetings.
- Focus group with women participants in surrounding areas.

5.6 STAKEHOLDERS CONSULTED

In consultation process for EIA, the following stakeholders were consulted.

- Local communities, men, women and elders attended the meetings
- Local Government representatives

5.6.1 Consultation with Government Official

Following officers of government departments were consulted by the socio-environmental team of the consultants and concerned details about the project were noted down through personal interviews, group meetings, etc., in their offices, for instance.

5.6.2 Consultation with Local Community

The local people of the project area consulted and their views were recorded in form of survey forms and presented in table below:

Table 16: Stakeholder Consultation with Government Official and Local Community

Sr.#	Name of Respondent	Designation and Meeting Date and Time	Remarks/Concerns
	GOVERNMENT OFFICIAL		
1.	**Mr. Chaudhary Akhtar Rasool**	**Director Environment CDA** **28-08-2023 at 3:10pm**	Overall proposed design of building seems to be compliant of basic environmental standards. The open spaces around the proposed building has been planned to be green buffers with indigenous tresses and grass. Proper system of solid waste disposal of solid waste has to been designed to ensure healthy environment the proposed design will also cater though proper sight and air circulation to enable an ambient environment.

2.	**Mr. Aashiq Nawaz**	**Director** **Pak- EPA** **16-10-2023 at 11:30am**	Project should be implemented in environment friendly manner, take all the mitigation measures to reduce the adverse impacts
3.	**Mr. Khalid Chadhar**	**Deputy Director** **Pak- EPA** **16-10-2023 at 12:30am**	During construction phase, ambient air quality should be monitored. Camping site are rehabilitated after completion of construction.
3.	**Mr. Syed Asghar Zaidi**	**Deputy Secretary** **Ministry of Climate Change** **16-10-2023 at 1:20pm**	Impact of building construction should be mitigate by proper handling of construction material, Plantation done to reduce the air pollution problems.
	LOCAL PEOPLE		
i.	**Muhammad Waseem**	0304-60256269	During the survey in the study area following concerns of the local community were noted: ➢ Health of the workers should be ensured during construction. ➢ Plantation should be carried out at extensive scale. ➢ Proper disposal of solid waste should be practiced. ➢ Indigenous trees should be planted after construction. ➢ The area will become further Commercialized /inhabited which is the need of the hour. ➢ Solid waste like cardboards should be reused. ➢ Workers must be instructed to wear PPEs. ➢ Cleanliness of the area should be ensured.
ii.	**Sheraz Yousaf**	34603-7173067-7	
iii.	**Ghulam Saeed**	0333-5125031	
iv.	**Rafakat Hussain**	0345-7465007	
v.	**Muhammad Shareef**	0341-9239000	
vi.	**Syed Shahzaib Ali**	0300-7646512	
vii.	**Baaz Muhammad**	32304-4557326-1	
viii.	**Noor Muhammad**	37203-5848841-1	
ix.	**Syed Anwar-ul-Hassan**	82203-0286874-3	

5.7 STAKEHOLDER CONCERNS AND RECOMMENDATIONS

The finding of the community consultation has been addressed in various sections of EIA. Mitigation plan has been incorporated into EMP. The summary of consultation with various stakeholders is given below:

5.7.1 Project Approval

The community consultations demonstrated that goodwill towards the project proponent indeed exists. Approval for project activities by communities was evident. The consultations were considered a good gesture and were appreciated; especially by men and women. The poverty level is such that communities are looking forward to any project proponent to improve their financial well-being to a great extent. Benefit from the project should be distributed judiciously and equitably among the primary stakeholders in the project area, and the proponent will continue to ensure that this principle is followed in this project and community development program.

5.7.2 Local Employment

Communities in the project area emphasized that local inhabitants should be given priority when employing people for related works and activities according to their skills.

5.7.3 Compensation

Compensation shall be paid for any damage if it is there. The compensation process should be transparent.

5.7.4 Interaction with Local Community

Non-local work force coming in the project area who will not be aware of the local customs and norms and may result in conflicts with the local community; keeping in mind the sensitive law and order situation and culture of area.

5.7.5 Resettlement/ Relocation

The proposed site is located within industrial area and the land is owned by proponent. No human population resides within project area. No structure of any significance (cultural, religious, archaeological, recreational or any other) stands on the land selected for the project. No flora or fauna; especially belonging to endangered species is found within a safe distance from the site which is to be removed or moved to some other part. Hence, no relocation and resettlement is required. Socio-economic survey forms are attached as Annex-VIII with EIA report.

5.7.6 Project Response

Respondents were in favor of the proposed project as it will raise the employment opportunities for the skilled and unskilled labor. 98% favored the construction of the project keeping in view its importance.

Figure 22: Stake holder Consultation with Local People

CHAPTER 6: ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.1 GENERAL

This section presents the overall impacts (either beneficial or adverse) of pre- construction/design, construction and operation phases of the proposed project on the physical, ecological and socio-economic environment of the study area. In addition, it also covers the mitigation measures of the potential adverse environmental and social impacts.

Impacts of the proposed project were identified on the basis of site visit, detailed review and analysis of secondary data available for all environmental parameters in project area, site surveys and expert opinion son prevailing site conditions and sensitive receptors.

6.2 METHOD FOR EVALUATION OF IMPACTS

The tools used for evaluation of potential environmental and social impacts of project were Environmental Impact Matrix and overlays. The impacts were studied within delineated AOI. Apart from the AOI, area designated for the construction/ contractor camps, vehicle, equipment yard, material quarry areas, access tracks are also considered for impact assessment. As the location of Construction/Contractor camps, vehicle, equipment yard, material quarry areas and access tracks are usually finalized by construction contractor, so impacts evaluated due to these facilities in this section will be of generic nature.

6.2.1 Environmental Impact Matrices

The environmental impacts matrices have been developed to evaluate magnitude of the impacts of different project activities on different environmental settings for both construction and operation phases. The following scale has been used for the evaluation of impacts:

LA	=	Low Adverse
MA	=	Medium Adverse
HA	=	High Adverse
B	=	Beneficial
O	=	Insignificant / No Impact

6.3 ENVIRONMENTAL SENSITIVITY MAP

A comprehensive map showing environmental sensitive receptors of the project area and AOI is given in Section 4 as Figure 9. Tentative locations of sensitive receptors are indicated on the map.

Table 17: Environmental Impacts Matrix for the Construction Phase

		Physical Environment					Biological Environment		Socioeconomic Environment				
	Project Activities / **Environmental Components**	**Topography**	**Soil Erosion/Contamination**	**Air Quality**	**Drainage**	**Ground Water Quality**	**Flora**	**Fauna**	**Health & Safety of Public and Workers**	**Employment**	**Disturbance to local community**	**Noise & Vibration**	**Traffic Issue**
1	Site clearance	LA	MA	MA	LA	O	MA	LA	LA	B	LA	LA	LA
3	Establishment & functioning of construction camps, workshops	LA	MA	MA	LA	O	LA	O	LA	O	MA	LA	LA
4	Excavation operations	LA	MA	MA	LA	LA	LA	LA	MA	B	LA	MA	O
5	Transportation of construction materials	O	LA	LA	O	O	O	O	MA	O	LA	MA	LA
6	Generation of municipal and construction waste	O	LA	LA	LA	LA	O	LA	MA	O	MA	O	O

Legend

O - Insignificant B – Beneficial
zLA - Low Adverse MA - Medium Adverse

Table 18: Environmental Impacts Matrix for Operational Phase

Sr. No.		Physical Environment				Biological Environment		Socioeconomic Environment		
	Environmental Components / **Project Activities**	**Air Quality**	**Soil**	**Noise**	**Groundwater**	**Flora**	**Fauna**	**HSE Issues**	**Employment**	**Disturbance to Locals**
1	Movement of public in the sector	LA	O	LA	O	O	O	LA	O	LA
2	Consumption of water	O	O	O	MA	O	O	O	O	LA
3	Municipal solid waste and wastewater generation	LA	LA	O	LA	LA	LA	LA	B	LA
4	Landscaping/ Maintenance of Green areas	B	O	B	LA	B	B	O	B	O

Legend

O - Insignificant B – Beneficial
zLA - Low Adverse MA - Medium Adverse

6.4 ANTICIPATED POTENTIAL IMPACTS DURING PRE-CONSTRUCTION/ DESIGN PHASE

Impacts envisaged during pre-construction/design phase and the recommended mitigation measures have been described under biophysical and socio-economic categories as follows.

6.4.1 Topography

The topography in the project area will change due to the construction of building. The change will not be significant as the total area of plot is 2.2 Kanals only and nature of land is commercial as per Master Plan devised by CDA. Moreover, the project site is surrounded by several similar commercial buildings in cluster.

Mitigation:

Visual changes to the topography will be permanent and need no mitigation measures except that the project design should consider aesthetic concerns.

6.4.2 Layout Planning

Incompatible layout plan and engineering design of the project's structures can undermine the overall aesthetic beauty and ambience of the Project Area. Low utilization of the available spaces and designing the structures without considering the prospective and futuristic needs can result in structures with low social acceptability and functionality.

Incompatible planning and engineering design of the structures with little spaces between adjacent buildings can result in congested structures with poor ventilation, low air circulation and reduced sunlight, inconveniences of movements of the pedestrians, difficulty in transporting materials through narrow passages and blockage of sunlight. Such structures will in turn have other environmental and social consequences such as restriction of free movement of persons and vehicles. This impact will be permanent and moderate adverse in nature.

Mitigations:

- All structural, layout and engineering designing of project should be in strict accordance with the applicable bylaws, building codes and engineering parameters as prescribed.

6.4.3 Water Quantity and Quality

As the ICT already faces water shortages, stress may be generated ground water reservoirs due to occupancy of the instant building after completion, which will require 33,000 gallons/day. Water consumption may affect water supply system of surrounding areas in case of excessive usage of water. Design and location of water storage tanks may also impact the water quality. This will be a moderate adverse impact.

Mitigations:

- As the nature of land is commercial at the site chosen for this project, therefore water supply and drainage system are available;
- Water supply will be the responsibility of CDA through its own supply system, therefore no depletion of ground water is envisaged due to the project activities
- Use of water saving practices like low loss plumbing fixtures and flow control devices may be incorporated in the design;
- Introduction of dual flush system to reduce the wastage of water by excess use in the low- or high-level cistern may be planned;
- Location of water storage tanks should be planned carefully. Water storage tanks meant for drinking should not be located directly beneath any sanitary plumbing or any other pipes conveying non-potable water; and
- Water storage tanks must be provided with a cover, designed to prevent the entry of dust, roof water, surface water, ground water, birds, animals or insects.
- Water conservation practices should be encouraged amongst the occupants and contractor's work force.

6.4.4 Sewerage and Storm Water Drainage System

Around 26,400 gallons per day of wastewater will be generated i.e. 80% of 33,000 gallons per day water requirement due to operation of the project buildings. The impact is considered to be moderate adverse in nature.

Mitigation Measures:

- The subsurface around the structures should be properly drained by providing a permanent drainage system. Proper paving should also be provided adjacent to the exterior walls of the structures. These arrangements would stop ingress of surface water into the ground in the vicinity of the buildings;
- An efficient storm water drainage system with adequate capacity should be designed according to National Plumbing Code, U.S.A and Building Code of Pakistan;
- All wastewater would be discharged in the municipal sewerage system provided by CDA
- An installation of plumbing fixture, if found to be defective or unsafe shall not be allowed to continue in use unless corrections have been made to comply with the building code requirements; and
- The drainage and sanitation system shall not be covered or enclosed or put into operation until it has been inspected, tested and approved by CDA. The authority may examine the appliances and fittings before their installation or during the progress of the work.

6.4.5 Ecological Impact

Due to the construction activities, a couple of trees at site will be removed. This impact will be negative, local, low, long-term.

Mitigation:

- Proposed project should be designed in a way that minimum tree cutting would be involved;
- A detailed tree planation plan has been proposed to mitigate the impact on Flora (Annex-V)

6.4.6 Land Acquisition

Since the instant project has minimum land requirement i.e. 2.2 Kanals and it is being proposed on designated commercial land already owned by Bestway group so no further land acquisition will be involved. Hence no mitigation is required.

6.4.7 Public Utilities

As the project site is within commercial area, proper utilities planning has been done by CDA for facilitation of many similar projects there. It is highly unlikely that any utilities distribution lines exist at the project site itself. However, during provision of these facilities for the proposed project, public utilities in the nearby areas may be affected that may cause inconvenience to the general public but CDA being the prime responsible for provision of basic utilities will ensure that minimum inconvenience is caused, if any. This impact is however temporary and low adverse in nature.

Mitigation Measures:

- Scheduling of rehabilitation of all public utilities likely to be affected by the proposed project well ahead of the commencement of construction work; and
- Timely notification of disruption and minimizing time to relocate the utilities.

6.4.8 Building Safety

a. Seismic Hazard

According to Building code of Pakistan, Revised Seismic Provisions -2007 prepared by NESPAK, the Project Area falls in Seismic Zone 2B of Pakistan (low to moderate damage), and peak ground acceleration (PGA) from 0.16 to 0.24 g. Project structures may be affected negatively in case of earthquake tremors and the significance of damage depending upon the severity of earthquake.

Mitigations:

The structures, design and building material of the proposed project will be designed and used considering these to withstand moderate earthquakes. For seismic hazard analysis, updated structural and seismic evaluations will be consulted.

b. Electrical Hazards

The workers of the proposed buildings may be exposed to electrical hazards including shocks, fires and burns caused by faulty electrical wiring, unsafe installations, frayed cords, substandard power trips, and defective equipment.

Mitigation Measures:

- Appropriately grounded and double insulation of every single piece of equipment, machine, and device should be kept in the design;
- Proper installation check and periodic maintenance by a competent electrician should be planned; and
- All power strips should be planned in the design to place in well-ventilated areas for adequate heat dispersion.

c. Fire Fighting System & Storage

Inefficient firefighting system and insufficient storage of fire water may cause severe damage to the project in case of any fire incident. Non-provision of escape routes and firefighting arrangements / equipment in the layout design of the building may take a heavy toll in case of outbreak of any emergency. This will be a permanent and high adverse impact.

Mitigation Measures:

- A comprehensive, efficient and automated firefighting system has been planned for the instant project **(layout attached as Annex-VI)**;
- Fire hose cabinets should also be provided at different locations of the project buildings;
- A separate fire alarm system should also be installed inside the project buildings;
- Assigning of special number to be dialed to inform about the fire to emergency response team
- Adequate emergency evacuation plan should be developed and floor-wise plan should be displayed at conspicuous places
- Emergency evacuation routes and assembly area should be clearly marked.
- safety instructions and directions for usage of firefighting equipment should be displayed;

6.5 ANTICIPATED IMPACTS DURING CONSTRUCTION PHASE

Anticipated Impacts during construction phase and the recommended mitigation measures have been described under biophysical and socio-economic categories as follows.

6.5.1 Soil Erosion and Contamination

Due to the proposed construction activities, soil erosion and contamination may occur. Soil erosion may occur on roadside and at contractors' camps as a result of uncontrolled run-off from equipment washing yards and excavation of earth/cutting operations whereas contamination of soil may be caused by oil and chemical spills, equipment washing yards, camp sites and temporary construction site office. This impact is, however, temporary and low adverse in nature.

Mitigation:

- Confining excavations to the specified spots as per the approved engineering drawings. Unnecessary excavation needs to be avoided at all times;
- Excess spoil should be reused where possible and residual spoil can be disposed of at designated site to prevent erosion;
- Septic tanks of adequate capacities should be constructed for receiving and treating wastewater from all temporary worksite toilets and construction camps to avoid soil contamination;
- Regular inspection of any wastewater disposal from construction camps;
- Construction work should be scheduled accordingly to cope up with monsoon season to avoid the soil erosion through surface run-off.

6.5.2 Excavation

The proposed Bestway Tower is located in an area which is already surrounded by the commercial buildings. Therefore, the excavation may not affect the structure stability of the surrounding buildings. This impact is not permanent and minor adverse in nature.

Mitigation Measures:

- Soil investigation study should be carried out before construction;
- Unnecessary excavation should be avoided;
- Temporary retaining structures should be provided to ensure no damage to surrounding buildings.
- Excavations should be carried out as per approved engineering drawings;

- Excavations should be carried out carefully to avoid damaging infrastructure in the surroundings of the project area; and

6.5.3 Air Quality and Dust

a) Air Quality

The air quality of the project area will be affected by the exhaust emissions (NO2, SO2, CO, $PM_{2.5}$) produced from the construction machinery and equipment. All these including PM are considered as pollution indicators. These emissions may also affect the bio-physical environment. Emissions may be carried over longer distances depending upon the wind speed, direction, temperature of surrounding air and atmospheric stability. The impact is temporary and moderate adverse.

Mitigation Measures:

- All vehicles, machinery, equipment and generators to be used during construction activities should be kept in good working condition and be properly tuned and maintained in order to minimize the exhaust emissions;
- All vehicles, machinery and equipment to be used for the construction should be plugged off or switched off immediately after completion of their work to avoid idling condition;
- Filters should be installed at the point sources (machinery or equipment's) of air emissions and should be replaced regularly;
- Open burning of solid waste from the contractor's camps should be strictly banned;
- Only good quality oils, petroleum products, additives and spares shall be used in the machinery, generators, and the construction vehicles. Usage of used oil should be strictly prohibited;
- NEQS applicable to gaseous emissions generated by construction vehicles, equipment and machinery should be enforced during construction works; and
- Air emission monitoring program for NO_2, SO_2, CO and PM should be undertaken quarterly by the construction contractor, as specified in the EMP.

b) Dust:

During construction stage, the dust level may increase considerably especially in summer season as the Capital City is prone to dust storms. All earthworks construction, site clearing, stockpiling, operation of

batching plants and hauling of materials will generate dust and affect the local air shed. Local people and the workers may be exposed to high dust levels during construction. These impacts would be temporary and moderate adverse in nature.

Mitigation Measures:

- Blowing of dust from potential sources at the worksite should be avoided by shielding them from the exterior, for example using polythene curtains or raising a fence of corrugated sheets around areas of active constructions;
- Blowing of dust and particulate matter from stockpiled loose materials (e.g. sand, soil) can be avoided either by sheeting them with tarpaulin or plastic sheets or by sprinkling them with light shower of water;
- Preventive measures against dust should be adopted for on-site mixing and unloading operations. Regular water sprinkling of the site would be carried out to suppress fugitive dust emission(s);
- Regular water suppression shall be ensured during all excavation activities.
- Tyres of all the vehicles leaving the site should be washed. No earth, mud, dust and the like shall be deposited on the public road;
- All vehicles carrying raw materials to site or leaving the site with excess excavated soil etc. shall be covered with tarpaulin or like material.
- Speed limits for construction machinery shall be implemented to ensure minimum dust emissions due to movement of vehicles.
- Construction workers should be provided with masks for protection against the inhalation of dust.

6.5.4 Noise and Vibration

The noise and vibration will be produced due to the operation of construction machinery, equipment and generator. Sources of noise and vibration during construction are heavy machinery such as bulldozers, excavators, stabilizers, concrete mixing plant, pneumatic drills etc. The above machinery is expected to generate noise levels that may be excessive.

The likely impacts due to noise are:

- Psychological effects of distraction of attention, irritation and short temperedness in the exposed persons due to persistently higher noise levels;

- Noisy settings and higher background levels can cause temporary threshold shift and the consequent habit of speaking loud, which may cause damage to vocal cords in the persons exposed

This impact is temporary and moderate adverse in nature.

Mitigation Measures:

There are a variety of ways by which construction equipment and worksite noise can be controlled. The following is a list of ways to control noise level worksites:

Quieter Equipment

A cost-effective way to reduce noise at a construction worksite is to ensure use of quieter equipment. In addition, equipment in use should be the most suitable for the job. Avoid using equipment that is over-powered and, conversely, avoid using under powered equipment. Whenever possible the quietest equipment alternative should be used. In general, electronic powered equipment is quieter than diesel powered equipment and hydraulically powered equipment is quieter than pneumatic power. Furthermore, backup generators if required at site during construction shall be canopy type sound proof generators.

Barrier Protection

An effective way of reducing noise is to place noisy equipment behind purpose-built barriers. The barriers can be constructed on the work site from common construction building material (plywood, block, stacks or spoils) or the barriers can be constructed from commercial panels which are lined with sound absorbing material to achieve the maximum shielding effect possible. To be effective, the length of the barrier should be greater than its height. The noise source should not be visible and barrier should be located as close as possible to either the noise source or the receiver.

Work Activity Scheduling

Work activity scheduling are administrative means to control noise exposure. Planning how noise sources are sited and organized on a work site can reduce noise hazards. Jobs can be rotated so that exposure time is limited. Transferring workers from a high exposure task to a lower exposure task could make the employee's daily noise exposure acceptable. Administrative controls include activity planning, for example, scheduling pavement breaking operations so as to reduce the number of work site workers exposed. In addition, noisy equipment should not be run for periods longer than necessary and should be

switched off when not in use. Furthermore, avoiding the use of higher noise generating equipment at night time may also be exercised.

Maintenance

Increased attention to maintenance of tools and equipment will reduce worksite noise levels. Maintaining plant and equipment in good order not only increases its life, but makes it safer to use and quieter. Loose and worn parts should be fixed as soon as possible. Ideally, the worksite should have a system in place for checking and servicing the various machines and power tools.

Noise Perimeter Zones

Noise perimeter zones (NPZ) are another administrative control to limit exposure to noisy processes or equipment to as few workers as possible. NPZ are areas where noise levels of 90 dB(A) or more are roped off and marked to keep out all workers who don't have to be there. NPZ can be set up using a sound level meter to find the safe distance from the source (90 dB (A)) and the NPZ can be set up at that distance. Noise does not radiate from the source at the same level in all directions. Noise from machinery can be higher in one direction than another because the noise can also be either absorbed or reflected from surfaces it contacts, such as the ground or a wall. Therefore, measurements should be taken at several points in an area where people might be working. Once noise levels that are 90 dB (A) or more are determined, rope off this area as the Noise Perimeter Zone. Exclude all workers who do not need to be in that zone. All workers who need to work within the zone must wear hearing protection.

6.5.5 Green House Gas (GHG) Abatement

The main sources of greenhouse gases (CO2, CH4, NOx etc.) during the construction activities of the proposed project will include both mobile and stationary sources. The mobile source will be the construction and transportation vehicles while the stationary source will be the batching and asphalt plants. Emission of greenhouse gases from project activities will contribute in global warming and other climatic changes on regional and global scale.

Mitigation Measures

- Regular motioning of the equipment and vehicles for engine efficiency;
- Avoid idling of construction vehicles;

- Alternative energy resources shall be considered where possible;
- NEQS applicable to gaseous emissions generated by construction vehicles, equipment and machinery shall be enforced during construction works.

6.5.6 Water Resources and Quality

During construction phase, water demand will be enhanced and chances of contamination of water reservoirs will increase. Water will be required for site preparation, water sprinkling to control dust, construction activities, curing, domestic and for other use of labor and staff onsite. Construction waste and wastes from worker's camps, if left unattended may result in forming leachate that can percolate through the soil strata and reach underground water table and hence, may end up contaminating it. There is a probability that various liquids like fuel, lubricant oil and other oily products, which are used during the construction phase may contaminate any groundwater source, if they are not handled properly. These impacts are permanent and high adverse in nature.

Mitigations:

- Water required for construction should be obtained in such a way that the water availability and supply to nearby communities remain unaffected;
- Water supply from CDA will be used therefore risk of excessive extraction from ground water resources is eliminated;
- Regular water quality monitoring should be carried out according to determined sampling schedule;
- All practical measures such as provision of septic tanks, garbage cans and other sanitation facilities should be implemented at the construction camps to prevent the wastewater and solid wastes from entering groundwater recharge areas;
- The solid waste should be disposed of at designated dumping sites;
- Any spills should be handled, cleaned and disposed of properly;
- Protection of groundwater reserves by use of lining materials, from any source of contamination such as the construction and oily waste that will degrade its potable quality;
- Open washing of machinery and vehicles should be prohibited; sealed washing basins shall be provided and wastewater shall be collected in sedimentation/retention pond; and
- No refueling, storage, servicing, or maintenance of equipment should be allowed within 150

feet of drainages or other sensitive environmental resources.

6.5.7 Solid Waste (Construction, Municipal and Hazardous Waste)

Different type of waste is likely to be generated during the construction phase of the project. The municipal waste will be in the form of food, cans, paper and wastewater from construction camps toilets and washing yards. Construction waste will include excavated soil, sand, gravel, rocks, asphalt, pieces of concrete, bricks, wood, metal pieces and electrical wires whereas hazardous waste can be comprised of paints and construction chemicals. All these, if left unattended, can become a source of nuisance and environmental pollution in the project area. Insecure and unhygienic disposal of the solid wastes particularly garbage and trash may cause degradation of soil and land. Insecurely disposed of heaps of wastes containing kitchen garbage and food waste can serve as breeding grounds for the disease spreading vectors and rodents. These impacts are temporary and moderate adverse in nature.

Mitigation:

- Solid waste generated during construction and camp sites should be safely disposed of at designated waste disposal sites;
- Proper labelling of waste containers, including the identification and quantity of the contents, hazard contact information should be carried out;
- Training of employees involved in the transportation and handling of hazardous material regarding emergency procedures should be ensured;
- Construction workers and supervisory staff should be encouraged and educated to practice waste minimization, reuse and recycling to reduce quantity of the waste;
- Waste disposal plan must be reviewed during the entire construction phase in the light of changing weather conditions.

6.5.8 Resource Conservation

Resources involved in the construction of proposed project would include construction materials, water and fuel. Construction material to be used for construction includes coarse aggregates, fine aggregates, asphalt, cement, reinforced and structural steel etc. Almost all the materials to be used in the construction of proposed project are non-renewable and therefore their sustainable use is necessary for the future. wastage of water during construction and operation may pressurize water resources in the Project Area and in certain cases may disturb the existing water supplies in the Project Area.

Fuel will be used to operate construction machinery,. Sustainable use of energy resources is very important not only for future use but also to reduce air emissions. The overall impact is considered to be permanent and high adverse in nature.

Mitigation:

- Wastage of water should be reduced by training the workers involved in water use;
- Water jets and sprays should be used for watering surfaces rather than using overflow system;
- Water supply provided by CDA should be used as allowed by it. It must be ensure that excessive water use should not disturb the existing community water supplies;
- Ensure adequate insulation to reduce heat loss through batching and asphalt plants;
- Schedule regular monitoring of CO and CO2 content of the flue gases to verify that combustion systems are using practical excess air volumes
- Reuse of construction waste materials;
- Unnecessary equipment washings should be avoided;
- Use minimum amount of bitumen for road surfacing;
- A good camp design and an efficient worksite management plan can help the contractor to reduce the water demand to the lowest levels;

6.5.9 Construction Camp/Camp Site

Improper construction camp location and mismanagement of construction camp activities can lead to various social and environmental impacts which include noise, health and safety, traffic problems, soil degradation, loss of vegetation and assets on the selected land, solid waste and water pollution. Furthermore, cultural differences, behavior of construction workers, potential disregard for local cultural norms can lead to increased tension between local communities and workers residing in the construction camps. This impact is temporary and moderate negative in nature.

Mitigation:

- The project will seek to avoid settings camps where their presence might contribute to any conflicts with locals;
- Employment policies which aim to maximize job opportunities for local people will help to

minimize tensions caused by different socio-cultural values;

- Camps will be designed to be self-contained to reduce demand on infrastructure and services of nearby communities;
- A comprehensive safety and security plan for the camps will be prepared which will comprise of a training manual, use of safety equipment and emergency preparedness;
- Training will be provided to all staff on camp management rules and overall discipline and cultural awareness;
- Waste Management Plan will be implemented to ensure safe handling, storage, collection and disposal of construction wastes and the training of employees who handle waste;
- Provision of the pit latrines, septic tanks for camps will be ensured to treat the sanitary wastewater before its discharge into public sewer;
-
- Site for construction camp will be selected to minimize the removal of existing macro- plants at camp sites;
- Photographical and botanical inventory of vegetation before clearing the site;
- Compensatory plantation to be done when construction work near ends; and
- The contractor(s) shall ensure removal & rehabilitation of site upon completion.

6.5.10 Ecological Environment Flora

Exhaust of noxious gases and dust from the movement of heavy machinery may pollute air which will adversely affect health and vigor of plants.

Mitigations

- Plantation of trees will be carried out at available spaces and rooftop garden, as per the design of the project. Same will be implemented with the permission of CDA
- Open fires should be banned in the area to avoid hazards of fire in the area;
- Construction vehicles, machinery and equipment will remain confined within their designated areas of movement;
- The Contractor's staff and labor shall be strictly directed not to damage any vegetation such as trees or bushes. They shall use the paths and roads for movement and shall not be allowed to

trespass through green areas;

- Contractor shall provide gas cylinders at the camps for cooking purposes and cutting of trees/bushes for fuel shall not be allowed;

Fauna

During construction phase the existing population of mammals and reptiles of the proposed areas will be affected due to disturbance arising from activities involving movement of machinery and vehicular traffic, movement of labor, drilling etc. Any animals will leave the directly affected areas due to activities and human intervention. Some animals particularly reptiles may get killed during the earth works operations. Moreover, the movements of the mammals and reptiles will be restricted during the construction phase.

Birds as well will tend to move away from the nearby areas and find shelter and food elsewhere due to the activities mentioned above for fear of being hunted / trapped.

Noise generated from machinery particularly during the night hours will even scare the wildlife residing in habitats located at some distance from the areas. This impact is indirect, site- specific, temporary, reversible and medium significant.

Mitigations:

- As the project site is located in commercial area and construction of many similar projects is already underway or completed, it is expected that any species may already have moved away from the vicinity due to increased human and traffic movement and the chances of encountering any may be minimal
- Caution shall be taken during activities for avoiding purposely or by chance killing of animals.
- If any wild species and habitat found during working that must dealt carefully and local wildlife department officials should be called;
- Hunting, poaching and harassing of wild animals shall be strictly prohibited, and Contractor shall be required to instruct and supervise its labor force accordingly and clear orders should be given in this regard;
- The Contractor must be held responsible for instructing his work force accordingly and for enforcing this restriction. In addition, this shall have to be controlled by the Wildlife

Department;

- Special measures shall be adopted to minimize impacts on the wild birds, such as avoiding noise generating activities during the critical periods of breeding; and
- Similarly, wastes shall be properly disposed of to prevent it being eaten by animals, as it may be hazardous to them.

6.5.11 Health and Safety

a) Occupational Health and Safety

Health risks and work safety problems may result at the workplace/camps if the working conditions provide unsafe and/or unfavorable working environment due to storage, handling and transport of construction materials. The health and safety issues are also associated with the malfunctioning in operation of construction machinery and equipment which may cause minor to severe injuries to workers. As the instant project is a commercial building comprising 15 stories above ground, working at height and working in confined spaces remains a risk. This impact is permanent and high adverse in nature.

Mitigation:

- Providing basic medical training to specified work staff and basic medical service and supplies to workers;
- Preparing layout plan for camp site, indicating safety measures taken by the contractor, e.g. firefighting equipment, safe storage of hazardous material, first aid, security, fencing, and contingency measures in case of accidents;
- Work safety measures and good workmanship practices should be followed by the contractor;
- Ear muffs should be provided to the workers doing job in the vicinity of high noise generating machinery or equipment;
- Provision of adequate sanitation, washing, cooking and dormitory facilities in the camps;
- Provision of Personal Protective Equipment (PPEs) including protective clothing for laborers handling hazardous materials, e.g. helmet, masks, adequate footwear for bituminous pavement works, protective goggles and gloves;
- Provision of adequate harnesses and other safety equipment for workers working at height and in confined areas;
- Ensuring strict use of protective clothing and equipment during construction activities;

- Elaboration of a contingency plan in case of major accidents;
- Ensuring availability of adequate signage, lightning devices, barriers and marking tape during the entire construction phase to manage traffic at construction sites and access roads;
- All potable drinking water supplies to be tested regularly on monthly basis during the entire construction phase;
- Provision of first aid facility and ensuring its cleanliness and disinfection; and
- Ensuring the availability of a dispenser at the active construction site throughout the construction period to provide emergency treatment.

b) Community Health and Safety

The construction activities and vehicular movement at construction sites and access service roads may also result in accidents along road side as the local communities may not be familiar with the presence of heavy equipment and machinery. This is a permanent and high adverse impact. Quality of ground water and surface water resources available in the nearby local communities may get contaminated due to the construction activities, oil spillage and leakage, roadside accidents etc. The laborers with different transmittable diseases may cause spread out of those diseases in the local residents. Dengue may also break through due to stagnant water at the construction sites.

Mitigation:

- Construction area should be clearly marked and cordoned off.
- Adequate Fencing of the parameter should be ensured to eliminate the risk of falling of any human or animal.
- There should be proper control on construction activities and particularly oil spillage/ leakage of vehicles, machinery and equipment;
- All labour must be medically checked so that if they interface with the local communities, undesirable transmittable disease does not spread;
- The labourers with different transmittable diseases should be restricted to the construction site only if unavoidable;
- Efforts should be made to create awareness about road safety among the drivers operating construction vehicles;
- Timely public notification of planned construction works;

- Provision of proper safety and diversion signage at sensitive/accident-prone spots;
- Setting up speed limits in the construction areas in close consultation with the local stakeholders;
- Keeping out of non-working persons, particularly children, off work sites;
- The communicable disease of most concern during construction phase, like sexually- transmitted disease (STDs) such as HIV/AIDS, should be prevented by successful initiative typically involving health awareness; education initiatives; training heath workers in disease treatment; immunization program and providing health service;
- SOPs related to the construction industry to control spreading of Dengue Larva, COVID-19 etc., should be implemented by the contractor and should be strictly monitored.
- Efforts should be made to prevent the spread of vector borne diseases through implementation of diverse interventions aimed at eliminating the factors that lead to disease, which include prevention of larval and adult propagation of vectors through sanitary improvements and elimination of breeding habitat close to human settlements and by eliminating any unusable impounding of water.

c) Emergency Response to Natural and Man-made Disasters

Natural Disasters such as earthquakes & flooding and other disasters triggered by humans such as act of terror etc. may occur, and must be considered to avoid or to minimize their impacts. This impact will be permanent and moderate in nature

Mitigations:

Emergency Response Plan attached as Annex-VI should be implemented in close consultation with the District Rescue Service, fire-fighting department, bomb disposal squad and paramedics. In addition, training of the staff/employees regarding the emergency procedures/plans should be regularly conducted.

6.5.12 Economic Activity

Due to the construction of the proposed project, economic activity will be generated in the Project Area as the laborers and semi-skilled staff will have an opportunity to work for the construction of the proposed project. This will help in developing their skills and capacities. This is a moderate positive impact.

6.6 ANTICIPATED IMPACTS DURING OPERATIONAL PHASE

Anticipated impacts during Operational Phase and the recommended mitigation measures have been described under biophysical and socio-economic categories as follows.

6.6.1 Drinking Water Contamination

Water pollution can originate at the internal water network. If the pipes and the water storage tanks are not cleaned properly, they may lead to bacteriological contamination of the potable/drinking water and thus will lead to infectious diseases/health problems to the staff member. The impact is temporary and moderate adverse in nature.

Mitigation Measures:

- The Management of the proposed project may install small water filtration units of required capacity in order to avoid any bacterial contamination in the drinking water;
- Water dispensers should be used in the proposed Bestway Tower; and
- Overhead water storage tank(s) should be cleaned and disinfected on quarterly basis.

6.6.2 Water Consumption

During operation phase, the estimated water consumption of proposed building will be about 33,000 gallons per day. Water storage will also be required for emergency response in case of a fire. Prolonged water consumption may stress the available water resources. This will be a permanent and moderate adverse impact.

Mitigation Measures:

An effective water conservation plan should be developed. Following operational measures will be adopted for water conservation:

- The water taps should be regularly checked for any leakage;
- It should be made sure that all faucets and circulating pumps etc. do not leak and are regularly maintained;
- Leakage or dripping faucet, pump or toilet should be immediately reported;
- Utility bills should be kept in track for the consumption of water;
- Water-saving equipment such as low-flow shower heads, sensor taps, sinks with auto-shutoff

mechanisms, and water-saving toilets and urinals should be purchased and used;

- Treated water from septic tank will be disposed off in drainage system.; and
- An effective training program about water conservation should be established for the building superintends.

6.6.3 Sewerage System

Untreated sewage discharge from the proposed building may create surface water contamination and associated health risks in the surrounding area. Any bursting or choking of internal sewer may cause adverse impact such as foul smell, unhygienic waterlogged condition and health related impact on the live-in population. The impact is considered to be temporary and moderate adverse.

Mitigation Measures:

- Regular maintenance checks shall be carried out to check any bursting or chocking of internal sewer; and
- The drainage and sanitation system shall be maintained in a sanitary and safe operating condition and all the surface drains should be cleaned periodically by the management.

Improper operation and maintenance of sewerage system may lead to illegal ingress of municipal solid waste into manholes/sewers, deposition of silt/sludge reducing capacity of sewers significantly, choking of sewer resulting in stagnant of wastewater in the streets or in low lying areas. Stagnant wastewater may cause inconvenience to pedestrians, foul smell, unhygienic environment and health issues.

Mitigations:

- Solid waste bins/containers should be placed at appropriate location along the roads and in streets to avoid entrance of solid waste into sewers.
- Occupants should be encouraged not to throw solid waste in wastewater sewers.
- Routine desilting should be carried out to avoid blockage
- Regular cleaning of grit chambers and sewer lines should be ensured to remove grease, grit, and other debris that may lead to sewer backups;
- Inspection of the condition of sanitary sewer structures should be carried out frequently or as per schedule of CDA.

6.6.4 Air Quality / Ambient Air Quality

Air quality of the project area may be affected due to vehicular movement, operation of generators, air conditioners etc. if not managed properly. This will be a temporary and moderate adverse impact.

Mitigation Measures:

- Plantation of grass and plants to absorb emissions;
- Use of renewable energy sources should be preferred as supplementary power source; The instant project involves the use of solar catching glass as defined in the project description; and
- Vehicles with excessive smoke emissions should not be allowed to enter the proposed building.

Indoor Air Quality (IAQ)

Good IAQ in buildings is an important component of a healthy indoor environment. It contributes to a favorable and productive environment for building occupants, giving them a sense of comfort, health, and well-being.

IAQ may be affected with poor building design or failure of the building enclosure or envelope (roof, facade, foundation, etc.). Other issues may be associated with the location of the building and mixed uses of the building. Many common IAQ problems are associated with improperly operated and maintained heating, ventilating and air-conditioning (HVAC) systems, overcrowding, radon, moisture incursion and dampness, presence of outside air pollutants, and the presence of internally generated contaminants such as use of cleaning and disinfecting supplies and aerosol products, off-gassing from materials in the building, and use of mechanical equipment. Improper temperature and relative humidity conditions can also present problems, especially concerning comfort.

Failure of building owners and operators to respond quickly and effectively to IAQ problems can lead to numerous adverse health consequences.

Mitigation Measures:

- It is recommended to develop and implement an IAQ management plan to address, prevent, and resolve IAQ problems in their building. To prevent IAQ problems effectively and efficiently, building manager should know and understand the history of the building (construction, uses, maintenance, etc.).
- For control of Indoor Air Quality (IAQ), carbon filters may be used in addition to normal filters to remove odor from circulating air. In addition, ducted return air instead of from ceiling plenum may be provided;
- Following are some important practices that can be adopted to manage the IAQ:
- Inspect and assess the building envelope, including the roof, walls, and foundation, and promptly respond to identified problems. Routinely check the building for water leaks, seals around doors and windows, and any visible damp or moist parts of the building. Clean and dry any damp or wet building materials and furnishings within 24 to 48 hours after detection to prevent the growth of mold;
- Ensure and validate that the building is maintained under a slight positive pressure (i.e., air comes out of the building when exterior doors are opened);
- Check whether the temperature and humidity are maintained in a recommended comfort range;
- Ensure that routine maintenance of the HVAC system is being performed, including the performance of the system bringing outdoor air into the building;
- Monitor carbon dioxide (CO2) levels. The carbon dioxide levels can be used as a rough indicator of the effectiveness of ventilation and excessive population density (e.g., overcrowding);
- IAQ should be monitored on regular basis for parameters like CO, CO2, NO2, VOCs, etc. ;
- Ensure that good housekeeping practices are being applied;
- Ensure that routine preventive maintenance and upkeep of buildings is being performed. A preventive maintenance program provides the care to all building systems and components that keeps them operating at peak performance according to manufacturer's specifications, and also allows for early detection of problems; and
- Ensure that scheduled renovations are isolated from the building's general dilution ventilation system when occupants are in the building.

6.6.5 Heat Ventilation & Air Conditioning (HVAC) System

HVAC Operations and Maintenance (O&M) are the practices that keep mechanical systems working at

peak performance during the life of the building. Good HVAC O&M is measured by system performance. The system should continue providing thermal comfort at the energy use specified in the HVAC design for the building. Small malfunctions or errors in an HVAC system's operation early on can lead to inefficiencies in heating and cooling. Ultimately, these inefficiencies result in wasted energy and high gas and electric bills. Poor operation and maintenance of the HVAC system may lead to thermal discomfort particularly during the change in seasons.

Indoor air quality problems can be produced when contaminants enter a building with the outdoor air. Rooftop or wall-mounted air intakes are sometimes located adjacent to or downwind of building exhaust outlets or other contaminant sources. Problems can also result if debris accumulates at the intake, obstructing airflow and potentially introducing microbiological contaminants.

Mitigation Measures:

- An important part of the O&M is schedules for cleaning ducts, filters, and other components, replacing filters, and measuring energy use and comfort. Performance measurements should be done monthly or at least quarterly, to provide operators with enough data to tell when systems are beginning to perform poorly.
- Ducts should also be periodically inspected for leaks, as this can cause surprisingly large energy losses.
- HVAC control systems are often run by programmable thermostats that schedule heating and cooling for different times of day and days of the week. Such schedules should be set to match the occupancy and activity schedules of different spaces. Sensors for HVAC controls, such as temperature and humidity sensors, or occupancy sensors, should be regularly checked for proper operation. Sensors that start shutting off or turning on heating or cooling at the wrong times make people too hot or too cold, and can waste energy.
- Like any other part of the HVAC system, a boiler must be adequately maintained to operate properly. However, it is particularly important that combustion equipment operate properly to avoid hazardous conditions such as explosions or carbon monoxide leaks, as well as to provide good energy efficiency.

6.6.6 Noise

The operation of generators, movement of vehicles to and from the building may create noise. The impact

is permanent and high adverse in nature.

Mitigation Measures:

- Use of solar panels should be preferred as power source;
- In case generators are used, it should be enclosed with a canopy to reduce noise;
- Use of horn should not be allowed in the close proximity of the proposed project buildings;
- Green belts and landscaping should be used as noise barrier; and
- Employees working close to generators for extended periods should be encouraged to wear ear protection.

6.6.7 Solid Waste

A substantial amount of solid waste will be generated from operation of the proposed building. Hazardous waste is also likely to be generated from building maintenance activities. Examples of these types of wastes include: chemicals, spent solvents and oily rags, empty paint cans, chemical containers; used lubricating oil; used batteries (such as nickel-cadmium or lead acid); and lighting equipment such as lamps or lamp ballasts.

Improper storage and dumping of waste may pollute soil and groundwater. It may also affect the aesthetics and can cause foul order and result in health problems to the office staff. This impact is negative, local, low, long-term and definite.

Mitigation measures:

- Waste Collection Bins should be provided inside and outside the buildings at suitable locations for collection of daily generated solid waste;
- Assign color to collection bins according to the international standards;
- Recyclable wastes such as newspaper, cardboard, plastics, glass and metals could be separated for individual collection. Single stream collections may be more cost effective as the recyclables can be cheaper to collect and will reduce the volume of a more costly co-mingled dry recyclable collection;
- Hazardous Waste should be stored in a manner that prevents the commingling or contact between incompatible wastes, and allows for inspection between containers to monitor leaks or spills;

- Waste minimization should be encouraged and regular training be provided to office staff in correct identification and disposal of waste;
- Waste bins should be emptied by sanitary workers on daily basis;
- A registered contractor from Municipal Corporation Islamabad should be hired for collection and disposal of solid waste from offices.
- Ensure the transport of hazardous wastes and contaminated soils is conducted by licensed Contractors for disposal at licensed facilities, in accordance with legislative requirements.

6.6.8 Emergency Management

Emergency management in case of natural and man-made disaster is a major concern during operation phase. The impact will be of permanent and high adverse in nature.

Mitigations:

- Routine inspection should be carried out to check that the area around the generator is free of clutter and no flammable material is present;
- Standard fire and smoke detection and protection devices such as fire alarms, fire hoses and hydrants should be provided in all critical areas / of the proposed project;
- Firefighting equipment should be regularly examined and maintained by a reputable fire safety and security company;
- First Aid kits shall be available;
- Emergency response plan shall be implemented in close consultation with the Fire Fighting Department, Rescue 1122, bomb disposal squad and paramedics
- Emergency Numbers shall be posted clearly at various places.
- Adequate emergency exits shall be provided.

6.6.9 Development & Employment

Operation of the project will result in development of economy of the country by expending business opportunities. Employment will also be generated with the project execution.

6.6.10 Flora

No adverse impacts are envisaged on the flora during the operational phase. Presence of adequate flora

through landscaping will help absorbing, noxious hydrocarbon gases, emitted vehicular movement and emissions from generators. Maintenance of green spaces and trees shall be maintained for improved conditions of air and noise and to enhance the aesthetics of the area.

6.6.11 Occupational Health and Safety

At the operational phase, health and safety issues may arise. Operation and maintenance of the building may cause health risks to staff members including maintenance staff (electrical and mechanical staff, solid waste management staff, etc.) that may include injuries due to electric shocks, arc flash and arc blast; health risks due to working in confined space, at heights and in handling of solid waste. The impact will be temporary and moderate adverse in nature.

Mitigations Measures:

- Trained staff should be hired for maintenance of building.
- Basic training to staff for handling of the waste should be imparted;
- Provision of Personal Protective Equipment (PPEs) for workers should be ensured;
- Ensuring strict use of protective clothing and equipment during maintenance works and waste handling;
- Provide fall protection for all maintenance personnel especially for roof-mounted equipment such as HVAC equipment and cooling towers; and
- Elaboration of a contingency plan in case of major accidents.

6.6.12 Potential Environmental Enhancement Measures

Specific measures will be undertaken which will help in enhancing the environmental quality of both the project and the project area. These are in the form of properly design sewerage and drainage system and provision of green area/terraces. However, in addition to the aforementioned enhancement measures, following steps may be adopted during the operation phase of the project

Mitigations Measures:

- Installation of solar collecting glass in the windows of the building shall be considered to supplement the supply of electricity from the national grid;

- The use of auto switch lighting system and energy conserving electric lights (LED light) for general lighting shall be preferred;
- Rainwater harvesting technique may be planned for use of rainwater;
- Insulations on walls and roofs to save energy loads; and
- Awareness sessions shall be conducted during operational phase / occupation to create awareness among the staff regarding sustainable consumption of electricity.

This section discusses the project's potential environmental impact on the area's geomorphology, soil, water resources, air, biological resources and socioeconomic condition and, where applicable, identifies mitigation measures that will reduce, if not eliminate, its adverse impact. The assessment carried out in this section is based on potential impacts on overall environmental receptors within the project area.

CHAPTER 7: ENVIRONMENTAL MANGEMENT AND MONITORING PLANS

7.1 GENERAL

An EIA report contains predictions about the environmental impacts of proposals and recommendations for their mitigation and management. The report is essentially a discretionary planning document. Usually, a separate project approval sets the terms and conditions with which the proponent must comply. An environmental management plan (EMP), also referred to as an impact management plan, is usually prepared as part of EIA reporting. It translates recommended mitigation and monitoring measures into specific actions that will be carried out by the proponent. Depending upon particular requirements, the plan may be included in, or appended to, the EIA report or may be a separate document. The EMP will need to be adjusted to the terms and conditions specified in any project approval. It will then form the basis for impact management during project Construction and operation.

The main components of an EMP are described in the table below, which reflects practice at the World Bank. Although there is no standard format, the EMP should contain the following:

- Summary of the potential impacts of the proposal;
- Description of the recommended mitigation measures;
- Statement of their compliance with relevant standards;
- Allocation of resources and responsibilities for plan implementation; and
- Contingency plan when impacts are greater than expected.

7.2 MANAGEMENT RESPONSIBILITIES

A number of parties have responsibilities in relation to the implementation of the EMP. All project staff has a responsibility and must adhere to the procedures outlined in the EMP at all times.

Table 19: Institutional Capacity

Role	Responsibilities
Proponent / Environmental Manager	» Implementation and monitoring of the EMP. » Provide all supervisory and management staff with an awareness and understanding of their responsibilities under this EMP.

	» Provide appropriate and adequate resources are allocated to allow for the effective implementation and maintenance of the EMP. » Conduct periodic reviews of environmental performance are conducted. » Report any major environmental incidents that may have a significant impact on the surrounding environment. » Provide employees and contractors with the relevant environmental instruction in relation to the EMP and awareness and understanding of their obligations and duties.
Construction Contractor	» Be aware of and understand the contents of and the reason for implementing the elements of the EMP and ensure all personnel including subcontractors adhere to these requirements. » Provide adequate training in the elements of the EMP to all personnel, including contractors. » Provide personnel involved in the project, including subcontractors and visitors, with the appropriate environmental training required to provide them with awareness and understanding of their responsibilities under the EMP as well as understanding of the environmental approvals that adhere to the strategies outlined in the EMP. » Carry out all work in accordance with the procedures outlined in the EMP. » Make sure that all environmental safeguards and precautions are in place and adhered to at all times at the site and activity. » Regularly inspect and monitor all activities for

	adherence to proper environmental safeguards. » Ensure that all equipment used is properly serviced and that all precautions are in place to prevent the likelihood of an environmental incident occurring. » Report all environmental incidents to the Superintendent's Representative as soon as practicable, but within 24 hours of them Occurring.
Superintendent's Representative All employees and subcontractors	» Be aware and understand the contents of, and the reason for, implementing the elements of the EMP. » Exercise environmental due diligence and achieve compliance with the EMP. » Report all environmental incidents to the principal as soon as practicable, but within 24 hours of them occurring.

7.3 ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

It lists all the mitigation measures identified in the EIA and the associated environmental or social aspect, during construction and operation phase with the administrative framework involving all the responsible implementing authorities required to take the planned actions/measures. It enhances project benefits by reducing its impacts and making it environment-friendly.

7.3.1.1 Environmental Management and Monitoring Plan for Construction Phase

This section outlines the aspects that will be covered in the Environmental Management and Monitoring Plan (EMMP) for the construction phase of the project, but also to enhance project benefits as well as to introduce standards of good practice to be adopted for all project activities.

Table 20: Environmental Management and Monitoring Plan

. No.	Parameters	Target	Mitigation	Implementation	Responsibility
A) Pre-Construction/Design Phase					
1.	Layout Planning	To ensure smooth and safe operation of proposed building	▪ All structural, layout and engineering designing of project should be in strict accordance with the applicable bylaws and engineering parameters.	▪ Project Manager ▪ Site Supervisor	▪ BCL management
2.	Water Quantity and Quality	To use water sustainably and protect water from contamination	▪ Ensuring use of CDA water supply at all times to eliminate impact on ground water resources of the project area. ▪ Promoting water conservation and sustainable use practices ▪ Use of water saving practices like low loss plumbing fixtures and flow control devices may be incorporated in the design; ▪ Introduction of dual flush system to reduce the wastage of water by excess use in the low- or high-level cistern may be planned; ▪ Location of water storage tanks should be planned carefully. Water storage tanks meant for drinking should not be located directly beneath any sanitary plumbing or any other pipes conveying non-potable water; and ▪ Water storage tanks must be provided with a cover, designed to prevent the entry of dust, roof water, surface water, ground water, birds, animals or insects.	▪ Project Manager ▪ Site Supervisor	▪ BCL management

3.	Sewerage and Storm Water Drainage	To protect the roads surface, parking lots and buildings from deterioration due to water ponding and to avoid water contamination due to poor design of sewerage.	▪ The subsurface around the structures should be properly drained by providing a permanent drainage system. Proper paving should also be provided adjacent to the exterior walls of the structures. These arrangements would stop ingress of surface water into the ground in the vicinity of the buildings; ▪ An efficient storm water drainage system with adequate capacity should be designed ▪ All wastewater would be discharged in the CDA sewerage system ▪ An installation of plumbing fixture, if found to be defective or unsafe shall not be allowed to continue in use unless corrections have been made to comply with the building code requirements; and ▪ The drainage and sanitation system shall not be covered or enclosed or put into operation until it has been inspected, and tested	▪ Project Manager ▪ Site Supervisor	▪ BCL management
4.	Ecology	To protect floral species	▪ Proposed project should be designed in a way that minimum tree cutting would be involved; and ▪ A tree planation plan has been prepared and attached as Annex-V.	▪ Project Manager	▪ BCL management
5.	Public Utilities	To minimize disruption of services by affecting public utilities	▪ Scheduling of rehabilitation of all public utilities likely to be affected by the proposed project well ahead of the commencement of construction work; and ▪ Timely notification of disruption and minimizing time to relocate the utilities.	▪ Site Supervisor	▪ BCL management

6.	Building Safety	To safeguard building in case of Hazard e.g: ▪ Earthquake ▪ Fire ▪ Electrical	**Earthquake** ▪ The structures of the proposed project will be designed and constructed to withstand moderate earthquakes. For seismic hazard analysis, updated structural and seismic evaluations will be consulted. **Fire** ▪ Water Storage tanks should be designed for firefighting; ▪ The firefighting pump should be designed to maintain constant pressure in the system;	▪ Project Manager ▪ Site Supervisor	▪ BCL management
7.	Fire Fighting Arrangement		▪ Fire hose cabinets should also be provided at different locations of the project buildings; ▪ A separate fire alarm system should also be installed inside the project buildings; ▪ Following provisions for fire safety shall also be made in the proposed project during the design phase. These will be: o The number of emergency exits; o Assigning of special number to be dialed to inform about the fire to emergency response team o System required to detect fire; o Alarms required to warn people of fire. **Electrical** ▪ Appropriately grounded and double insulation of every single piece of equipment, machine, and device should be kept in the design; ▪ Proper installation check and periodic maintenance by a competent electrician should be planned; and ▪ All power strips should be planned in the design to place in well-ventilated areas for adequate heat dispersion.		

B) ***Construction Phase***					
1.	Soil Erosion and Contamination	To minimize soil erosion & contamination	▪ Confining excavations to the specified spots as per the approved engineering drawings. Unnecessary excavations need to be avoided; ▪ Excess spoil should be reused where possible and residual spoil can be disposed of at designated site to prevent erosion; ▪ Septic tanks of adequate capacities should be constructed for receiving and treating wastewater from all temporary worksite toilets and construction camps to avoid soil contamination; ▪ Regular inspection of the wastewater disposal from construction camps; ▪ Jute erosion protection mats can be applied in areas where erosion is noticed during inspections	▪ Project Manager ▪ Site Supervisor	▪ BCL management
2.	Excavation		▪ Soil investigation study should be carried out before construction; ▪ Unnecessary excavation should be avoided; ▪ Temporary retaining structures should be provided. ▪ Excavations should be carried out as per approved engineering drawings; ▪ Excavations should be carried out carefully to avoid damaging infrastructure in the surroundings of the project area; and	▪ Site Supervisor	▪ BCL management

Sr. No.	Parameters	Target	Mitigation	Implementation	Responsibility
3.	Air Quality and Dust	To avoid deterioration of air quality due to construction activities	▪ All vehicles, machinery, equipment and generators to be used during construction activities should be kept in good working condition and be properly tuned and maintained in order to minimize the exhaust emissions; ▪ All vehicles, machinery and equipment to be used for the construction should be plugged off or switched off immediately after completion of their work to avoid idling condition; ▪ Filters should be installed at the point sources (machinery or equipment's) of air emissions and should be replaced regularly; ▪ Open burning of solid waste from the contractor's camps should be strictly banned; ▪ Only good quality oils, petroleum products, additives and spares shall be used in the machinery, generators, and the construction vehicles. Usage of used oil should be strictly prohibited; ▪ NEQS applicable to gaseous emissions generated by construction vehicles, equipment and machinery should be enforced during construction works; and ▪ Air emission monitoring program for NO2, SO2, CO and PM10 should be undertaken quarterly by the construction contractor, according to the program specified in the EMP. ▪ Blowing of dust from potential sources at the worksite should be avoided by shielding them from the exterior, for example using polythene curtains or raising a fence of corrugated sheets around areas of active constructions; ▪ Blowing of dust and particulate matter from stockpiled loose materials (e.g. sand, soil) can be avoided either by	▪ Project Manager ▪ Site Supervisor	▪ BCL management

			sheeting them with tarpaulin or plastic sheets or by sprinkling them with light shower of water; ▪ Preventive measures against dust should be adopted for on- site mixing and unloading operations. Regular water sprinkling of the site would be carried out to suppress excessive dust emission(s); ▪ All excavation work should be regularly sprinkled with water to control dust. ▪ Construction workers should be provided with masks for protection against the inhalation of dust. ▪ Ensure precautions to reduce the level of dust emissions from hot mix plants, crushers and batching plants e.g. providing them as applicable, with protection canvasses and dust extraction units. Mixing equipment should be well sealed and equipped as per existing standards		

Sr. No.	Parameters	Target	Mitigation	Implementation	Responsibility
4.	Noise	To minimize the impact of noise on workers and local community	▪ Use of Quieter Equipment ▪ Modifying Existing Old Equipment ▪ Barrier Protection ▪ Work Activity Scheduling ▪ Maintenance Demarcation of Noise Perimeter Zones	▪ Project Manager Site Supervisor	BCL management
5.	Water Resources	To avoid contamination and to conserve water resources during construction activities	▪ Water required for construction should be obtained in such a way that the water availability and supply to nearby communities remain unaffected; ▪ Continuous withdrawal and over pumping of groundwater should be avoided. Instead, intermittent pumping be carried out to conserve the groundwater resources; ▪ Regular water quality monitoring should be carried out according to determined sampling schedule; ▪ All practical measures such as provision of septic tanks, garbage cans and other sanitation facilities should be implemented at the construction camps to prevent the wastewater and solid wastes from entering groundwater recharge areas; ▪ The solid waste should be disposed of at designated dumping sites to sustain the water quality for domestic requirements; ▪ Protection of groundwater reserves by use of lining materials, from any source of contamination such as the construction and oily waste that will degrade its potable quality; ▪ No refueling, storage, servicing, or maintenance of equipment should be allowed within 150 feet of drainages or other sensitive environmental resources.	▪ Project Manager ▪ Site Supervisor	▪ BCL management

Sr. No.	Parameters	Target	Mitigation	Implementation	Responsibility
6.	Solid Waste (Construction, Municipal and Hazardous Waste)	To avoid/minimize nuisance and environmental pollution in the Project Area due to solid waste.	▪ Solid waste generated during construction and camp sites should be safely disposed of at designated waste disposal sites; ▪ Proper labelling of waste containers, including the identification and quantity of the contents, hazard contact information should be carried out; ▪ Training of employees involved in the transportation of hazardous material regarding emergency procedures should be ensured; ▪ Construction workers and supervisory staff should be encouraged and educated to practice waste minimization, reuse and recycling to reduce quantity of the waste; ▪ A comprehensive plan for construction waste management should be made and implemented ▪ Waste disposal plan must be reviewed during the entire construction phase in the light of changing weather conditions.	▪ Project Manager ▪ Site Supervisor	▪ BCL management
7.	Resource Conservation	To ensure sustainable use of non-renewable resources	▪ Wastage of water should be reduced by training the workers involved in water use; ▪ Water jets and sprays should be used for watering surfaces rather than using overflow system; ▪ Source of water should be carefully selected. Water use should not disturb the existing community water supplies; ▪ Rainwater will be collected for conservation of resources ▪ Schedule regular monitoring of CO and CO2 content of the flue gases to verify that combustion systems are using practical excess air volumes ▪ Reuse of construction waste materials;	▪ Project Manager ▪ Site Supervisor	▪ BCL management

			▪ Unnecessary equipment washings should be avoided; ▪ Use minimum amount of bitumen for road surfacing; ▪ A good camp design and an efficient worksite management plan can help the contractor to reduce the water demand to the lowest levels; and ▪ Resource conservation plan should be followed.		
8	Construction Camps	To avoid various social and environmental impacts due to mismanagement of construction camp activities.	▪ The project will seek to avoid sitting camps where their presence might contribute to any conflicts with locals; ▪ Employment policies which aim to maximize job opportunities for local people will help to minimize tensions caused by different socio-cultural values; ▪ Camps will be designed to be self-contained to reduce demand on infrastructure and services of nearby communities ▪ A comprehensive safety and security plan for the camps will be prepared which will comprise of a training manual, use of safety equipment and emergency preparedness. ▪ Training will be provided to all staff on camp management rules and overall discipline and cultural awareness. ▪ Waste Management Plan will be implemented to ensure safe handling, storage, collection and disposal of construction wastes and the training of employees who handle waste; ▪ Provision of the pit latrines, septic tanks for camps will be ensured to treat the sanitary wastewater before its discharge into public sewer; ▪ Site for construction camp will be selected to minimize the removal of existing macro-plants at camp sites; ▪ Compensatory plantation to be done when construction work near ends; and	▪ Project Manager ▪ Site Supervisor	▪ BCL management

			▪ The contractor(s) shall ensure removal & rehabilitation of site upon completion.		
9.	Ecological Environment	To minimize the risk to flora and fauna due to construction activities	▪ Plantation of trees will be carried out at available spaces, in the project area by the consultation and implementation of local forest department; ▪ Open fires should be banned in the area to avoid hazards of fire in the area; ▪ Construction vehicles, machinery and equipment will remain confined within their designated areas of movement; ▪ The Contractor's staff and labor shall be strictly directed not to damage any vegetation such as trees or bushes. They shall use the paths and roads for movement and shall not be allowed to trespass through farmlands or forested areas; ▪ Contractor shall provide gas cylinders at the camps for cooking purposes and cutting of trees/bushes for fuel shall not be allowed; and ▪ A tree plantation program shall be formulated with the recommendations and technical support of concerned Forest Department ▪ Caution shall be taken during activities for avoiding purposely or chance killing of animals. ▪ If any wild species and habitat found during working that must dealt carefully and local wildlife department officials should be called; ▪ Hunting, poaching and harassing of wild animals shall be strictly prohibited, and Contractor shall be required to	▪ Project Manager ▪ Site Supervisor	▪ BCL management

			instruct and supervise its labor force accordingly and clear orders should be given in this regard; ▪ The Contractor must be held responsible for instructing his work force accordingly and for enforcing this restriction. In addition, this shall have to be controlled by the Wildlife Department; ▪ Special measures shall be adopted to minimize impacts on the wild birds, such as avoiding noise generating activities during the critical periods of breeding; and ▪ Similarly, wastes shall be properly disposed of to prevent it being eaten by animals, as it may be hazardous to them.		
	Health and Safety	To minimize health risks to workers and associated communities.	▪ Obligatory insurance against accidents for laborers/workers; ▪ Providing basic medical training to specified work staff and basic medical service and supplies to workers; ▪ Preparing layout plan for camp site, indicating safety measures taken by the contractor, e.g. firefighting equipment, safe storage of hazardous material, first aid, security, fencing, and contingency measures in case of accidents; ▪ Work safety measures and good workmanship practices should be followed by the contractor; ▪ Ear muffs should be provided to the workers doing job in the vicinity of high noise generating machinery or equipment; ▪ Provision of adequate sanitation, washing, cooking and dormitory facilities in the camps; ▪ Provision of Personal Protective Equipment (PPEs) including protective clothing for laborers handling hazardous materials, e.g. helmet, masks, adequate footwear for bituminous	▪ Project Manager ▪ Site Supervisor	▪ BCL management

			pavement works, protective goggles and gloves; ▪ Ensuring strict use of protective clothing and equipment during construction activities; ▪ Elaboration of a contingency plan in case of major accidents;		
	Health and Safety	To minimize health risks to workers and associated communities.	▪ Obligatory insurance against accidents for laborers/workers; ▪ Providing basic medical training to specified work staff and basic medical service and supplies to workers; ▪ Preparing layout plan for camp site, indicating safety measures taken by the contractor, e.g. firefighting equipment, safe storage of hazardous material, first aid, security, fencing, and contingency measures in case of accidents; ▪ Work safety measures and good workmanship practices should be followed by the contractor; ▪ Ear muffs should be provided to the workers doing job in the vicinity of high noise generating machinery or equipment; ▪ Provision of adequate sanitation, washing, cooking and dormitory facilities in the camps; ▪ Provision of Personal Protective Equipment (PPEs) including protective clothing for laborers handling hazardous materials, e.g. helmet, masks, adequate footwear for bituminous pavement works, protective goggles and gloves; ▪ Ensuring strict use of protective clothing and equipment during construction activities; ▪ Elaboration of a contingency plan in case of major accidents; ▪ Ensuring availability of adequate signage, lightning devices, barriers and marking tape during the entire construction phase to manage traffic at construction sites	▪ Project Manager ▪ Site Supervisor	▪ BCL management

			and access roads; ▪ All potable drinking water supplies to be tested regularly on monthly basis during the entire construction phase; ▪ Provision of first aid facility and ensuring its cleanliness and disinfection; and ▪ Ensuring the availability of a dispenser at the active construction site throughout the construction period to provide emergency treatment ▪ There should be proper control on construction activities and particularly oil spillage/ leakage of vehicles, machinery and equipment; ▪ All labour must be medically checked so that if they interface with the local communities, undesirable transmittable disease does not spread; ▪ The labourers with different transmittable diseases should be restricted to the construction site only; ▪ Efforts should be made to create awareness about road safety among the drivers operating construction vehicles; ▪ Timely public notification of planned construction works; ▪ Provision of proper safety and diversion signage at sensitive/accident-prone spots; ▪ Setting up speed limits in the construction areas in close consultation with the local stakeholders; ▪ Keeping out of non-working persons, particularly children, off work sites; ▪ The communicable disease of most concern during construction phase, like sexually-transmitted disease (STDs) such as HIV/AIDS, should be prevented by successful initiative typically involving health awareness; education ▪ initiatives; training heath workers in disease treatment; immunization program and providing health service;		

			▪ SOPs related to the construction industry to control spreading of COVID-19, should be implemented by the contractor and should be strictly monitored. ▪ Efforts should be made to prevent the spread of vector borne diseases through implementation of diverse interventions aimed at eliminating the factors that lead to disease, which include prevention of larval and adult propagation of vectors through sanitary improvements and elimination of breeding habitat close to human settlements and by eliminating any unusable impounding of water		
13.	Emergency Response to Natural and Man-made Disasters	To be prepared in case of natural or man-made disasters.	▪ Emergency Response Plan formulated should be implemented in close consultation with the District Rescue Service, fire-fighting department, bomb disposal squad and paramedics. In addition, training of the staff/employees regarding the emergency procedures/plans should be regularly conducted.	▪ Project Manager ▪ Site Supervisor	▪ BCL management

Sr. No.	Parameters	Target	Mitigation	Implementation	Responsibility
C) Operation Phase					
1.	Drinking Water Contamination	To ensure availability of safe drinking water	▪ The Management of the proposed project may install small water filtration units of required capacity for each building in order to avoid any bacterial contamination in the drinking water; ▪ Water dispensers should be used in the proposed Bestway Tower; and	▪ Project Manager ▪ Site Supervisor	▪ BCL management
2.	Water Consumption	To conserve water and consume sustainably	▪ The water taps should be regularly checked for any leakage; ▪ It should be made sure that all faucets and circulating pumps etc. do not leak and are regularly maintained; ▪ Leakage or dripping faucet, pump or toilet should be immediately reported; ▪ Utility bills should be kept in track for the consumption of water; ▪ Water-saving equipment such as low-flow shower heads, sensor taps, sinks with auto-shutoff mechanisms, and water- saving toilets and urinals should be purchased and used; ▪ Treated water from wastewater treatment plant will be used for watering of lawns and other services; and ▪ An effective training program about water conservation should be established for the building superintends.	▪ Project Manager ▪ Site Supervisor	▪ BCL management

3.	Sewerage System	To ensure adequate drainage	▪ Regular maintenance checks shall be carried out to check any bursting or chocking of internal sewer; and ▪ The drainage and sanitation system shall be maintained in a sanitary and safe operating condition and all the surface drains should be cleaned periodically by the management. ▪ Solid waste bins/containers should be placed at appropriate location along the roads and in streets to avoid entrance of solid waste into sewers. ▪ Residents should be educated not to throw solid waste in wastewater sewers. ▪ Routine desilting should be carried out to avoid blockage ▪ Regular cleaning of grit chambers and sewer lines should be ensured to remove grease, grit, and other debris that may lead to sewer backups; ▪ Inspection of the condition of sanitary sewer structures should be carried out frequently or as per schedule of CDA.	▪ Project Manager ▪ Site Supervisor	▪ BCL management
4.	Air Quality	To minimize ambient air pollution and maintain good indoor air quality	**Ambient Air Quality** ▪ Plantation of grass and plants to absorb emissions; ▪ Use of solar panels should be preferred as power source; and ▪ Vehicles with excessive smoke emissions should not be allowed to enter the proposed building. **Indoor Air Quality** ▪ It is recommended that building manager develops and implement an IAQ management plan to address, prevent, and	▪ Project Manager Site Supervisor	▪ BCL management

Sr. No.	Parameters	Target	Mitigation	Implementation	Responsibility
			resolve IAQ problems in their specific buildings. To prevent IAQ problems effectively and efficiently, building manager should know and understand the history of the building (construction, uses, maintenance, etc.). ▪ For control of Indoor Air Quality (IAQ), carbon filters may be used in addition to normal filters to remove odor from circulating air. In addition, ducted return air instead of from ceiling plenum may be provided; ▪ Following are some important practices that can be adopted to manage the IAQ: o Inspect and assess the building envelope, including the roof, walls, and foundation, and promptly respond to identified problems. Routinely check the building for water leaks, seals around doors and windows, and any visible damp or moist parts of the building. Clean and dry any damp or wet building materials and furnishings within 24 to 48 hours after detection to prevent the growth of mold; o Ensure and validate that the building is maintained under a slight positive pressure (i.e., air comes out of the building when exterior doors are opened); o Check whether the temperature and humidity are maintained in a recommended comfort range; o Ensure that routine maintenance of the HVAC system is being performed, including the	▪ Project Manager Site Supervisor	BCL management

			performance of the system bringing outdoor air into the building; o Monitor carbon dioxide (CO2) levels. The carbon dioxide levels can be used as a rough indicator of the effectiveness of ventilation and excessive population density (e.g., overcrowding); o IAQ should be monitored on regular basis for parameters like CO, CO2, NO2, VOCs, etc. ; o Ensure that good housekeeping practices are being applied; o Ensure that routine preventive maintenance and upkeep of buildings is being performed. A preventive maintenance program provides the care to all building systems and components that keeps them operating at peak performance according to manufacturer's specifications, and also allows for early detection of problems; and o Ensure that scheduled renovations are isolated from the building's general dilution ventilation system when occupants are in the building.		

Sr. No.	Parameters	Target	Mitigation	Implementation	Responsibility
5.	Noise	To minimize the impact of noise on workers and local community.	▪ Use of solar panels should be preferred as power source, In case generators are used, it should be enclosed with a canopy to reduce noise; ▪ Use of horn should not be allowed in the close proximity of the proposed project buildings; ▪ Green belts and landscaping should be used as noise barrier; and ▪ Employees working close to generators for extended periods should be encouraged to wear ear protection.	▪ Project Manager Site Supervisor	▪ BCL management
6.	Solid Waste (Construction, Municipal and Hazardous Waste)	To avoid environmental, social and health issues due to solid waste	▪ Waste Collection Bins should be provided inside and outside the buildings at suitable locations for collection of daily generated solid waste; ▪ Assign color to collection bins according to the international standards; ▪ Recyclable wastes such as newspaper, cardboard, plastics, glass and metals could be separated for individual collection. Single stream collections may be more cost effective as the recyclables can be cheaper to collect and will reduce the volume of a more costly co-mingled dry recyclable collection; ▪ Hazardous Waste should be stored in a manner that prevents the commingling or contact between incompatible wastes, and allows for inspection between containers to monitor leaks or spills; ▪ Waste minimization should be encouraged and regular training be provided to office staff in correct identification and disposal of waste; ▪ Waste bins should be emptied by sanitary workers on daily basis; ▪ A registered contractor from Municipal Corporation Islamabad should be hired for collection and disposal of	▪ Project Manager ▪ Site Supervisor	▪ BCL management

			solid waste. ▪ Ensure the transport of hazardous wastes and contaminated soils is conducted by licensed Contractors for disposal at licensed facilities, in accordance with legislative requirements.		
7.	Emergency management	To minimize the health and safety risk due to Emergencies/Hazards	▪ Routine inspection should be carried out to check that the area around the generator is free of clutter and no flammable material is present; ▪ Standard fire and smoke detection and protection devices such as fire alarms, fire hoses and hydrants should be provided in all critical areas / of the proposed project; ▪ Firefighting equipment should be regularly examined and maintained by a reputable fire safety and security company; ▪ First Aid kits shall be available; ▪ Emergency response plan shall be implemented in close consultation with the Fire Fighting Department, Rescue 1122, bomb disposal squad and paramedics ▪ Emergency Numbers shall be posted clearly at various places. ▪ Adequate emergency exits shall be provided.	▪ Project Manager ▪ Site Supervisor	▪ BCL management
8.	HVAC	To maintain efficient HVAC System	▪ An important part of the O&M is schedules for cleaning ducts, filters, and other components, replacing filters, and measuring energy use and comfort. Performance measurements should be done monthly or at least quarterly, to provide operators with enough data to tell when systems are beginning to perform poorly. ▪ Ducts should also be periodically inspected for leaks, as this can cause surprisingly large energy losses. ▪ HVAC control systems are often run by programmable	▪	▪

			thermostats that schedule heating and cooling for different times of day and days of the week. Such schedules should be set to match the occupancy and activity schedules of different spaces. Sensors for HVAC controls, such as temperature and humidity sensors, or occupancy sensors, should be regularly checked for proper operation. Sensors that start shutting off or turning on heating or cooling at the wrong times make people too hot or too cold, and can waste energy. ▪ Like any other part of the HVAC system, a boiler must be adequately maintained to operate properly. However, it is particularly important that combustion equipment operate properly to avoid hazardous conditions such as explosions or carbon monoxide leaks, as well as to provide good energy efficiency.		
9.	Ecology	To maintain ecology of the Project Area	▪ Maintenance of the green areas and the protection of saplings to ensure better environmental conditions; ▪ Keep areas weed free. Weeds should be monitored weekly and removed no less than every two weeks. Use of chemicals for weed control and suppression needs to be approved by the concerned authorities. ▪ Use of fertilizers should be strictly monitored in order to avoid any incident. Natural nutrients should rather be preferred.	▪ Project Manager ▪ Site Supervisor	▪ BCL management

7.4 INSTITUTIONAL CAPACITY OF THE INDUSTRY

The organizational structure for the Environment Management Plan is outlined below:

7.4.1 Primary Responsibilities

The primary responsibility for implementing EMP within the proposed project lies under the management of BCL and Construction Contractor.

7.4.2 Operation Management & Control

Conducting the operational activities in environmentally sound manner will be the responsibility of the concerned Manager; for which he will be trained.

7.4.3 Supervision & Monitoring

Senior Supervisor will be responsible for all environmental issues and for the implementation of EMP.

7.4.4 Communications and Documentation

An effective mechanism to store and communicate environmental information during the project is an essential requirement of an EMP.

7.4.5 Meetings

Two kinds of environmental meetings will take place during the project:

- Kick-off meetings
- Weekly meetings

The purpose of the kick-off meetings will be to present the EMP to project staff and discuss its implementation.

A weekly meeting will be held during operation. The purpose of this meeting will be to discuss the conduct of the operation and environmental issues and their management. The proceedings of the meeting will be recorded in the form of a weekly environmental report.

7.4.5.1 Changes-Record Register

A change-record register will be maintained at the site, in order to document any change in project design; especially those which have direct impact on the industry's emissions, effluents, wastes and resource management. These changes will be handled through the change management mechanism.

7.4.5.2 Environmental Training

Environmental training will help ensure that the requirements of the EIA and EMP are clearly understood and followed by all project personnel in the course of the project.

Table 21: Environmental Training Schedule

Target audience	Trainers	Contents	Schedule
Selected management staff	Contractors	Key finding of mitigation measure	After every five months
All personnel	Proponent & Contractor	Mitigation measures	Monthly
Fire Drill	Field Expert	Mitigation Measures Especially Fire Fighting, Safety, Health And Environment (Emissions	Monthly
Technical Staff	EMS Manager	Waste disposal, vehicle movement restriction and other mitigation measures	After every three month
Other staff	Managers	Waste disposal, resource conservation and other mitigation workers	Monthly

7.4.6 Equipment Maintenance Details

Plant machinery will be maintained by the proponent according to the design and as suggested by the contractor. Fire safety equipment such will be regularly monitored to eliminate hazards of associated risk. Following is the maintenance details for the portable fire extinguisher:

Table 22: Equipment Maintenance Plan

Task	Weekly	Monthly	Semi-Annually	Annually
Visual Inspection	□			
Testing and Inspection		□		
Check for Leakage		□		
Recharging				□
Fire Mains and Nozzles		□		
Containers/Cylinders			□	
Control and Section Valves			□	

7.5 ENVIRONMENTAL BUDGET

The environmental budget consists of cost of plantation, monitoring (ambient air, ground water and noise), maintenance of fire-fighting equipment the monitoring of the impacts associated with the proposed project construction and operation will be carried out as and when required. The environmental budget for the proposed project will be **approx 4.0 Million.**

Cost of solar collecting glass, insulated curtain walls, roof top garden plantation, supply of PPEs during construction and other environmental enhancement activities should be included. The budget may go higher and a tentative break up in tabular form may be provided

Table 23: Breakdown of Environmental Budget

Sr. No	Component	Cost (PKR)
	Firefighting system	2,000,000
	Environmental Monitoring and Other regulatory Compliance	1,000,000
	Health and Safety PPEs	500,000
	Plantation	500,000
	Total	**4,000,000**

CHAPTER 8: CONCLUSION AND RECOMMENDATIONS

8.1 CONCLUSION

This report presents Environmental Impact Assessment (EIA) for the Construction of Bestway Tower proposed to be constructed at Plot No. B-2, Blue Area, Sector F-9/G9, Main Jinnah Avenue, Islamabad. EIA of project is conducted and report is being prepared according to guidelines and procedures prescribed by the Pak-EPA. It includes description of the project, description of the environmental baselines, potential environmental impacts and suggested mitigation measures. An implementation mechanism for mitigation measures in the form of an Environmental Management Plan is included in the report.

The prepared EIA reports described all anticipated impacts (both positive and negative), associated with the project. Appropriate mitigation measures as explained in the environmental study shall reduce, if not eliminate, these impacts so that these are within acceptable limits. Moreover, no deterioration, depletion or exploitation of resources is expected to be caused by this project.

Based on overall assessment of the environmental impact of the project, it is concluded that the project is not likely to cause any significant and long term adverse impact on the social, physical and ecological environment of the area, provided that suitable mitigation measures as identified in this study are implemented.

It is accordingly recommended that Environmental Approval for the project may be issued by the Pakistan Environmental Protection Agency, subject to payment of the requisite scrutiny fee by the proponent of the project and fulfillment of all codal formalities.

8.2 RECOMMENDATIONS

To sum up, following recommendations are suggested after detailed study of proposed project;

- The adverse environmental impacts can be reduced significantly by adopting best management and monitoring practices as well as by implementation EMP with true spirit.
- Separate Traffic Impact Assessment Study may be conducted and proper traffic management plan should be implemented to reduce traffic congestion issues in peak hours.
- Ensure adoption of environmentally sustainable practices to maintain the natural beauty and values of project area

- Waste minimization practices should be introduced to workers by conducting lectures on the spot to aware the workers about the long-term benefits of the same in lieu of the surrounding environment.
- A proper tree plantation plan should also be developed in order to make the project environment friendly.
- Small domestic waste storage bins should be placed at different locations for proper collection and disposal of solid waste.

It is recommended that the Proponent should obtain an Environmental Approval (NOC) from the Pak-EPA before proceeding further.