

**ENVIRONMENTAL IMPACT ASSESSMENT OF CONSTRUCTION OF ALTERNATE
ROUTE TO CIRCULAR ROAD FROM NEW AZADI CHOWK TO MASTI GATE**

By

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ABSTRACT

EIA is considered as one of the important tool for ensuring the “Sustainable Development” throughout the world. Pakistan has a proper framework and policies for conducting EIA before any major development. Since the Environmental Act 1997 for the Protection of Environment has been passed many EIA’s have been carried out. After the 18th Amendment in the constitution the Environmental Act is now a Provincial subject. All the environmental consultants and practitioners are following the provisions.

High Quality EIA is one of the main components of effective translation of EIA policy into practice.

EIA of “Construction of Alternate Route to Circular Road” was carried out through a holistic approach as a case study. The quality of existing report on this project was also assessed. The study is frame worked in political and historical context. Interviews were conducted with all the stakeholders to identify their concerns and impacts of the project.

The study reveals that there are certain problems within the Laws of EIA. One of the major finding is the controversial “Land Acquisition Act 1894.” Apparently the act seems straightforward but the major loophole is that it totally negates the public interest by not giving them fair compensation and acquiring any land any time for any kind of development and no arrangements for displaced people and their businesses. The law is “Anti citizen” and “undemocratic” and reflects the legacy of British Colonial times. Furthermore after the 18th amendment the powers have been shifted from federal to provincial level, and these powers are now used for the advocacy of mega development projects. This leaves the quality of EIA questionable.

The analysis further exposes that certain areas of EIA do not receive sufficient attention. The inadequacies are in decision making, consideration of alternatives and Public participation and consultation. It's not true that Government institutes are incompetent or lack capacity and interest in critical and holistic environmental matters but they are helpless and felt constraints against the central policies of Government.

This study underlines the need for further research on EIA through critical lens and holistic perspective.

Keywords: Environmental impact Assessment, Effectiveness, Quality of EIA, Development, Policies, Pakistan

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List of Symbols

BOD	Bio-chemical Oxygen Demand
°C	Degree Centigrade
CC	Construction Contractor
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
dB (A)	Decibel
DCR	District Census Report
DC	Design Consultant
EC	Environmental Committee
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environment Protection Agency
EPD	Environment Protection Department
GOP	Government of Pakistan
IEE	Initial Environmental Examination
Km	Kilometer
LDA	Lahore Development Authority
LGO	Local Government Ordinance
MBS	Metro Bus Transit System

MSL	Mean Sea Level
NEQS	National Environmental Quality Standards
NESPAK	National Engineering Services Pakistan
NO _x	Nitrogen Oxides
NGO	Non-Governmental Organization
NSL	Natural Surface Level
PEPA	Pakistan Environmental Protection Act
PM	Particulate Matter
ROW	Right of Way
SO _x	Sulfur Oxides
SOP	Standards Operating Procedures
TEPA	Traffic Engineering Transport Planning Agency
TSS	Total Suspended Solids
USEPA	United States Environmental Protection Agency

1 INTRODUCTION

1.1 General

Pakistan is experiencing a rapid growth in its economy, increase in its population, and urban growth. Over time industrialization, rural urban migration, and change in environmental conditions is causing adverse impacts. Lahore is the second largest city of Pakistan and provincial capital of Punjab. After independence in 1947 the city has transformed itself into cultural, educational, recreational, transportation and industrial center of the nation (Anjum, 2013). The infrastructure of Lahore is being developed and upgraded at a very fast pace. Most of the EIA's conducted are partial and superficial. There is a need to look deeper into the development process and from an ecological point of view to protect nature and interest of its population. Such a critical evaluation of the alternate route to circular road from new Azadi Chowk to Masti Gate is being presented as a case study for the urban development of Lahore in general to make informed decisions and facilitate sustainable development.

Generally Road Projects are proposed to enhance the economic and social prosperity. For all the positive impacts of road projects, they might additionally have critical negative effects on adjacent communities and nature. Roads permit the movement of people and merchandise starting with one spot to the next and make a connection between two places (the cause and terminus). Motorized road transports are considered as a necessary component of current life, contributing to economic development and improve the quality of life. Because of the huge expansion of urban and provincial commuters the demand for roads has likewise expanded. The interest has further expanded since road transport has turned into the significant method for customized transport. The development, extension and overhauling

of the national road networks has now turned into a significant part of the economic development programs in the country. Roads are executors of progress and along with that pursue the change. Fast urban development results in the extension of urban regions outwards along transportation corridors through Industrial, business, and private advancement. Lahore city is facing problems because of unplanned urban expansion. Being the Provincial capital and center of business and industry the rate of migration from the surrounding urban areas and south Punjab is high. The unplanned extension of the city put the burden on the current infrastructure of Lahore city bringing about the traffic congestion and pollution. In this respect, Government of Punjab chose to develop and enhance its public transport by executing the first Metro Bus System (MBS) on three routes of Lahore city.

- Corridor I:** Ferozepur Road (Gajjumatta to Shahdara), 27 km
- Corridor II:** Multan Road (Thokar To MAO College), 13 Km
- Corridor III:** G.T Road (Azadi Chowk to Lahore Ring Road), 13 Km

Because of massive congestion fast urban development and industrial infrastructure on Ferozepur Road, the corridor for MBS has been developed and opened to public in February, 2013. This corridor is halfway grade and somewhat lifted. From Gajju matah to Qaddafi Stadium, it is at grade, from Qaddafi Stadium to Bhaati Chowk (8.5 km) it is lifted, and from Bhaati Chowk to Shahdara it is again grade. Azadi Chowk is one of the busiest Junctions because of the current land use patterns of the area. It has numerous archeological, historical, religious/social and cultural locales. These sites includess: Lahore Fort, Badshahi Mosque, Minar-e Pakistan, Tombs of Hafiz Jalandhri, Data Darbar, Gurdawara Dehrab Sahib, Samadhi of Bhai Vasti Ram, Samadhi of Ranjit Singh, Shah Jahan's Quadrangle, Jahangir's Quadrangle, and other vacation spots like Food Street. There are also health institutions including specialized hospitals like Punjab Dental Hospital and Lady Walingdon Hospital which is a combined maternity and gynecological facility. Major Bus Stand for Intercity Transport known as Lari Adda is used by large number of passengers. The project area is likewise used to get to major educational institutes in the city, such as GC University Lahore, National College of Arts Lahore and so on.

To improve transport facility and to maintain the archeological legacy of the area, Government of Punjab (GOP) has chosen to relinquish existing Circular Road up to Masti Gate, over a length of approximate by one (1) km (from Azadi Chowk to Laari Adda Chowk). An existing road (Ahmed Ali Road), adjacent to Iqbal Park, will be upgraded as a substitute to the reach of Circular Road. This road will be realigned to join with existing Circular Road at Laari Adda Chowk. The overall objective of the proposed project is facilitating vehicular movement and security of archeological legacy of the region. To comply with Pakistan's Environmental Regulations according to Pakistan Environmental Protection Act (PEPA) 1997 the Environmental Impact Assessment (EIA) Study for the development of Alternate Route to Circular Road from New Azadi Chowk to Masti Gate is carried out.

1.2 Scope of Study

Basically the origin of EIA is parallel to Cost benefit analysis (CBA) and environmental impact analysis was born in the US whereas CBA was logically developed by economists whereas EIA was developed by ecologists and environmentalists (Hall, 1978). There is one typical process which is being practiced all over the world with some modifications for conducting EIA. So it looks at environment through a reductionist approach and it ultimately excludes many things from it. The scope of the EIA Study points at collection and examining of information identified with biophysical and socio-economic environment of the project area and to set up the baseline environmental profile. It likewise points at the identification, prediction, and evaluation of the possible ecological effects of the proposed projects on its surroundings on both short and long term basis. Whereas my scope of work would be different from the typical process and connect it with political and historical perspective. This is the other policy approach in which EIA process would be studied in historical and political perspective, it includes the ecological perspective. Looking at the things and connecting to it with larger framework is known as holistic approach. So we can understand the dynamics of the system and can have depth in it. With view of the ecological perspective in EIA we can achieve or ensure Sustainable development.

1.3 OBJECTIVES OF THE STUDY

The overall objective of EIA is to assess the process of environmental impact assessment in political and historical perspective and analyze the “construction of alternate route to circular road from new Azadi Chowk to Masti gate” as a case study. Identifying the short comings in the project and how it can be improved. The whole process of EIA would be conducted and documented in detail. The specific objectives of the EIA Study for construction of Alternate Route to Circular Road from New Azadi Chowk to Masti Gate include the following:

- Critical literature review with political and historical perspective
- Identify the spirit of EIA and the reality of EIA process
- Preparation of baseline environmental profile and collection and scrutinization of data related to physical, biological, and socio-economic environments of the project area.
- Identification, prediction and evaluation of environmental impacts of the proposed Project;
- Propose mitigation measures to minimize the adverse effects of the project
- Preparation of an Environmental Management and Monitoring Plan.
- Evaluation of public participation/ consultation and Identification of vulnerable groups present in the area.

1.4 The Project

“Need for EIA Study of the Proposed Project”

“EIA is mandatory according to the Pakistan Environmental Protection Act (PEPA-1997). Section 12 (1) of the PEPA-1997 which 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 Pakistan Environmental Protection Agency (Review of IEE and EIA) Regulations 2000, the proposed project falls under category D (Transport) of Schedule II, which requires EIA before commencement of construction (GOP, 1997).

The proponent and Consultant & Construction

The proponent of the project is Lahore Development Authority (LDA) and the consultation for construction of alternate route to circular road from new Azadi Chowk to Masti gate is designed by NESPAK (created in 1973) and is, being constructed by Sarwar Construction & Co. under the supervision of NESPAK and TEPA.

STUDY AREA



Figure 4.13: Sensitivity Map of Project Area

Figure 1.1 Location Map of the Project Area

The proposed study would be carried out in the city of Lahore in Punjab province. The study would be carried out on location along Ahmed Ali road. It would start from Ravi Chargha (at Ravi Road) and ends at Masti Gate. This road is a busy road being used by commuters travelling to and from Lari Ada, Azadi Chowk, and Sabzi mandi crossing many tourist hot spots and civic amenities in the area. The existing Circular Road would be abandoned up to Masti Gate, over a length of approximate one (1) km (from Azadi Chowk to Laari Adda Chowk). An existing road (Ahmed Ali Road), adjacent to Iqbal Park, will be improved as a substitute to the reach of Circular Road. This road will be realigned to join with existing Circular Road at Laari Adda Chowk. The overall objective of the proposed project is facilitating vehicular movement and protection of archeological heritage of the area.

1.5 THESIS OUTLINE & COMPONENTS

The thesis outline and components of research are as follows:

- i. Introduction** – it includes the scenario of transport and development in Lahore, Scope of the Study, objectives, background of the project area, and relevant legal provisions.
- ii. Literature review** – it will include brief review of research papers, technical reports, and unpublished material on transportation history, political and historical background of EIA in Pakistan and all over the World.
- iii. Methodology** – it will comprise of methodology of study and its comparison with other methods and shortcomings in the current EIA.
- iv. Data** – all the data (primary or secondary) was collected and analyzed from government organizations, NESPAK and interviews with the locals of the area were conducted and along with that standard questionnaire would be filled.

Contents of EIA

- v. **Description of the Project** – the detailed information about location of the project, size of the project, problems arising due to the project and alternatives of the project.
- vi. **Environmental Baseline Profile** – it includes baseline conditions for physical, biological, ecological, and environmental conditions in the project area.
- vii. **Public Participation** – it identifies the main stakeholders, their political position, their concerns about the whole project and their reaction and role during the whole procedure.
- viii. **Environmental Impacts and Mitigation** – this included the identification of all the social, ecological, and environmental impacts of the project during its different phases and mitigation strategies were proposed for each of them and how to tackle the challenges faced by the public.
- ix. **Environmental Management and Monitoring Plan** – it suggested the proposed mitigations measures needed to be implemented and monitoring of the whole process not only in operational phase but even after the completion of the project.
- x. The last chapter is on discussion and conclusion. It also includes recommendations.

1.6 INSTITUTIONAL FRAMEWORK

The current environmental policy as well as legal and administrative framework related to carrying out the EIA of “construction of Alternate route to circular road from new Azadi Chowk to Masti gate” is being discussed and analyzed. The proposed project requires an EIA in accordance with Pakistan Environmental Protection Act (PEPA), 1997 and IEE/EIA Regulation, 2000.

1.6.1 Policy Framework

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

1.6.2 National Environmental Policy, 2005

For addressing the environmental issues Government of Punjab (GOP) has launched its National Environmental Policy in March, 2005. Section 5 of the policy integrates the environment into development planning as an instrument for achieving the objectives of National Environmental policy (GOP, 2005). The clause (b) further states in subsection 5.1 that for all development projects provisions related to Environmental Protection Act, 1997, will be diligently enforced. To address the environmental concerns and to ensure the effective management of the environmental resources the broad guidelines to the federal government, provincial governments, federally administered territories and local governments has been also provided (GOP, 1997).

1.6.3 National Resettlement Policy, 2002

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

1.7 Legislative Framework

Government of Punjab has promulgated laws/acts, regulation and standards for the protection, conservation rehabilitation and improvement of environment. Along with this they have also developed environmental assessment procedures governing development projects

1.7.1 The Pakistan Environmental Protection Act, 1997

The Act was enacted on December 06, 1997 by repealing the Pakistan Environmental Protection Ordinance 1983. It provides the framework for implementation of the PNCS, 1992 establishment of provincial sustainable development funds, protection, and conservation of species, conservation of renewable resources, and establishment of Environmental Tribunals, appointment of Environmental

Magistrates, Initial Environmental Examination (IEE), and Environmental Impact Assessment (EIA). Section 12 of the Act stresses the need to carry out EIA/IEE study prior to construction or operation of a project. PEPA, 1997 is available at official website of EPD, Punjab.

Due to the passing of the 18th Amendment to the Constitution of Pakistan, Pakistan's federal Ministry of Environment was devolved to the provincial level on June 30, 2011. Thus, a recent amendment in Pakistan Environmental Protection Act, 1997 was resented and is published in Punjab Gazette on April 18, 2012 as an Act of Provincial Assembly of Punjab.

Twenty three amendments have been made in the **Punjab Environmental Protection (Amendment) Act, 2012 (The Punjab Law Department, 2012)** . The amendments can be categorized as follows;

- Amendments in Short Title and commencement as Punjab Environmental Protection Act and it extends to the whole of Punjab only;
- Amendments in administrative jurisdiction (Transfer of powers and control from Federal to Provincial Government);
- Definitions and reference to the territorial waters, exclusive economic zone and historic waters shall be omitted based on the devolution of powers from Federal to Provincial levels
- Amendment in penalties.

1.7.2 **Pakistan Environmental protection Agency (Review of IEE/EIA) Regulations, 2000**

The criteria for projects requiring IEE and EIA are provided by these regulations. They also explain the preparation and review of Environmental reports. These regulations are also available at official website of EPD, Punjab (GOP, 2000b).

1.7.3 **Pakistan Environmental Assessment Procedures, 1997**

Environmental protection with regard to toxic and hazardous waste is covered by the Pakistan Penal Code (PPC), 1860. Environmental protection department (EPD), Punjab, is mandated to monitor the

transportation of hazardous materials within the provincial limits. Pakistan Environmental Assessment procedures (1997) are, in fact, a package, which contains following set of information regarding the proposed project.

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

Environmental Policy and administrative procedures to be followed are explained by this. Filling of environmental examination/ assessment reports by the proponents and their review is all briefed in it.

b) Guidelines for the Preparation and review of Environmental Reports

These guidelines have been prepared for the facilitation of both proponent and decision makers that how to prepare the reports and how to carry out the review.

c) National Environmental Quality Standards (NEQS), 2010

Pakistan Environmental Protection Council (PEPC) first approved these standards in 1993. After this they were being revised in 1995, 2000, and 2010. They furnish information on the permissible limits for discharge of municipal and industrial effluent parameters and industrial gaseous emissions in order to control environmental pollution. The National Environmental Quality Standards (NEQS), 2010 are available at official website of EPD, Punjab (GoP, 2010).

1.7.4 Other Relevant Laws

a) Punjab Local Government Ordinance, 2001

Environmental Protection is developed subject under Punjab local government ordinance (LGO), 2001. Despite any specific provisions, every local government may perform functions conferred by or under the Punjab LGO, 2001 and in performance of such functions may exercise 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 Punjab LGO, 2001. Environmental

protection is at serial 48 of the sixth schedule (Punjab, 2001).

b) Canal and Drainage Act, 1873

The Act entails provisions for the prevention of pollution of natural or manmade water bodies (Gazette of India, 1872) .

c) Pakistan Penal Code, 1860

This defines the penalties for violations concerning pollution of air, water bodies, and land (GOP, 1860).

d) Guidelines 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 (EPA, 2005) .

e) Sectoral Guidelines, 1997

Pakistan Environmental Assessment procedure deals with general guidelines as well as the sectoral guidelines for the environmental assessment studies. The sectoral guidelines have been given for some categories of the projects and deals with the following:

- Major thermal power station
- Major Chemical manufacturing plants
- Municipal waste disposal
- New township development
- Oil and gas exploration and production
- Major roads
- Water supply projects
- Sewerage schemes
- Industrial estates

1.8 Air Quality Standards

In pursuance of the statutory requirement under clause (e) of sub-section (1) of section (6) of the Pakistan Environmental Protection Act, 1997(XXXIV of 1997), the Pakistan Environmental Protection Agency

with prior approval of the Pakistan Environmental Protection Council, has published the NEQS for Ambient Air in 2010 (GOP, 2000a) . USEPA standards along with NEQS effective from January, 2013.

1.9 Noise Quality Standards

In pursuance of the statutory requirement under clause (c) of sub-section (1) of section (6) of the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997), the Pakistan Environmental Protection Agency with prior approval of the Pakistan Environmental Protection Council, has published the NEQS for Noise (2010). These standards are established for the four different categories which include residential area, commercial area, industrial area and silent zone. These standards vary according to the day and night timing, day time hours are 6:00 am to 10:0 pm and night time hours are 10:00 pm to 6:00 am. USEPA standards and World Bank guidelines along with National Environmental Quality Standards for Noise effective from January, 2012 are used for bench marking purpose.

1.10 Drinking Water Quality Standards

Pakistan Environmental Protection Act, 1997 (XXXIV of 1997), the Pakistan Environmental Protection Agency with prior approval of the Pakistan Environmental Protection Council, has published the National Standards for Drinking Water Quality,2010. WHO Drinking water quality guidelines and USEPA standards has been used for bench marking purpose along with the National Standards for Drinking water quality effective from January, 2013.

1.11 Occupational Health

Development and operational activities can affect the occupational health of the workers. Quantitative National standards concerning the above perspective are yet to be created In Pakistan. However, guidance in qualitative terms can be obtained from the Labor Laws (Amended) Ordinance, 1972.

1.12 Toxic or Hazardous Waste

Protection of the environment with regards to toxic and hazardous waste is secured by the Pakistan Penal Code (PPC), 1860. Environment Protection Department (EPD), Punjab, is mandated to monitor the transportation of hazardous materials within the provincial limits.

1.13 Preservation of Cultural Heritage

The Antiquities Act, 1975, administered by the Provincial Government, is aimed at safeguarding the preservation of cultural heritage, destruction, damage or defacement of equities is an offence under the act.

1.14 Administrative Framework

1.14.1 Lahore Development Authority

The implementing agency of the proposed project is Lahore Development Authority (LDA) Government of Punjab. The management of LDA will ensure that all rules and regulation and the laws are effectively being implemented at all stages.

1.14.2 Environmental Protection Agency, Punjab

Pakistan Environmental Protection Council is the pinnacle between inter-ministerial and multi-stakeholders decision-making body, which is headed by Prime Minister. While Pakistan Environmental Protection Agency is implied for the authorization of environmental and ecological laws in Pakistan. They have delegated powers to provincial environmental protection agencies for review, approval, and monitoring of environmental examination/assessment projects. As respects the proposed Project, EPA Punjab will be in charge of issuing No Objection Certificate (NOC) and by and large monitoring of the proposed project activities.

1.14.3 Rules of Business for District Environment Office under Punjab LGO, 2001 National Reconstruction Bureau has formulated the following rules of business for district environment offices:

- To regulate motor vehicles subject to the provision of the Pakistan Environmental Protection Act, 1997 and the rules and regulations made thereunder;
- To ensure, guide and assist the proponents of new projects in submission of Initial Environmental Examination (IEE)/ Environmental Impact Assessment (EIA) to Director General, EPA for approval;
- To ensure implementation of environmental protection and preservation measures in all development projects at the district level and to sensitize government agencies on environmental issues;
- To identify the needs for legislation in various sectors of the environmental matters;
- To provide information and guidance to the public on environment;
- To encourage the formation and working of non-governmental organizations, to prevent and combat pollution and promote sustainable development
- To undertake regular monitoring of projects and to submit progress reports to Director General, EPA for publication in the annual report.

2 Literature Review

Literature presented in this chapter deals with EIA process, decision and policy making and other issues all over the world and within Pakistan along with that literature on transportation history, road network, and BRT (Bus Rapid Transit) in Pakistan is also incorporated. The infrastructure of Lahore is being upgraded at very fast pace and development projects are quickly deployed in the city out of all those projects BRT (Bus Rapid Transit) is one of the biggest urban development project. In regard to that the literature would be analyzed and presented critically.

The historical background of EIA dates back to the National Environmental Policy Act of the United States of America (NEPA) in 1969. Emulating the US activity, a few nations actualized EIA frameworks, for instance Australia (1974), Thailand (1975), France (1976), Philippines (1978), Israel (1981), and Pakistan (1983). EIA is being carried out now in more than 100 countries in the world (Canter, 1996). It indicates that in developing countries, the Asian nations began taking environmental measures and initiatives early, while numerous nations having an Environmental Impact Assessment framework set it up by the 1980's. ("History of EIA Systems and Measures taken around the World,")

In Pakistan EIA is defined as “Environmental impact assessment means an environmental study comprising collection of data, prediction of qualitative and quantitative impacts, comparison of alternatives, evaluation of preventive, mitigatory, and compensatory measures, formulation of environmental management and training plans and monitoring arrangements, and framing of recommendations and such other components as may be prescribed” (GOP, 1997)

Many developers believe that EIA is an anti-development process and is a hurdle in process of development as the process seems costly and time consuming. Though it's a step toward environmental protection but it would be interesting to evaluate the real practice of EIA.

Once Abraham Lincoln remarked that anyone who enjoys eating sausages and using the law should avoid seeing how either is made. The same can be said about many of the scientific “laws” and principles underlying environmental policy and debates today.

So review of Environmental impact assessment is important to consider along with this one should try to understand the ways in which science and politics are related or interconnected. As international institutions have major role in policy making for developing countries, so it is important for environmental scientists to turn with a critical lens on interactions between science and policy. Westman describes in his book clearly that environmental impact assessment is not only a scientific activity, but it is a complex combination of science and society in which biologists and environmentalist have a critical role to play (Westman, 1985). International studies have showed that political factors are the main driving factors behind the introduction and practice of EIA (Thomas, 2001). One author described Environmental protection as a “Critical democratic responsibility” and claims that EIA practice demands for frequent, continuous public participation, full access to information, right of appeal to an independent third party, full participation of interested and affected public and a clear decision making role for the public (Grace, 2005). In developing countries the process of EIA is bureaucratic requirement used for the approval of the project, political interference decides the fate of environmental review, and the practices by the public servants are dubious and question the process of EIA (Shah, 2010). Bojorquez-Tapia and Gracia argue that as a part of decision making process, EIA’s are political by their very nature (Bojórquez-Tapia & García, 1998). Political evaluations are powered by the way that most of the EIA’s are used to support, restrict, or reduce publicly disputable projects (Wilkins, 2003). Kiambere Gorge Project in Kenya is an example of this, in 1971 government of Kenya conducted EIA for securing the funding from the World Bank for construction of hydroelectric dam on Tana River the Kiambere Gorge. For securing the funding government did the favorable EIA. The major issue was that government estimated 3000 people would be displaced whereas the independent findings of the World Bank said that the figure was closer to 10,000 people which would be displaced (Hirji & Ortolano, 1991). Such varying estimates and results leave the

people feeling that methodology did not think seriously about their own particular needs or the true state of affairs. They leave people with the feeling that the EIA lack credibility in light of the fact that it was bias even when the effort has been done to resolve the issues (Wilkins, 2003). Secondly pressure to complete the EIA process as quickly as possible may limit the study from assessing the impacts of the project in different times of the year or in extreme cases can ignore essential components of EIA (Wilkins, 2003). For instance the case study of Masinga Dam project proposal in Kenya the experts were given 2 months' time for conducting the study, as a result consultants did not have enough time to consider the effects of siltation in the dam or changing in the water levels and instead of it focused on the other issues that were more important at that time (Hirji & Ortolano, 1991).

Environmental impact assessment does not appear as an effective tool to “Safeguard” the environment and socio-economic fabric of the communities in Pakistan (Aslam, 2006). The main issues regarding EIA's performance in Pakistan are insufficient human resources in both government and private sector, no transparency in public participation, poor quality, fraudulent, and fudged EIA reports, corruption, or unfair approvals owing to monopoly and maneuvering on behalf of few consultancy firms in the country (Saeed & Sattar, 2012). The nature of EIA cannot be accomplished unless socio-political context in which the EIA framework need to work is good (Nadeem & Hameed, 2008). In this regard Thomas mentioned that political pressures have been the main thrust behind the EIA. He further suggests that EIA will be successful in future only if environmental values are incorporated in culture of the society, public law and policy (Thomas, 2001).

Despite of the fact that Pakistan has “Sound legal basis”, guidelines, regulations, hierarchy of environmental institutions the EIA practice in public sector development projects is generally weak and the reasons are poor public participation, poor quality of EIA reports (Nadeem & Hameed, 2013). There are many projects which have been carried out without EIA, poor EIA or either EIA was conducted during the construction phase, examples of such projects are exploration of oil and gas in Kirthar National

Park, Karachi, Lahore Islamabad Motorway project (M-2) and Zero Point Interchange project in Islamabad (Nadeem & Hameed, 2013).

Riffat reviews and evaluates the EIA system of Pakistan using 14 criteria of the Christopher Wood model and claims that Government of Pakistan and the funding agencies are ultimately the decision makers of the project which is a dictatorial approach. Though the reports for the project are prepared but have little or no effect on the decision making process. In the same way all the projects which are funded by federal/provincial or local governments all the decisions are based on political basis influenced by certain quarters. It is troublesome as well as just impossible to change the location of the project due to the political pressure. In this situation Pakistan EPA cannot play a crucial part in decision making process. Generally Pakistan EIA framework does not satisfy the criteria of decision making (Riffat & Khan, 2006). There is a clear need to give more importance to decision making process in EIA system of Pakistan.

According to Shah due to the time limit on the project and for clearance of EIA to avoid time delay is a one of the major constraints in EIA practice in Pakistan (Shah, 2010). He further mentioned major problems in EIA review as following:

- EIA is nothing more than a bureaucratic requirement for the clearance of the project
- Political interference decides the outcomes of environmental reviews
- The practice of EIA by the Public servants disgrace the process and make it questionable
- The implementation of the project in critical areas is not satisfactory.

Participation is a process in which public/stakeholders take part in decision making process and share control on the development projects which affect them (bank, 1996). The process of consultation and participation with Public is being held since year 2000 but it has been claimed by number of authors that the process is not effective nor transparent (Aslam, 2006).

According to Wood that EIA could not be done without consultation and participation of people (Chris Wood, 2002). So it would be justifiable to say that public participation is one of the main components of

EIA. It must be ensured that it's not just a formality but must involve the real stakeholders and people who are actually affected by the project. It will not only enhance the quality of the EIA in fact it would help to resolve the conflicts among the developer and people and promotes sustainability if conducted with transparency. The EIA reports are complex and technical and difficult for the public to understand (Sullivan & Kuo, 1996). The reports are written in English only. Neither any executive summary nor other thing is written in the native and local language. So it's difficult for the public to understand or consult the reports. Secondly public hearings are held at distant and "Fancy" places or at such places which are far away from the project site due to which the low income people of the public are kept out of the public hearing process (Nadeem & Hameed, 2014). So decision making related to EIA process is not transparent at all. Public is kept out of the process and involved when the major decision has been taken about the project so there is less opportunity that they will influence the decision (Manowong & Ogunlana, 2006).

The common challenges in EIA practice are as follows (Christopher Wood, 2003):

- Poor integration of EIA in decision making process
- Least participation of stakeholders in EIA process
- Inadequate converge of impacts
- Poor quality of EIA reports
- Poor review of EIA reports
- Weak implementation of mitigation, measures and monitoring of impacts

The contribution of EIA in both consent to decision and design of the project is normally moderate rather than substantial (Jay, 2007).

Pakistan's strategic priorities are briefed in "Vision 2030" which is prepared by Planning Commission of Pakistan in August, 2007 and approved by National Economic Council which envisions "developed,

industrialized, just and prosperous Pakistan through rapid and sustainable development in a resource constrained economy by developing knowledge inputs”(GOP, 2007).

Some of the important points of “Vision 2030” for Lahore city are mentioned below:

- “With present infrastructure, it will not be possible to expect our enterprises to become a part of, and players in, the international supply chain, or to facilitate new investment in the industry, agriculture and services” (GOP, 2007).
- “Lahore returns to being a city of intellectual activity and entertainment. Half a dozen of foreign universities will have made it their first overseas campus; together with its older well known Pakistani universities, they will offer a variety of studies to people from across the world. The mall will have a large number of theatres and restaurants, with the walled city and historical monuments becoming a haven for tourists and students. Its industrial estates, technology parks, and shopping centers will rival the best in the region. Its cultural and art festivals will attract a large numbers of domestic and international tourists” (GOP, 2007).

The purpose of quoting these plans is to connect the current development with this and to understand the far reaching consequences of these projects and developments. This paradigm of development seems quite glamorous but then we have to pay an enormous cost not only in monetary term, in fact in social and environmental terms as well. As the public participation is weaker and poor in Pakistan so the people would be more marginalized and it will deteriorates the social fabric. Moreover as it has been said that in the Vision they want to make Pakistan prosperous through “Rapid sustainable development.” This might lead to rapid economic development but shows the short term thinking and unsustainability of the environment and the people. The state now increasingly invests huge sums of money in infrastructures to open it up to extraction by foreign capital.

According to Wilkins predicting the future is a difficult thing to do and it becomes more difficult when you have to determine the effects of synergies and their connections in the natural environment. If the

purpose of EIA is only to make informed decisions on development projects then its unfeasible (Wilkins, 2003) .

Jones and Greig summarize this point as:

“A common feature of all environmental impact assessment is that they are doomed to failure. Failure, that is, in the sense that our hopes of accurately predicting all the impacts of an action that impinges upon the environment are virtually nill. The more we learn about environmental systems the more we tend to be struck by our profound ignorance of the interactions and processes which govern their response to perturbations” (Jones M & Greig, 1985).

In recent Economic survey 2013-14 Government of Pakistan claims that it’s “Committed to develop and enhance and modernize transport and logistics sector. Vision 2025 seeks to establish an efficient and integrated transport system that will facilitate the development of our economy” (yusufi, 2013-14). Whereas total road networks in Pakistan is 263,775kms out of which 70% are paved and about 40.9% of total roads lie in province of Punjab (yusufi, 2013-14) . This shows that urban transport problems in Pakistan are resolved or fixed by building larger and better roads whereas the principal of sustainable transport encourage using low cost public transport which can work better in mixed land use and high density Pakistani cities (Imran, 2009).

In institutional barriers to urban transport in Pakistan Imran says that road density (km of road per sq.km of land area) in Pakistan (0.32) is even higher than many countries such as China (0.19), Bangladesh (0.14), Thailand (0.11), and Turkey (0.19) (Imran, 2010).

Imran and Low reported that scarce resources in Pakistani cities are set out for the development of the road projects at the cost of public transport and non-motorized transport. They found that all the policies of road development are not after effect of any modern development in Pakistan and there were hardly any private vehicle in Pakistan until after World War II. The policies are actually there because of the involvement of International development institutions and their specialists, which supports the road

development policies rather than inherited railway that pass through the vast majority of the urban areas. They infer that heavy investment in road development projects left no money for improved Public transport in Pakistan urban communities (Imran & Low, 2007).

Thorner believed that after the independence of India and Pakistan in 1947 they have opportunity to develop such public transport policy which is according to the demands of newly independent countries which were defiantly different from the colonial masters obligations (Thorner, 1955) .

In the first five year plan (1955-1960) 70% of the resources were allocated to the total land transport for Pakistan railway and 30% for the road transport and they acknowledge this fact that

“The backbone of [west] Pakistan’s transport system in broad gauge railway network. It is a system of main lines, one in each of five parallel river valleys, interlinked and stretching from the coast to Afghanistan and India’s frontiers”

(Government of Pakistan, National Planning Board 1957:485)

But right after this the second five year plan (1960-1965) depicts another picture which is entirely different from the first plan. It was the first document in Pakistan which supports the road sector and priority was given to the roads over railways and more financial resources were allocated for the roads and the reason behind it was stated as:

“Road transport is particularly suited to the conditions and requirements of Pakistan... the motor vehicle is more adaptable than the railways to varying degrees of traffic intensity and permits a greater degree of speed and efficiency in haulage over short distances... there is close relationship between the volume of transport and the level of economic activity because each depends upon the other”.

(Government of Pakistan, Planning commission 1960).

The second plan not only supports the road sector it also encourage the private sector to come forward and run road based public transport. From that time to until now government is formulating such policy which attracts the private sector and international organizations to set up public transport and government is helping them in building infrastructure for such projects and Lahore metro bus service is one of such project most recently running in Punjab. Now similar projects are being replicated in Multan, Rawalpindi, and Islamabad without analyzing its efficiency.

With efforts of international institution (World Bank) and Government of Pakistan The Transport Sector Development Initiative (TSDI) was framed in 1999 and a comprehensive transportation policy was formed (TSDI, 20001). The document emphasizes on paradigm of privatization and deregulation of Public transport. The document states that:

“Each mode should be developed according to the guidance of market forces... the private sector should be encouraged to play its part in public transport ... a common platform of public and private sector should be established to discuss issues regarding different modes of transport.... Existing laws and tax duties should be modified in favor of privatization” (TSDI, 2001).

The point to be noted is that all the documents or policies which are prepared with the help of international institution put emphasis on privatization.

In 2001 the Integrated Master Plan (2001-2021) was prepared in Lahore for future development, but it's not a bit different from all other previous Master plans which encourage the Road network and ignore the potential of formulation of Public transport (Imran, 2009). In the same way the first five year program for transportation development in Lahore suggests 94.8% resource allocation for road development, its maintenance and management whereas only 5.2% for the public transport terminal (LDA, 2004a).

Now the support from The World Bank and Asian Development Bank for BRT system in Pakistan is again the favor and advocacy of private sector in terms of policy making, investment, and running public transport. It is interesting to note that since the creation of Pakistan from early 1960's private sector is

interested in investing in and running of public transport while Public sector finance has been used for the construction of roads only and all the international institutes helps in building roads and even provide funds for it but never provide help in developing adequate public transport (Imran, 2009).

In a report by EMBARQ it has been reported that at present more than 160 countries around the world have implemented 4,200Kms of bus rapid transit along with high quality bus corridors which transport almost 30 million passengers on daily basis. Whereas from 1992-2001 only 23 cities had implemented BRT system while 115 cities have implemented BRTs since 2002 (Carrigan, 2010).

According to Menon new environmental impact assessment notification in India in 2006 for the grant of environmental clearance to development and industrial projects is such a legislation which is not in the favor of public or environment. In fact it has a potential to affect people's livelihood, natural environment and its resources and not only this but would disturb the ecological wellbeing of the country. The experience of the people after its enactment is bitter and disappointing and the entire process was compromised with substandard, fraudulent, and fudged EIA reports and public hearings. Environmental priorities are replaced with investment priorities and violate the mandate of environmental protection Act. Local community groups are partially or completely out of the whole process. It has been propagated that citizens are enjoying and celebrating the use of their right to information however this retrograde step restrict the affected persons access to final impact assessment based on which the clearance will be granted to the project. It make local communities and environment vulnerable to project impacts as they don't include the social scientists, ecology experts and the local community in the process (Menon & Kohli, 2007). This is the decision making story from India but Pakistan's story is not different from it. After the Gazette Notification 2012 twenty three amendments have been made in the Punjab Environmental protection Act, 2012 after which the powers have been transferred from Federal to Provincial Government. Now it's much easier to allocate huge resources for the development process and to build a new infrastructure (The Punjab Law Department, 2012). For supporting all the development

process different laws has been created by Punjab Government since 2012 some of them are listed below which supports the new urban development projects.

- Punjab Metro Bus Authority Act, 2012
- Punjab Environmental Protection (amendment), 2012
- The Walled City of Lahore Act, 2012

With all such reforms EIA procedures have been tied up with economic interests rather than environmental concerns and now it's much easier for allocating the huge sums of money for infrastructures projects as powers have been delegated from Federal Agency to Provincial Agency after the amendments in environmental protection act 2012.

Beattie argues in his paper that purpose of EIA is to provide potential impacts of the particular project on the environment. But actually the EIA's are part of broader government and private decision making processes and as they have distributed impacts which could be small or large so they are always political EIA's are more concerned with urban planning, economic growth, and corporate planning and less to do with environment, public and science (Beattie, 1995)

Environmental, economic, and social change is inherent to development. Environmental Impact Assessment is a tool used for decision making regarding projects, developments, and programs. EIA is intended to identify the environmental, social, and economic impacts of a proposed development prior to decision-making (Heer and hagerty, 1977). This means it is easy to identify

- The most environmentally suitable option at an early stage.
- The Best Practicable Environmental Option.
- Alternative processes.
-

The words of Peter Hall are so valid and relevant over fifteen years ago and in fact implies today even:

“EIA is unlikely to become long sought after scientific tool which, plugged in, will solve all planning problems. But neither is it a medieval philosopher’s stone _ a tool of alchemy which promises everything and yields nothing. Rather, it is a useful additional battery of techniques that can aid the planner_ and also the political decision maker and the affected public_ to conduct a more rational, more structured debate about the effects of proposals for development, and about the weightings that ought to be attached to those effects”__ (Hall, 1978).

The basic aim of EIA is not to inquire the balance placed by the decision maker on environmental in contrast to economic, social, or other considerations but also to assure that decision is made on the basis of informed knowledge of the environmental consequences of the decision (Roberts & Roberts, 1984).

The effectiveness of EIA cannot be improved unless there is a political will to make it succeed, a legal and institutional infrastructure to enforce and control the operations and technical skill and proper educational awareness through all development process (Briffett, 1999).

These are the situations regarding the policy framework and how it is actually interlinked with science and politics. But most of the laws in Pakistan are from the colonial times which have not been changed or modified and advocate the development without considering environment and the Public concern. The governing legislation regarding land acquisition and compensation is the Land Acquisition Act (LAA), 1894. . The LAA is limited to a cash compensation policy for the acquisition of land and built-up property, and damage to other assets such as crops, trees, infrastructure, etc. The LAA does not take into account the rehabilitation and resettlement of displaced populations and the restoration of their livelihoods.

3 METHODOLOGY

Project Profile

Project Name: Environmental Impact Assessment of “Construction of Alternate Route to Circular Road from New Azadi Chowk to Masti Gate”

Client: TEPA (Traffic Engineering Transport Planning Agency TEPA LDA)

Consultant: NESPAK (National Engineering Services Pakistan)

Contractor: Sarwar and Company (Pvt) Ltd.

Location: The Project is located on Ahmad Ali Road. Outer circular road starts from New Azadi Chowk and runs along the periphery of the Iqbal Park until Masti Gate, Lahore. Major part of Maulana Ahmad Ali road almost 400m is converted into flyover rotary ramp

Project Cost: The estimated capital cost of the project was 1, 8341.153 Million Pak Rs.

Completion Period: 165 days

Inauguration: July 13, 2014

This chapter will explain the study approach and methodology through which EIA is being conducted. Along with that some other methods are also adopted to improve the EIA process. Numerous methodologies have been adopted over the time period in the history of EIA. The Study is based on both primary and secondary data and information. So while having understanding of the relationship between society and environment ecological, quantitative, qualitative methods are incorporated. The interviews and questionnaire are main methods employed in the study. Following methods were adopted:

A detailed map is prepared for own understanding of the study so that a common ground can be achieved and to understand various issues of the study.

3.1 Literature:

Review of Literature on the role of EIA, Public participation, environmental governance, evaluation of EIA system in Pakistan and transportation history and the flaws in transportation system. Peer-reviewed literature, research articles, EIA reports, unpublished material, and other secondary literature are employed to analyze every single step of EIA critically and to identify the shortcomings in current EIA practice.

3.2 Planning for Data Collection:

A detailed data acquisition plan was prepared. The plan includes identification of specific data requirements and their sources. Data was collected from literature, Government Departments such as (EPA, EPD, TEPA, and LDA) and the private organizations or NESPAK.

3.3 Questionnaire for evaluation of public participation:

Questionnaires were filled from the locals (100 people) for analyzing their opinion about the project and their role in it. They were the residents of Ravi road, Masti Gate, shopkeepers, businessmen, tourists coming to Lahore, and other people who are affected due to this activity. Out of those 100 questionnaires 5 were rejected which were not filled properly; therefore the sample size became 95. Statistical analysis was carried out by applying Z-test on the findings.

3.4 Interviews:

Interview was the main research method employed in this study. Interviews were conducted with Government and agency officials, planners, project executor researchers and Legal advisors/ lawyers, consultants and vulnerable groups.

3.5 Field Observation and photomontage:

The entire process was continuously observed through the field survey, the detailed timeline of the field visits and photographs are presented in Annex. Photographs have been taken during the demolition, construction and after the completion of the project.

3.6 Process and principles for EIA:

In standard framework of EIA the process involves the following steps (Glasson, Therivel, & Chadwick, 2005) :

- Project Screening
- Scoping
- Description of the project
- Description of environmental baseline
- Public Consultation and participation
- Evaluation of Significant Environmental impacts
- Environmental monitoring and management Plan

3.7 Analysis of Existing Report:

The existing report on the project is prepared by NESPAK and available in Public library. This was studied thoroughly and critically analyzed. The shortcomings of the report and the ground realities which are different from the report would be highlighted in the Data and its Analysis chapter.

3.8 Public Hearing:

Public hearing of the project was on 28th of January, 2014. Public Participation was evaluated through the field survey and through the participants in the hearing.

3.9 Interviews after Project Completion:

Interviews on the site have been conducted after the completion of the project with the public, shopkeepers, and maintenance staff on site.

3.10 Evaluation of Compensation Details:

The EIA report does not contain the data of affected persons and the compensations given to them. Details of compensation given to the people were collected from the government officials and then analyzed.

3.11 Maps and Land Acquisition Plans:

Maps presented in the report do not represent the exact location and explanation of the project; neither has it explained the complete components of the project. Lot of essential information is kept out of the report. So for that purpose the complete project plan and the exact maps were acquired and incorporated in the research. Land Acquisition Law has been analyzed critically and is compared with “*The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation, and Resettlement Act 2013.*”

3.12 Documentation and record of the Project through Timeline

Documentation and record of the project is maintained and for this purpose a detailed timeline has been prepared.

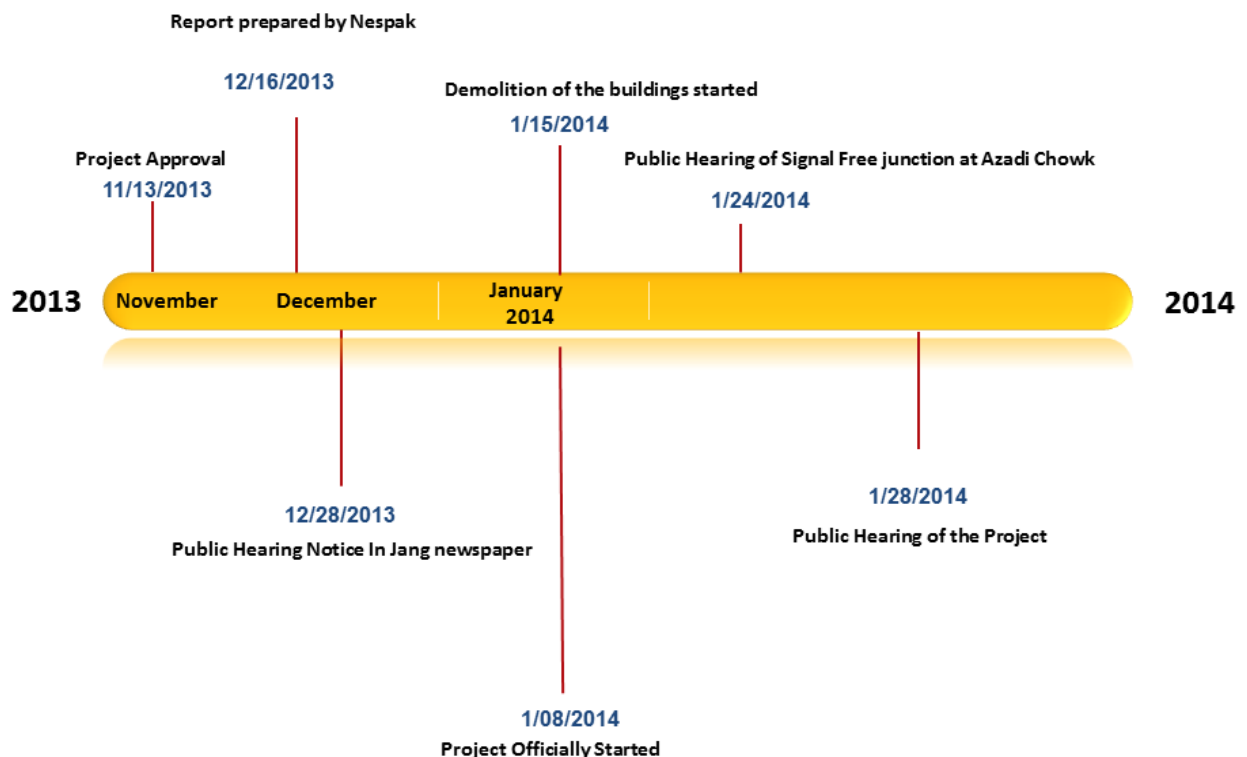


Figure 3.1 Timeline of the Project

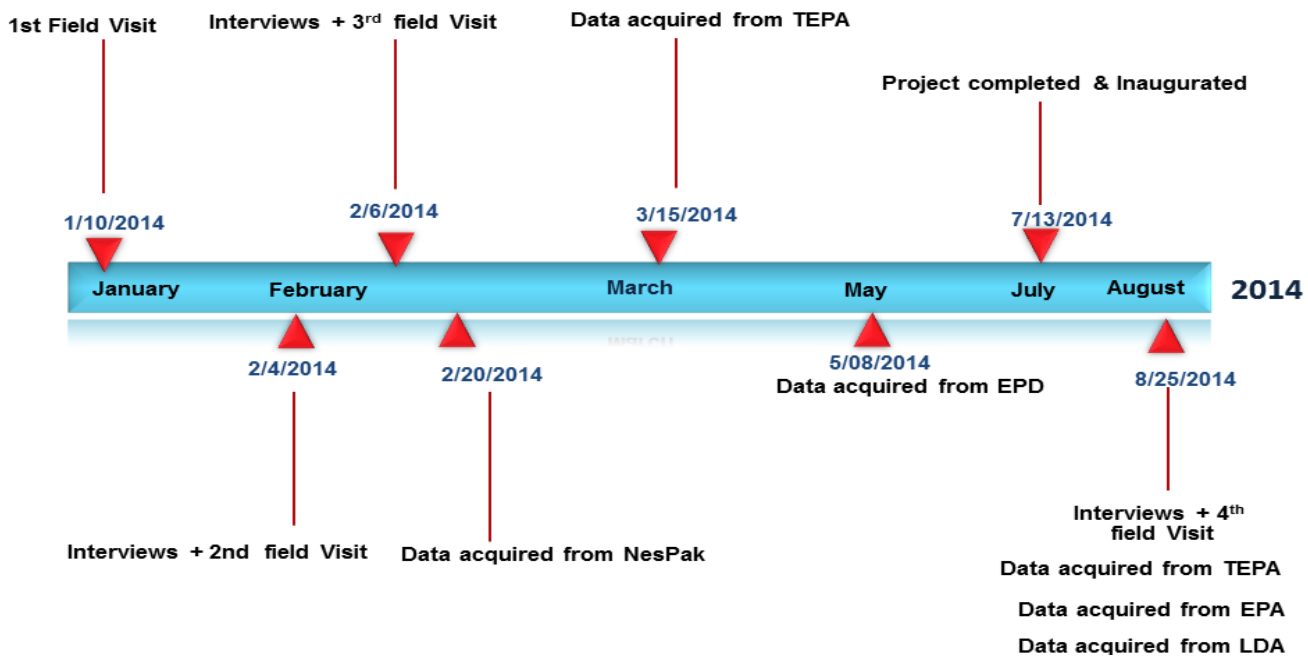


Figure 3.2 Timeline of Data Collection and field Visits

4 Data

Data are the most important aspect of the research study. There are two sources of data collection which are Primary data and secondary collection.

4.1 Primary Data

In primary data collection a questionnaire was prepared. And it was filled by 100 people from the area of Ravi Road to Masti Gate. Questionnaire was completed in two different stages. 1st when project started and 2nd when the project was completed. The people were those whose land has been taken, houses and shops have been demolished, residents of the area and road users. The main focus of the questionnaire was public participation and compensation given to the people. Extensive interviews were conducted with government officials, researchers, and government legal advisors in EPA, EPD, TEPA, LDA, and NESPAK. The interviews were of an open-ended nature because they provide additional views of the respondents besides the facts that one can ask. Field visits were done many times to identify the EIA practice in real and in papers. This shows that ground realities are entirely different from what has been written in the papers. Photomontage is a technique in which pictures were taken in different stages of project and combined.

4.2 Secondary Data:

In secondary data collection published books, existing report on the project, research papers, relevant journal articles, newspaper articles in and electronic resources were consulted. Data on project collected from NESPAK, Public hearing details from EPA, detailed maps and road alignment maps from TEPA and LDA were acquired. The significant data was collected through the field visits.

4.3 Land Acquisition data and plans:

Land acquisition data and maps have been acquired from TEPA and LDA. According to the data the larger part of the land was acquired from the sports complex which is 108 Kanals of the land and 70 Kanals have been acquired from the PHA and this is the area of the lake which was in Iqbal Park.

4.4 Public Hearing data:

Public hearing notice details were collected from TEPA. According to which the advertisement was given in Jang newspaper on 28th of December 2013. Public hearing details have been acquired from EPA, Lahore on 25th August, 2104. The data include the attendance sheet of the participants and the photographs of the public hearing. According to that 54 people participated in the process. Out of which 6 were the representatives from NESPAK whereas 5 were government representative from EPA, LDA, and EPA. Furthermore 15 participants were those which were actually out of Lahore and came from far flung areas such as Vehari, Pakpattan, and Narang Mandi etc. whereas 23 people were from different parts of Lahore such as Johar Town, Muslim Town, Green town etc. People from the concerned area (Project Location) who have actually attended the Public hearing were just 5 out of which 2 were from Ravi Road, 2 were from Azadi Chowk and 1 was from Badami Bagh. It's quite surprising that those who were losing their properties, livelihoods, and houses were not present. Majorly because they were intentionally kept out of the process to avoid conflict. Secondly they are not aware of this process or meeting because it was held at a fancy place far from the project site.

4.5 Data Analysis:

As the main focus of the questionnaires were to evaluate the decision making processes, public participation. So it was identified through the questionnaires that out of a sample of hundred (100) People only (03) people said that the public consultation was done and they were project

supervisors or site supervisors in the area. Whereas the main stakeholders and public said that no one actually consulted them nor did they have idea about public hearing in Alhamra Art Complex. According to public the whole process is authoritative and public is not considered. Notices were issued to demolish the houses and to acquire the land.

4.5.1 Public Consultation and Concerns According to NESPAK report:

The report prepared by the NESPAK mentioned that the main stakeholders were identified and interviewed and their concerns were addressed. According to the report the consulters were the stakeholders and their main/major concerns were considered (NESPAK, 2013).

Table 4.1 Different Stakeholders and their stakes in the Project Area

Sr. No.	Stakeholders	Stakes (Apprehensions)
1	Residents	Air pollution, exit/ entry problems, and disturbance of utilities, security / safety issues, noise, dust, and waste material.
2	Shop Owners	Noise, air Pollution, access problem for customers, reduction in number of customers, exit/entry problems, disturbance of utilities, security/ safety and decline in business.
3	Hospitals	Noise, air pollution, dust, access problem for patients and doctors,

		reduction in the number of patients, discomfort for the indoor patients, issue of parking of vehicles, disturbance of utilities, security/ safety issues, business decline
4	Schools and Colleges	Noise, air pollution, dust, access problem for the students & teachers, issue of parking of vehicles in the peak hours, disruption of utilities, safety issues & disruption in the classes & studies.
5	Motorized Transport users	Appropriate detour, management of traffic, dust & noise, increasing the time of travelling
6	Office Workers	Dust, noise & vibrations, access to office, disruption in routine work, parking of vehicles, disruption of utilities
7	Drivers	Appropriate detour, management of traffic, dust & noise, vibrations, disruption to passengers, increase travelling time during construction
8	Pedestrians	Appropriate detour, traffic management, exit/ entry problems etc.

Surprisingly all the major stakeholders were concerned about “Air and Noise Pollution” problems. Surprisingly they don’t have any concern about their properties or their livelihoods and displacement. Whereas my field findings are entirely different. When people were being interviewed and asked about their concerns the concern they showed were that they didn’t get Compensation and were sure whether would or would not get it. People are upset about their business, jobs and for their houses. Secondly people were upset and distressed because deadline had been given to them to demolish the structures by themselves. Those who got the compensations felt that it was not sufficient and is “Peanuts.” While some said they got the compensation by giving bribery. When it was asked whether they were consulted before the project began. All the people said that no one consulted or informed them about the project and for the compensation process they asked us to come to LDA office, Johar Town on 15th of January with their property papers. No one knew about any sort of public consultation, public participation, or public hearing process.

People highly criticized the “**Land Acquisition Act 1894**” and even “**The Project.**”

In an interview **Muhammad Imran** who lives in the area of Ravi road and owns a pharmacy said that these mega projects by the Government of Punjab were ruining the businesses and life of the people. The most affected are those who owned the property in that area as they had no option but to surrender their properties. Because the Government had the power and the legislation for doing any development or project. Under the Land Acquisition Act, 1894 Government can acquire private properties or any land for development purpose in the public interest and against which compensation would be paid only to the rightful owner.

Commitments for the compensations were verbal and no deal had been made in black and white. He further complains that there was no time frame or negotiations between the government representatives and the locals for acquiring the land or how much of the land would be acquired. People of Ravi Road were sleeping in the morning (6:00 Am) when the bulldozers were brought in for demolishing their houses. People were terrified with this act. They requested some time and then demolished the houses on their own expense. People wanted to talk to the government authorities but nobody had time for them.

There is no time frame for payment of compensation; compensations made were not fair and transparent. No compensation was given to the people who lost their business. There is no policy for rehabilitation of the displaced.

Ather Ehsaan who owned a Tyres shop on Masti Gate said that there were some alternatives of this project. They suggested the alternatives and proposed to the Government but the Government did not want to consider these alternatives. Because all the decisions had already been taken. The process of compensation was not fair and transparent. He got his compensation by giving bribery to government officials. He further said that these laws are “undemocratic” and “Anti Citizens” and showed the legacy of Colonial times.

Recently the Land Acquisition Act of the colonial times in India has been replaced with a new law titled as “***The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation, and Resettlement Act 2013.***” This new law was notified in India on January 1, 2014. Under the new law the developers have to offer four times the market price of the acquired land for the rural areas and twice of the urban land to the owners. Along with this there is a provision in this law for funding for relocation and resettlement of dislocated people.

In comparison to this there is a too much ambiguity in Land Acquisition Act of 1894 which negates the public interests and advocates the development blindly.

The other major flaw in the report is in Section -3 in description of the project. Because it does not explain the exact location of the project, and the location map presented in the report is not the actual map. Because the map showed the widening of the Ahmad Ali road and then its realignment with circular road at Lari Adda. The map did not show the actual alignments and the removal of existing infrastructure. But in actual fact 400m of Ahmad Ali road was used for the Construction of Bridge ramp. Outer circular road starts from New Azadi Chowk and runs along the periphery of the Iqbal Park until Masti Gate, Lahore. Major part of Maulana Ahmad Ali road (almost 400m) is converted into flyover rotary ramp. For the construction of the new alignment area of 108 Kanals was acquired from the Sports Complex. The area includes the main cricket grounds, badminton court, basketball court, gymnasium, indoor games area, cricket pavilion, 8-10 cricket pitches, apart from this 70 Kanals is acquired from the PHA (Parks and Horticulture Authority). Basically this was the area of the lake. Sports Complex was used for national and international games and activities. But now 108 kanals of Sports complex and 70 Kanals of PHA land were are used for the construction of the new road alignment. This new road is known as outer circular road.

Thirdly the report failed to explain the data of affected persons and the compensations given. There is no procedure defined for the compensation.

Fourthly Components of the project were also not mentioned in the report. The components of the project contained one round about and two U-turns as well as four lane carriageways

constructed on both sides and a two lanes service road at Masti Gate are the actual and main components of the project.

5 Description of the Project

This section describes the rationale, objectives, location, and components of the project.

5.1 Rationale of the Project

The infrastructure of Lahore is being developed and upgraded at a very fast pace. Most of the EIA's conducted are partial, superficial, and short term. There is a need to look deeper at the developmental process from an ecological point of view to protect nature and the interest of non-commercial residential population. Such a critical look at the alternate route to circular road from Azadi Chowk is being presented as a case study for the urban development of Lahore in general.

It is one of the biggest urban development projects in Lahore and involved large number of stakeholders they all should have been consulted and satisfied, and significant environmental and social impacts identified. All legislative and regulatory requirements should be evaluated. The significant Social, environmental, and economic impacts of the project were identified by the author. Impacts of the projects after implementation are discussed. It is important to identify the ecological and environmental impacts without being biased. The whole process of EIA has been carried out in order to address the environmental and social issues so that quality may be achieved. EIA Study aims at collection and scrutinizing of data related to biophysical and social issues of the project area and to prepare the baseline environmental profile.

5.2 Location of the Project

The Project is located on Ahmad Ali Road. Outer circular road starts from New Azadi Chowk and runs along the outer periphery of the Iqbal Park and leads towards Badami Bagh Larri Adda and Masti Gate, Lahore. In this project existing Maulana Ahmad Ali Road is realigned along the periphery of Iqbal Park and land acquired from the Iqbal Park is approximately 178 Kanals. Furthermore Iqbal Park Sports Complex was demolished which was in the alignment of the

project. While existing circular road which was present in between the Iqbal Park and Badshahi Mosque was demolished and converted into the Iqbal Park.

5.3 Components of the Project

At Azadi Chowk the existing circular road has been demolished for a length of about 1km (from Azadi Chowk to Masti Gate). For the construction of the new alignment, area of 108 Kanals was acquired from the sports complex. The area included the main cricket grounds, badminton courts, basketball courts, gymnasium, indoor games area, and cricket pavilion, 8-10 cricket pitches, apart from this 70 Kanals were acquired from the PHA (Parks and Horticulture Authority). Basically this was the area of the lake. Sports complex was used for national and international games and activities. But 178 Kanals were used for the construction of the new road alignment. This new road is known as outer circular road. Whereas the circular road which was actually abandoned will be rehabilitated as green belt, but so far it is not being done. Proposed Corridor-III at G.T road (from Azadi Chowk to Lahore Ring road) will follow this alignment. A 3.0 m wide corridor in the median is being reserved for future elevated MBS. The road section is about 1.6 km starting about 400m from New Azadi Chowk to Masti Gate. The components of the project contained one round about and two U-turns. It starts from Maulana Ahmed Ali Road and connects Minar-e-Pakistan, Lorry Adda, Badami Bagh, Masti Gate, and Circular Road. Along with that four lane carriageway is constructed on both sides and a two lanes service road at Masti Gate, Storm water drains, rehabilitation of existing Larri Adda Bus stand and Provision of LED Lights are the actual and main components of the project.

5.4 Proposed Alternative

5.4.1 Provision of Signal Free Roundabout at Sabzi Mandi Junction

This alternative was suggested and opted by NESPAK. But the other alternatives were not discussed in detail. Neither cost nor their plans and drawings of the alternatives were shown in

the report. Whereas the main purpose of choosing this alternative was due to two main concerns. For the future corridor of elevated MBS For promoting the tourism, as all the monuments would be at one place and a mega heritage park would be constructed in future. Earlier this project with one underpass was suggested by Walled City Lahore Authority (WCLA) and Geneva prepared drawings for that, but it was not pursued by them and later on this work was carried out by NESPAK. In the social concerns for choosing this site they mentioned that low compensation cost would be given because lesser area would be acquired from the public. But Government declared that 70% of the Land was Evacuated Trust Property and therefore Government land. So this way they ensured low compensation. In environmental concerns they mentioned reduction of air and noise pollution. While they ignored the disturbance to the society. The project advocated the economic concerns but not the environmental or social concerns. Public interest was not addressed.

5.5 Contractor

The construction of the project was given to SARWAR & COMPANY (PVT) LTD. This is a local company. Site supervisor (Tanvir) was interviewed after the completion of the project.

5.6 Construction Material

The materials used in the construction were coarse aggregates (crush), fine aggregates (sand), steel, water, asphalt, reinforcement, cement etc. Fine aggregates are locally available in the area, whereas the soil, cement, and steel were purchased from other sources.

5.6.1 Sargodha Quarries (Crushed Aggregate Source):

Sargodha rock quarries are located between Chiniot and Sargodha road. The Precambrian basement complex near Sargodha is spread over an area of about 200 sq. Km between Chiniot and Sargodha. These hills are called Kirana hills. The rocks in this area comprise meta-

sediments, represented by quartzite and phyllite. The volcanic rocks include rhyolite, volcanic tuff and other pyroclasts. Meta dolerite dykes provide excellent coarse aggregate for both cement and bitumen concrete. By crushing these aggregates to desired size can be produced without producing a significant amount of flat and elongated particles. However, aggregates produced by crushing slate contain a considerable amount of flat and elongated particles. The inclusion of slate may therefore be avoided during blasting and crushing. Crush stone were tested by the Design Consultant who suggested that this material was suitable for use in road construction, after crushing to the specified size and gradation. The quantities available are quite large and mining leases have already been obtained by various parties.

5.6.2 Fine Aggregate (Sand)

Good quality natural fine aggregate or sand of acceptable degradation was not available in nearby locality of the Project. The nearest source of sand is the Ravi River, which is accessible. The Ravi sand is fine grained and contains clay and organic matter. The other source of sand of acceptable properties is Haro River from where sand was utilized for construction purposes on the recommendation of NESPAK (NESPAK, 2013). However better quality sand of Lawrencepur could have been used.

5.6.3 Asphalt Reinforcement and Cement:

Asphalt, reinforcement, and cement were transported from the factories near Karachi, or then local agents in Lahore or Faisalabad for road construction for the project.

5.7 Construction Site Camps:

There were 15 site camps for the labor in front of Iqbal Park Sports Complex. All the materials were mixed or prepared on site in grounds of Iqbal Park.

5.8 Manpower Used:

The manpower used during construction includes CEO of Construction Company, managerial staff, skilled and unskilled labor. The details are given below in the table.

Table 5.1 Manpower used

Sr. No.	Manpower	Number of people
1	CEO	1
2	Project Manager	1
3	Site Engineer	3
4	Surveyor	15
5	Site Supervisors	20
6	Laborers	150
7	Quantity Surveyor	1
8	Lab Technicians	2
9	Drivers	5
10	Security Guards	15
11	Cooks	3

Source: LDA

5.9 Construction Equipment

The list of machinery and the equipment used in the project are given below in the table.

Table 5.2 Construction Equipment used

Sr. No	Type of Machinery and Equipment	No of equipment
1	Loaders	15
2	Dumpers	20
3	Graders	5
4	Concrete mix plant	1
5	Asphalt mix Plant	1
6	Cranes	2
7	Sheep foot roller	6
8	Bulldozers	8
9	Water Tanks/Trollies	34

Source: LDA

6 Environmental Baseline Profile

6.1 General

Environmental baseline study is a comprehensive description of the baseline conditions of the project area and includes environmental attributes or resources which are expected to be affected directly or indirectly due to the construction and operation of the project. Normally baseline is collected for environmental parameters which are identified during the scoping stage. The existing environmental conditions around the project have been considered with respect to physical, biological, human environment and cultural Heritage aspects. The site visits were conducted for the data collection on environmental, physical, human, and biological parameters. Moreover the public consultation was done with general public and main stakeholders in order to seek their opinion.

6.2 Physical Environment

For the identification and prediction of the impacts among the above mentioned possible areas, base line data was collected for the following environmental parameters.

- i. Topography
- ii. Regional Geology
- iii. Soil
- iv. Meteorology/air quality.
- v. Hydrology and Ground water.
- vi. Noise
- vii. Air Quality
- viii. Solid Waste
- ix. Seismology

- x. Water Quality
- xi. Ground Water Quality

6.3 Topography

The topography of the area is flat. The height of the area is 220 meters above the mean sea level (MSL). The area of Lahore is divided into two parts. The low lying alluvial soil is along the Ravi River, and the Upland in the East. Upland is a plain slope from North-east to South-west. The low lands are generally inundated during the monsoon season by Ravi River, flowing in the West of district along its boundary with district Sheikhpura. Figure represents the topography of the area.

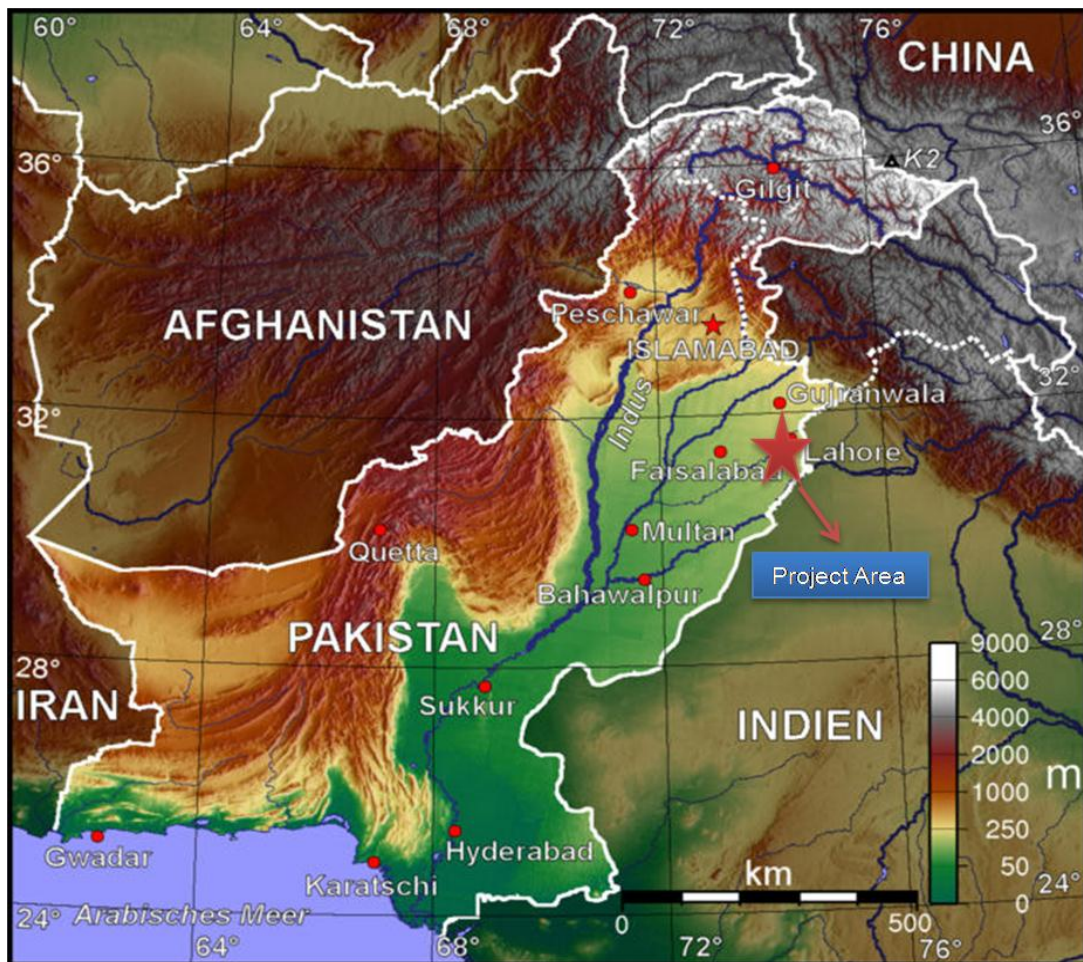


Figure 6.1 Topography of the Study Area

6.4 Regional Geology

The soil deposits at the project area belong to the Chung Formation which shows the last glacial cycle. The clay, silt, and sand deposits are from late Pleistocene to Recent in age. Because of the withdrawal of the sea in late Tertiary time, shallow water and deltaic deposits were laid down. After that it became a huge flood plain in which debris from the different streams have mingled to load with huge thickness of alluvial material derived from the Himalaya. The great climate change during the Pleistocene period had impact on the sedimentation and physiography of this region. The presence of old channels of Ravi River indicates conformity of the stream oscillation to terrestrial rotation in the deflection of the streams. The abrupt migration shows excessive flooding due to which the earlier channels were choked with sediments and streams were forced to create new channels. These alluvial deposits comprise earthy brown to black silt, sand, and clay. The beds are largely hard, laminated, and sandy with interbeds of clay and layers and lenses of sand. Geological map of the study area is given in the Figure 2. Project site is located in meander belt deposits. The project area does not have any valuable materials whereas scientific in depth investigations haven't been carried out. The economic minerals are kallar, kankar, sand, and clay.

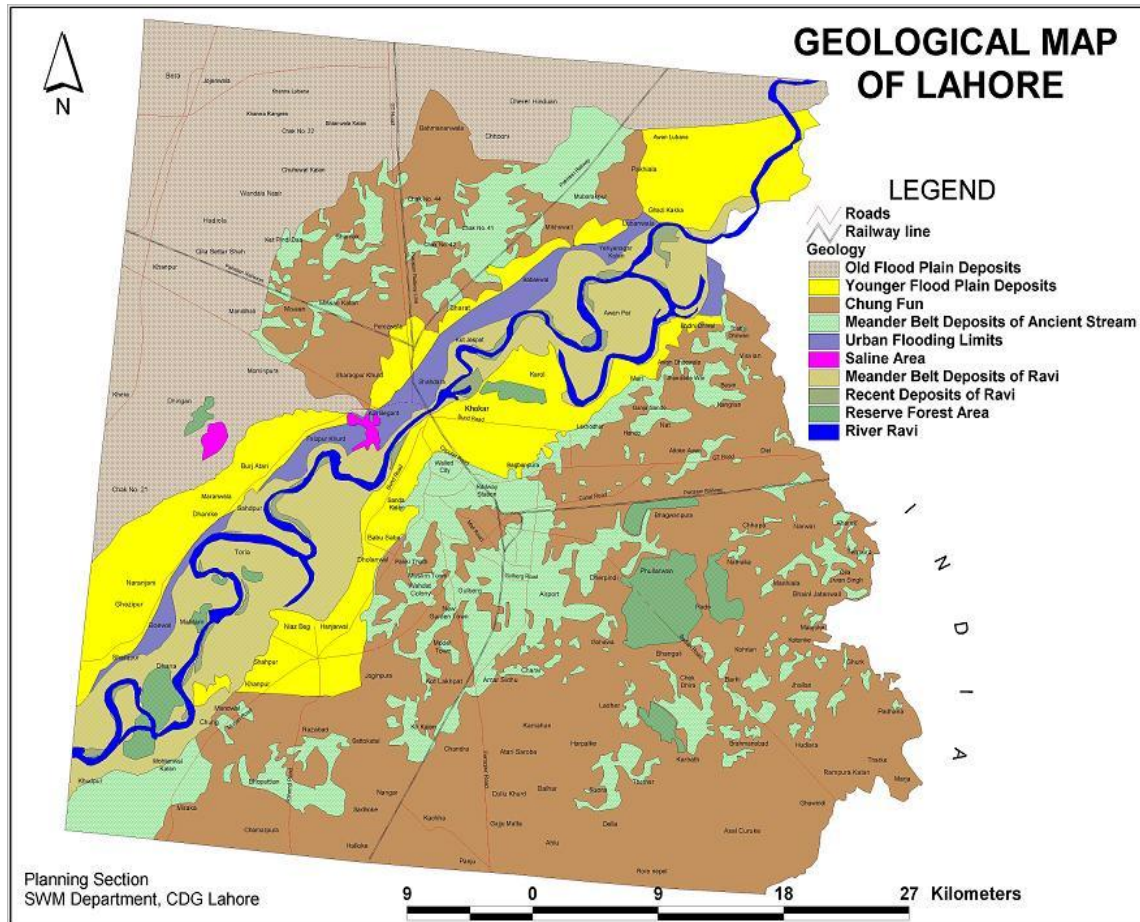


Figure 6.2 Geological Map of the Study Area

6.5 Soils

The soil in the project area is cohesionless and is of alluvial type deposited by Ravi River. Soil layers includes silt, silty clay, silty sand, poorly graded sand with silt, lean clay etc. Soil map of the project area is given in the figure 3. Whereas it is rich is a potential plant nutrients. Rainfall is low and groundwater is saline and brackish at the shallow depth and irrigation is dependent on the canals. Tube wells have also been sunk at the greater depth where fresh water is available.

The chemical quality of the groundwater in the district varies with depth. However the sweet potable water is available in a belt five to twenty miles wide paralleling River Ravi. Alluvium is soil or sediments deposited by the river or other running water. Alluvium is made up of variety

of materials including fine particles of silt and clay and larger particles of sand and gravel. A river is continually picking up and dropping solid particles of rock and soil from its bed throughout its length. Where the river flow is slow, more particles are dropped than picked up. The areas where more particles are dropped are called alluvial or flood plains and the dropped particles are called alluvium.

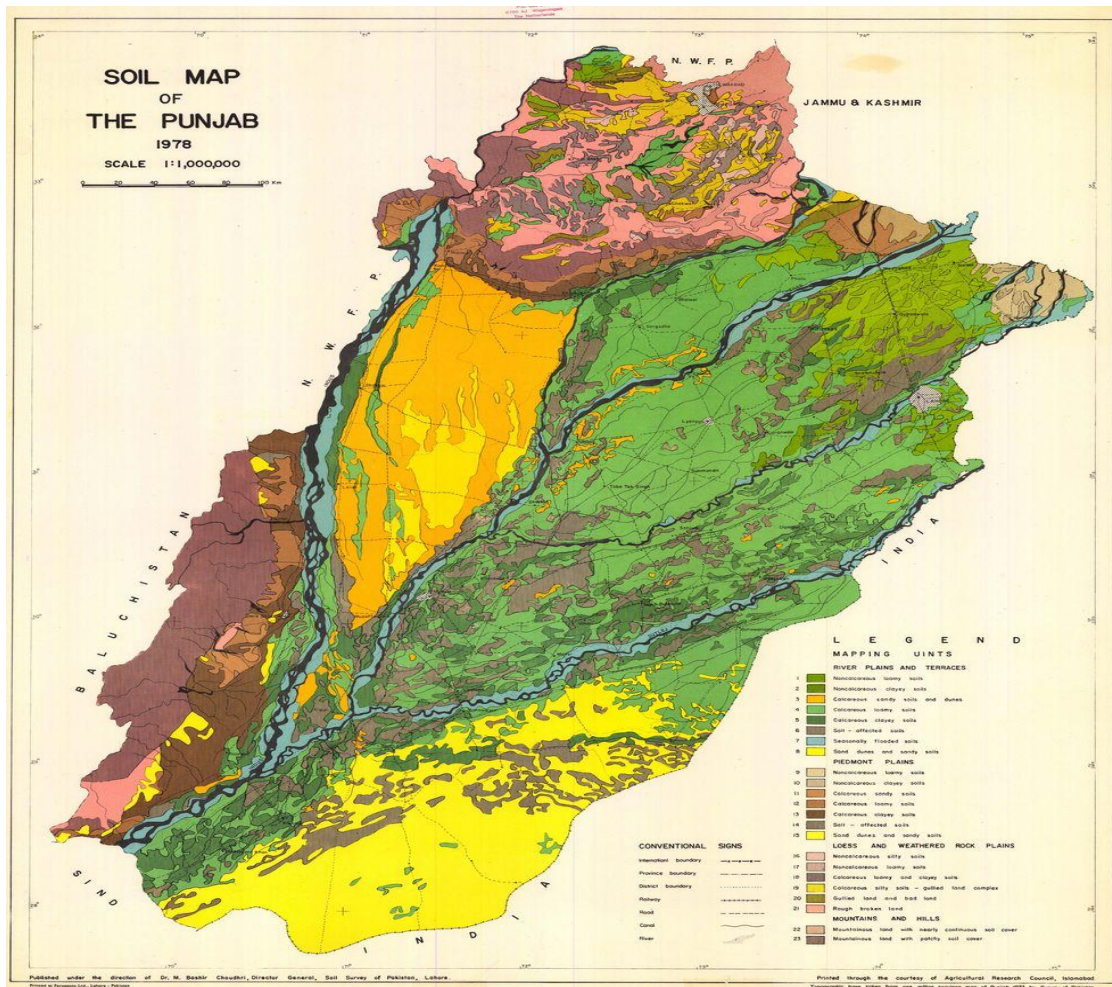


Figure 6.3 Soil Map of the Study area (Source CDGL)

6.6 Meteorology/ Air Quality

For the project design seasonal climatic conditions must be considered. The factors which influence the climatic conditions are air, humidity, precipitation, temperature, and evaporation.

For determination of overall effect of the climatic stresses, daily and seasonal temperature changes, site altitude, direct solar radiation, and precipitation must be considered. The project area has extreme climate, it has hot summers and cold winters. The summer starts from April and lasts till September. May, June, and July are hottest months. The mean maximum and minimum temperatures are 40.4°C and 27.3°C for these months. The winter season lasts from November to March. December, January, and February are the coldest months. The mean maximum and mean minimum temperature ranges from 21.1°C to 7.2 °C in January. Temperatures in the project area vary from - 2.2 °C to 40.4 °C. The project area receives rain in all the seasons but monsoon rain is pronounced and constitutes a definite rainy seasons between the months of July and September. The average rainfall is about 629 millimeters per year. Table 1 summarizes month wise temperature, precipitation, and relative humidity.

Table 6.1 Average Monthly Temperature, Precipitation, and Relative Humidity (2004-2008)

Month	Mean Temperature		Precipitation (mm)	Relative Humidity AT 0500 HRS (%)	Relative Humidity AT 2000 HRS (%)
	Maximum	Minimum			
January	19.8	5.9	28.92	80.4	51.9
February	22.0	8.9	37.14	79.0	52.4
March	27.1	14.0	34.3	68.6	42.2
April	33.9	19.6	44.32	50.2	25.3
May	38.6	23.7	24.38	45.7	27.2
June	40.4	27.3	91.62	59.1	40.9
July	36.1	26.8	150.52	76.7	60
August	35.0	26.4	161.42	78.8	65.9
September	35.0	24.4	67.28	74.4	56.4
October	32.9	18.2	11.74	70.6	44.2
November	27.4	11.6	4.44	77.1	48.8
December	21.6	6.8	9.94	82.9	53.73
Annual	30.8	17.8	666	70.34	47.4

Source: Meteorology Department Lahore

6.7 Hydrology and Ground Water

The study area forms the upper part of the Punjab plain, which is a part of Indo-Gangetic depression. The depression is of synclinal nature. Synclinal depression is a fore deep downward of the Himalayan foreland of variable depth, converted into flat plains by simple process of alluvial deposition. The aquifer underlying the study area comprises unconfined alluvium with a thickness of about 1050 feet as a part of regional ground water investigation.

It is parts of larger inter alluvial Upper Bari Doab, which is bounded by the River Ravi in Northwest and the Sutlej River to the Southeast. The Bari doab along with other Doabs like Rechna, and Chaj form the vast alluvial plain which are part of the Indus plain in the Punjab. The alluvium is derived from the erosion of mountain ranges in North. It has been deposited and reworked by the large meandering rivers and tributaries of the Indus River and comprises a random distribution of fine to coarse sand with lenses of silty clay and clay of varying thickness and extensions. Borehole logs for tube wells shows that the lenses of less permeable material are neither thick nor continuous so, in spite of their heterogeneity, the alluvial sediments constitute an aquifer which on regional basis behaves as a single homogenous unconfined water body.

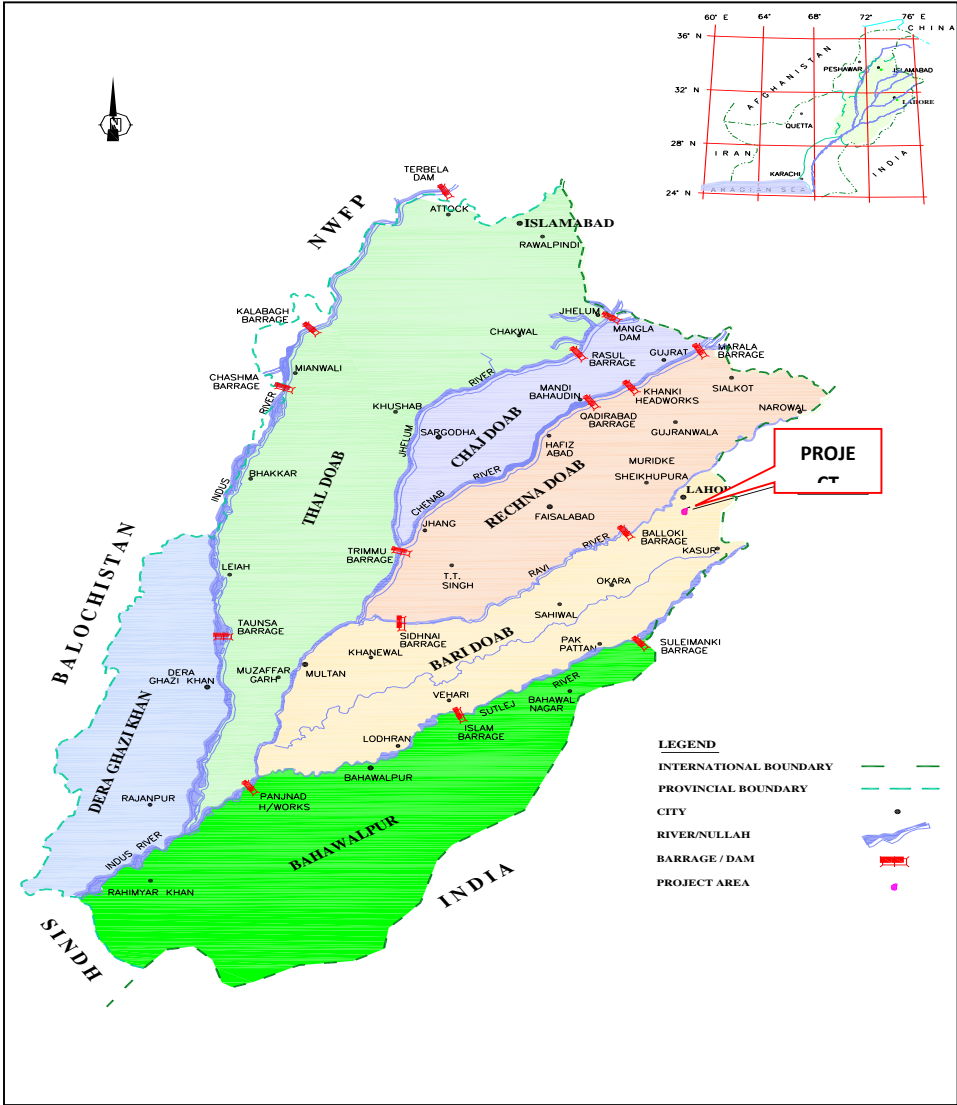


Figure 6.4 Hydrology of the Study Area

6.8 Noise

Noise pollution (environmental noise) is unpleasant to human or machine created sound that disrupts the activity or balance of human or animal life. A common form of noise pollution is from transportation, mostly from motor vehicles. The sources of most noise worldwide are transportation system, motor vehicle noise, along with aircraft noise and rail noise. Poor urban planning may give rise to noise pollution in the residential area. Other sources are car alarms,

office equipment, factory machinery, construction work, audio entertainment systems, loudspeakers etc. The noise level monitoring results by NESPAK were being used, which was conducted in November 2013 at Lahore Fort.

Table 6.2 Noise level Monitoring Results, 2013

Sr. No	Location	Test Results		Units	NEQS	
		Day	Night		Day	Night
1	Lahore Fort	78.4	73.34	dB (A)	70	60

Source: NESPAK

6.9 Air Quality

Atmospheric pollution, particularly in urban areas like Lahore, has a strong impact on daily life. Motor vehicles are major source of air pollution. However factories and cottage industry inside the Lahore city are also contributing to the air pollution. Sulphur dioxide (SO₂), Nitrogen dioxide (NO₂), carbon dioxide (CO₂), Carbon monoxide (CO), Ozone (O₃), and particulate matter (Pm₁₀) are considered pollution indicators. Air quality monitoring done by NESPAK is used.

Table 6.3 Ambient Air Quality Analysis, 2013

Parameter	Averaging Time		NEQS	Unit	Lahore Fort
Carbon Monoxide (CO)	1st Third	8 h	5	mg/m ³	8.88
	2nd Third	8 h			6.97
	3rd Third	8 h			5.76

Parameter	Averaging Time	NEQS	Unit	Lahore Fort
Sulphur Dioxide (SO₂)	24 h	120	µg/m ³	157.67
Nitrogen Dioxide (NO₂)	24 h	80	µg/m ³	70.54
Particulate Matter (PM₁₀)	24 h	150	µg/m ³	651

Source: NESPAK

6.10 Solid Waste

Lahore having a population of approximately 9 million is experiencing urban sprawl and industrialization leading to generation of huge amount of solid waste from many sources like house hold waste, commercial activities, industries, hospitals, construction and demolition waste, animal waste all of which are contributing to environmental and health hazards. Estimated per capita per day waste generated is 0.65 kg and the total waste generated is about 5700 tons/day. The lifting capacity of the solid waste management department is about 4500 tons/day. Around 350-450 tons of organic waste is utilized for compost preparation by private contractors under public private partnership contract with city district government Lahore (CDGL).

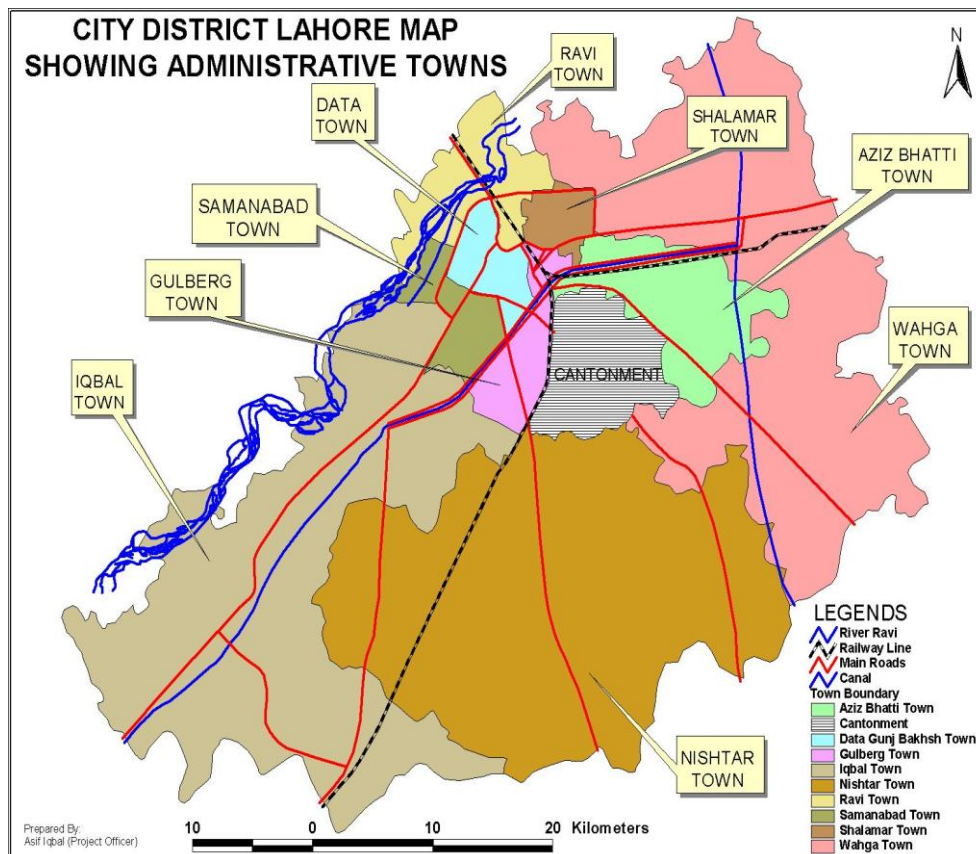


Figure 6.5 Administrative zone map for the collection of Solid waste

6.11 Seismology

The study area is located in the tectonic zone of down wrap and platform slop in the seismic zone of noticeable earthquake from 3.1 to 4.9 on Richter scale. According to the building code of Pakistan prepared by NESPAK it is located in the seismic zone 2A of Pakistan. Zone 2A represents peak ground acceleration (PGA) from 0.08 to 0.16 g.

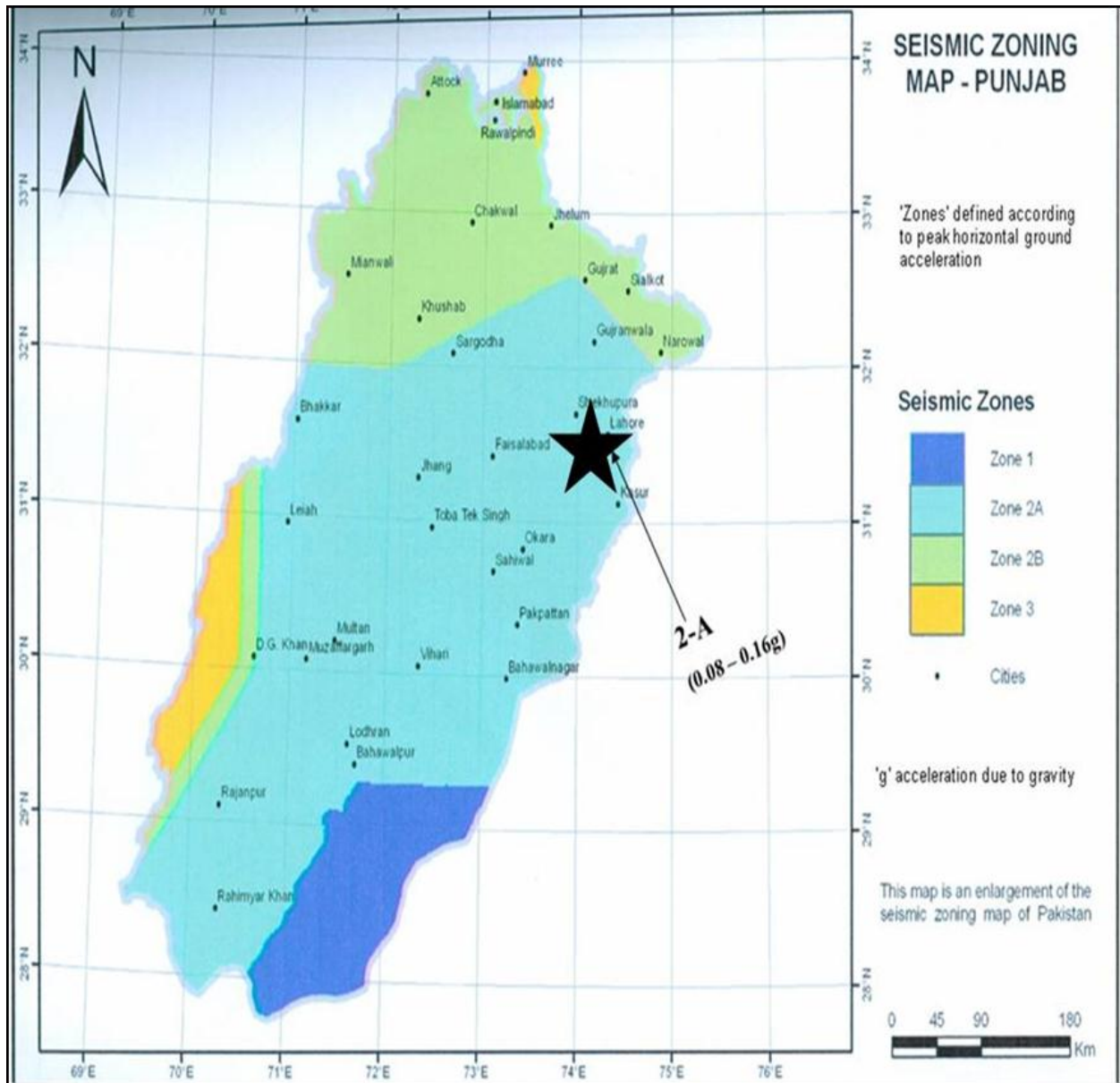


Figure 6.6 Seismic Zoning Map of Punjab

6.12 Water Quality

Water quality was monitored by NESPAK on 25th February, 2102 at Ravi River and Lahore canal. The results are given in the table.

Table 6.4 Water Quality and Parameters of River Ravi and Lahore Canal

Sr. No.	Parameters	Unit	Test Results		NEQS
					Values
			River Ravi	Canal	
1	Temperature	°C	18	16	=< 40
2	pH	-	8	8.1	6-9
3	Biochemical Oxygen Demand (BOD ₅)	mg/l	10	8	80
4	Chemical Oxygen Demand (COD)	mg/l	25	19	150
5	Total Suspended Solids (TSS)	mg/l	79	176	200
6	Total Dissolved Solids (TDS)	mg/l	204	193	3500
7	Oil and grease	mg/l	0	0	10
8	Phenolic compounds	mg/l	0	BDL	0.1
9	Chlorides Cl ⁻¹	mg/l	12	14.1	1000
10	Flouride F ⁻¹	mg/l	BDL	BDL	10
11	Cyanide	mg/l	0.005	0.004	1.0
12	Anionic Detergent	mg/l	BDL	BDL	20
13	Sulphate	mg/l	24	21.0	600
14	Sulphide	mg/l	0.01	0.008	1.0
15	Ammonia	mg/l	0.52	0.42	40
16	Cadmium	mg/l	BDL	BDL	0.1
17	Chromium	mg/l	0.02	0.01	1.0
18	Copper	mg/l	0.05	0.04	1.0
19	Lead	mg/l	BDL	BDL	0.5
20	Mercury	mg/l	BDL	BDL	0.01
21	Selenium	mg/l	BDL	BDL	0.5
22	Nickel	mg/l	0.02	0.01	1.0
23	Silver	mg/l	BDL	BDL	1.0

24	Total Toxic Matter	mg/l	0.09	0.06	2.0
25	Zinc	mg/l	0.08	0.05	5.0
26	Arsenic	mg/l	0.005	0.005	1.0
27	Barium	mg/l	BDL	BDL	1.5
28	Iron	mg/l	0.02	0.08	8.0
29	Magnesium	mg/l	0.068	0.042	1.5
30	Boron	mg/l	0.7	0.5	6.0
31	Chlorine Total	mg/l	0.04	0.03	1.0

Source: NESPAK

6.13 Ground Water Quality

The major source of drinking water supplied to Lahore is through ground water reservoirs. Thus, quality of groundwater is very important in terms of public health. Ground water analysis done by NESPAK is used. Ground water analysis is given in table.

Table 6.5 Groundwater Analysis of the Project Area, 2013

Sr. No.	Parameters	Unit	Shahdara Modr	WHO Guidelines	NEQS
Chemical Parameters					
1	pH	-	8.1	6.5 -8.5	6.5-8.5
2	Total Dissolved Solids (TDS)	mg/l	224.0	1000	<1000
3	Chloride (Cl)	mg/l	12.9	250	<250
4	Hardness	mg/l	88.0	500	<500
5	Nitrates (NO ₃)	mg/l	1.2	50	≤50
6	Sodium	mg/l	34.8	200	-

Sr. No.	Parameters	Unit	Shahdara Modr	WHO Guidelines	NEQS
7	Fluoride (F)	mg/l	0.06	1.5	≤1.5
8	Arsenic (As)	mg/l	0.10	0.01	≤0.05
9	Lead (pb)	mg/l	BDL	0.01	≤0.05
10	Mercury	mg/l	BDL	0.001	≤0.001
11	Iron (Fe)	mg/l	0.05	0.3	-
Microbiological Parameters					
12	Total Colony Count	cfu/ml	>5700	<500 cfu/ml	-
13	Total Coliforms	cfu/100ml	8	0/100 ml	0/100 ml
14	Faecal Coliforms (E.Coli)	cfu/100ml	0	0/100 ml	0/100 ml

6.14 Ecological/ Biological Environments

The climate of Lahore is semi-arid and subtropical, the vegetation of the area falls under scrub, dry, tropical thorn forest type as per Phyto-geographical classification of the area. The project area was once covered with thick vegetation consisting of trees like Karir (*Capparis deciduas*), Wan (*Salvadora Oleoides*), and Jand (*Prosopis Spicigera*). With passage of time and rapid urbanization and development this vegetation was cleared earlier for agriculture purpose and then for housing and commercial activities. These agriculture lands were then converted into business centers, Multi story Plazas and Housing colonies.

6.15 Flora

Lahore is famous for its gardens and also known as “City of Gardens.” Once Lahore had beautiful old gardens, trees, but now with the rapid development all such things are vanishing rapidly. These green areas and old endemic trees of Lahore were home to many resident birds’ species as well as many summer, winter, and transit migrants, so Lahore is very important due to its ecological conditions. Several types of floral species are present in Lahore, whereas principal trees, shrubs, and herbs are given in the table with their nomenclature including local names, English names and botanical names. These trees data is acquired from PHA (Parks and Horticulture Authority).

Table 6.6 Inventory of Trees Present in Lahore District

No.	Common Names	Botanical Names
1	Arjun	<i>Terminalia arjuna</i>
2	Dhak	<i>Butea frondosa</i>
3	Mahwa	<i>Bassia latifolia</i>
4	Bahara	<i>Terminalia bellerica</i>
5	Amaltas	<i>Cassia fistula</i>
6	Gul-e-nishter	<i>Erythrina subrosa</i>
7	Barringtonia	<i>Barringtonia acutengula</i>
8	Nim	<i>Melia indica</i>
9	Gab	<i>Diospyores embryopteris</i>

No.	Common Names	Botanical Names
10	Berna	<i>Crateva religiosa</i>
11	Khark	<i>Celtus australis</i>
12	Putajan	<i>Putranjiva roxburghi</i>
13	Fiddle wood/Kashmir Lagotis	<i>Eithryllum ruberratum</i>
14	Gul-e-mast	<i>Dalinia indica</i>
15	Gul-e-mohr	<i>Poinciana regia</i>
16	Alstonia	<i>Alstonia scholaris</i>
17	Ashoke	<i>Saraca indica</i>
18	Sheesham	<i>Dalbergia sisso</i>
19	Alata	<i>Stercolia colorata</i>
20	Kenair	<i>Nerium grandiflora</i>
21	Weeping Willow	<i>Salix babylonica</i>
22	Keekar	<i>Parkinsonia aculeate</i>
23	Nilem	<i>Jacaranda mimosfolia</i>
24	Kachnar	<i>Bauhinia purpurea</i>
25	Molsary	<i>Mimosop elengi</i>
26	Bel	<i>Aegle marmelos</i>
27	Siris	<i>Albizia lebbek</i>

No.	Common Names	Botanical Names
28	Tun	<i>Cedrela toona</i>
29	Jamin	<i>Eugenia jambolana</i>
30	Moor pankh	<i>Thuja orientalis</i>
31	Silkoak	<i>Grevillea robusta</i>
32	Sufeda	<i>Eucalyptus citriodora</i>
33	Peepal	<i>Ficus relegiosa</i>
34	Simbal	<i>Hyacinthus orientalis</i>
35	Berri	<i>Diospyros melanoxylon</i>
36	Suk chain	<i>Pongamia glabra</i>
37	Poplar	<i>Populus alba</i>
38	Aam	<i>Mangifera indica</i>
39	Shehtoot	<i>Morus alba</i>
40	Peepal	<i>Ficus relegiosa</i>

Source: PHA

Lahore is rich in ecological species, but along with that it also has different types of shrubs and herbs. Table represents the details of shrubs and herbs with their common and English names.

Table 6.7 Inventory of Shrubs Present in Lahore District

No.	Common Names	Botanical Names
1	Marwa	Murraya exotica
2	Gul-e-fanoos	Lagerstromia indica
3	Golden Durant	Duranta plumier
4	-	Exocaria bicolor
5	Jasmin	Gardenia jasmonoidis
6	Firebush	Hamelia patens
7	Jasmine	Jasminum grandiflora
8	-	Lantana alba
9	Henna	Lawsonia inermis
10	Haar Singhaar	Nyctanthes arbotrists
11	<u>Nila Chitrak</u>	Plumbago capensis
12	Tecoma	Tecoma stans
13	Queen of night	Cestrum nocturnum
14	-	Buddlia hybrid
15	Motia	Jasminum Sambac
16	Chandna	Tabernae Montana

No.	Common Names	Botanical Names
17	Amaltas	Cassia glaca
18	Ghural	Hibiscus rosa
19	Anar	Punica granatum
20	Sanna	Cassia angustifolia
21	-	Thevitia nertifolia
22	Kanair	Narum odorum
23	-	Ixora parviflora
24	Bottle brush	Calistimon linciolatus
25	-	Euphorbia cotinida
26	-	Atro batro
27	Orange flower	Crossandra undulifobia
28	-	Eranthemum mervoem
29	Yellow flower	Hypericum chinensis
30	-	Spiraea cantoniesis
31	Brick red flower	Woodfordia floribunda
32	-	Acalypha varieties
33	Bougain bail	Bougainvillea glabra

No.	Common Names	Botanical Names
34	-	Hamelia patens
35	Ratan joot	Jatrofa curcas

Source: PHA

Table 6.8 Inventory of Herbs Present in Lahore District

No.	Botanical Names
1	Russelia floribunda
2	Alternanthera red
3	Alternanthera white
4	Aurecaria
5	Asparages
6	Plumosis
7	Riben grass
8	American dasi
9	Stanottefferum
10	Hemerocallis
11	Oxalis
12	Amaryllis
13	Cineraria maritime

No.	Botanical Names
14	Euphorbia splendens
15	Iris barbette
16	Ruscus
17	Salvia splendens
18	Smilax asparagoides
19	Tradescantia discolor
20	Violets Varities

There are some floral species which are at risk of extinction. The table represents the list of endangered and prohibited floral species. The plants being grown in the project area are mostly bushy with thick leafy composition, hardy, drought resistant, which can withstand all the weather vagaries.

Table 6.9 List of Endangered and Prohibited Species in Lahore District

Endangered Species	Prohibited Species
Dalbergia sissoo	Eucalyptus species
Salvedora persica	Broussonetia papyrifera
Ficus bengalensis	Salmalia malabarica
Ficus religiosa	Populus nigra/Alba
Ficus enfeetoria	Nerium odorum
Ficus glomerata	Thevetia nerifolia

Endangered Species	Prohibited Species
Albizia procera	
Albizia lebbek	
Anogeissus acuminat	
Artocarpus integrifolia	
Artocarpus lakoocha	
Azadirachta indica	
Bischofia javanica	
Berser Serrata	
Dillenia indica	
Meringa oleifera	
Prosopis spiligera	
Ziziphus mauritiana	
Cassia alata	
Jaguinia aristata	
Tecoma undalata	
Prosopis juliflora	
Tamyrix articulate	
Magnolia grandiflora	

Source: Forest Department, Lahore

The project area has a variety of trees along the roadsides, consisting of the following major species as shown in the table.

Table 6.10 List of identified trees in the Project area

Sr #	Local Name	English Name	Scientific Name
1	Amaltas	Pudding pipe tree	<i>Cassia fistula</i>

Sr #	Local Name	English Name	Scientific Name
2	Golarra	Coccinia	<i>Coccinia cardifolia</i>
3	Alstonia	Devil tree	<i>Alstonia scholaris</i>
4	Neem	Ash-leaved bed tree	<i>Azadirachta indica</i>
5	Gul-e-nishtar	Coral tree	<i>Erythrina variegata</i>
6	Jamin	Black berry	<i>Eugenia jambolana</i>
7	Peepal	Ficus	<i>Ficus religiosa</i>
8	Simbal	Hyacinth	<i>Hyacinthus orientalis</i>
9	Sheesham	Sosoo tree	<i>Dalbergia sisoo</i>
10	Berri	Indian-cigar	<i>Diospyros melanoxylon</i>
11	Chanar	Platanus	<i>Platanus orientalis</i>
12	Suk chain	Smooth level pongama	<i>Pongamia glabra</i>
13	Poplar	Poplar	<i>Populus alba</i>
14	Aam	Mango	<i>Mangifera indica</i>
15	Bakain	Persian lilac	<i>Melia azedarach</i>
16	Molsary	Mimusaps	<i>Memusops elangi</i>
17	Shehtoot	Mulbury	<i>Morus alba</i>
18	Arjun	Terminalia	<i>Terminalia arjuna</i>
19	Anar	Pomegranate	<i>Punica granatum</i>

Sr #	Local Name	English Name	Scientific Name
20	Safeda	Indian willow	<i>Salix tetarsperma</i>
21	Keekar	Parkinsonia	<i>Parkinsonia aculeate</i>
22	Kawar gandal	Aloe	<i>Aloe vera</i>
23	Araucaria	Araucaria	<i>Araucaria cumminighamli</i>
24	Bans	Bamboo	<i>Bambusa stricta</i>
25	Khajor	Date palm	<i>Phoenix sylvestris</i>
26	Banana	Bannana	<i>Musa sapientum</i>
27	Kenair	Oleandar	<i>Nerium grandiflora</i>
28	Gulab	Rose	<i>Rosa Indica</i>
29	Ashook	Saraca	<i>Saraca indica</i>
30	Bougainvillia	Bougainvillia	<i>Bougainvillea spectabilis</i>
31	Dronta	Duranta	<i>Duranta repens</i>

6.16 Fauna

6.16.1 Mammals

Commonly found mammals in the area include dogs, cats, horses, house rats, and bats. However Small Indian Mongoose and Indian Palm Squirrel are also found in the area.

6.16.2 Reptiles

Lizards such as Spiny tailed lizard (*Uromastix hardwickii*) and fingered toed lizard (*Acanthodactylus cantoris*) are also found in the area.

6.16.3 Amphibians

The amphibians found in the area include common frog (*Rana tigrina*) and Indus valley toad.

6.16.4 Birds

House Sparrow (*Passer domesticus*), House crow (*Corvus Splenders*), are commonly found in the area. Along with these some of other birds were also found such as:

1. Nightingale (*Pycnontus cafer*)
2. Parrot (*Psittacula krameri*)
3. Pigeon (*Columba livia*)
4. Hoopoe (*Upupa epops*)

6.17 Social/Human Environment

This section explains the social conditions of the project area. The conditions of the people living in the area. It was determined through field surveys and interviews were conducted with residents, shopkeepers, road users, and major stakeholders. Their livelihood and professions were also identified so that their role and conditions in environment can be better understood.

6.18 Demographic Characteristics of the project area

The total population of Lahore District was 6,318,745 as counted in March 1998 with an increase of 78.3% since March 1981 when it was 3,544,942 souls. The average annual growth rate of population in the district during 1981-1998 was 3.5 percent. The total area of the district is 1772 square kilometers, which gives population density of 3,566 persons per square kilometer as against 2000 persons observed in 1981 indicating a fast growth rate of the district. **Table gives**

population, its increase, and average annual growth rate since 1951 of Lahore district.

Table 6.11 Population and Increase and Growth Rates

Description	1951	1961	1972	1981	1998
Population (in 000's)	1,135	1,626	2,588	3,545	6,319
Intercensal Increase (%)	43.3	59.2	37.0	78.3	-
Average Annual Growth Rate (%)	3.7	4.1	3.8	3.5	-

Source: District Census Report (DCR)

6.19 Religion

The people living in the area are mostly Muslims i.e. 93.9%. After this the 2nd highest percentage is of Christians with 5.8% and Ahmadis 0.2%. Whereas other minorities like Hindus are very small in number.

6.20 Ethnic Structure

The main casts and groups of Lahore district are Arain, Kashmiri, Jat, Rajput, Malik, Pathan, Mughal, Sheikh, kombh, and Gujjar.

6.21 Mother Tongue

The mother is the language used for communication among parents and their children in household. Punjabi is the major spoken language (86.2%).

6.22 Economic Conditions

The economically active population is defined 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 21.8 percent of the total population or 29.5 percent of the 10 years and over. The formal percentage is known as Crude Activity Rate (CAR), while the latter is known as Refined Activity Rate (RAR). Of the total male population 39.9% were economically active, while 60.1 percent were inactive, 25.4 percent children under 10 years, 18.0 percent students, 1.9 percent domestic workers, while 14.8 percent were landlords, property owners, retired persons, disabled etc. Further details can be seen in **Table**.

Table 6.12 Percentage (%) of Population by Economic Categories

Economic Category	All Areas			Rural			Urban		
	Both Sexes	Male	Female	Both Sexes	Male	Female	Both Sexes	Male	Female
Economically Active	21.8	39.9	1.6	20.7	37.9	1.3	22.0	40.4	1.6
Not Economically Active	78.2	60.1	98.4	79.3	62.1	98.7	78.0	59.6	98.4
Children under 10	26.1	25.4	26.8	31.1	30.3	32.0	25.0	24.3	25.7
Students	9.8	18.0	0.6	7.0	13.2	0.1	10.3	19.0	0.7
Domestic Workers	34.5	1.9	70.9	32.6	2.5	66.4	34.9	1.8	71.8
Others	7.9	14.8	0.1	8.5	16.1	00	7.7	14.5	0.1
Unemployment Rate	20.7	21.4	2.2	21.5	22.1	1.2	20.5	21.2	2.4

6.23 Impact Assessment Survey of the Project Area

For the purpose of impact assessment of the project area and to identify the public participation process sample of 100 respondents was taken through random sampling. Out of which 5 questionnaires were not completely filled, so they were discarded and then the sample size became 95. The respondents include shopkeepers, residents, labors, road users, students, and doctors.

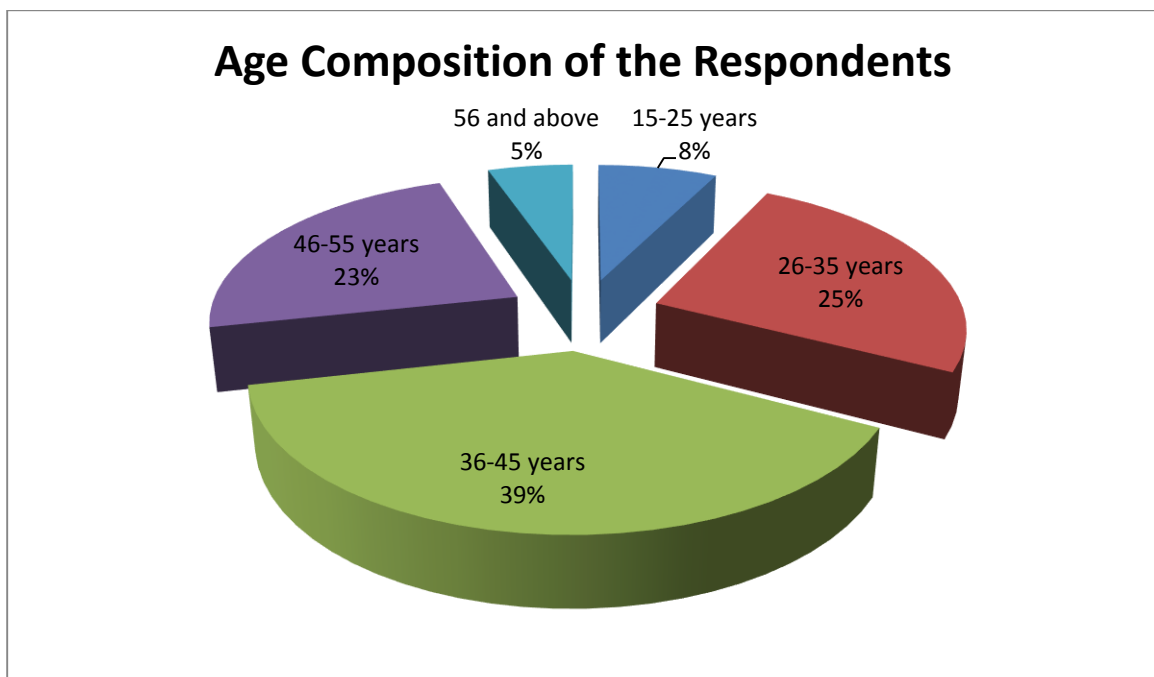
6.24 Survey Findings

Detailed findings of the survey comprising of different parameters are discussed below:

- **Age:** The demographic characteristics of the survey are shown in the table.

Table 6.13 Age Composition of the Respondents

Sr. No.	Frequency Distribution	Number	Percentage
1	15 – 25	7	7.36
2	26 – 35	24	25.26
3	36 – 45	37	38.94
4	46-55	22	23.15
5	56 and above	5	5.26
Total		95	99.97



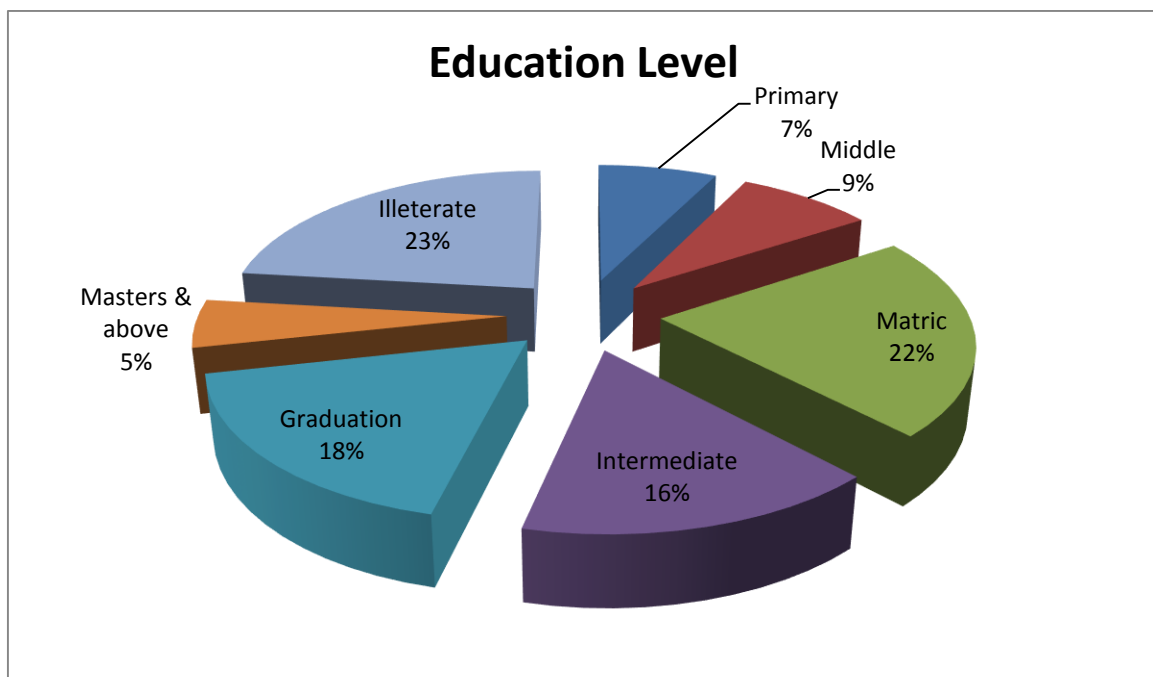
Graph 6.1 Age Composition of respondents

8% of the respondents were aged 15-25 years. 25% of the respondents were aged 26-35 years. 39% of the respondents were aged 36-45 years. They were more in number because this age group is economically more active. 23% of the respondents were aged 46-55 years. 5% of the respondents were aged 56 years and above. These figures show that by and large respondents were mature enough to express their opinion about the project.

- **Education:** Educational distribution of the respondents is shown in the table.

Table 6.14 Educational Level of the Respondents

Serial Number	Education Level	Number	Percentage
1	Primary	7	7.36
2	Middle	8	8.42
3	Matric	21	22.10
4	intermediate	15	15.78
5	Graduation	17	17.89
6	Masters and Above	5	5.26
7	Illiterate	22	23.1



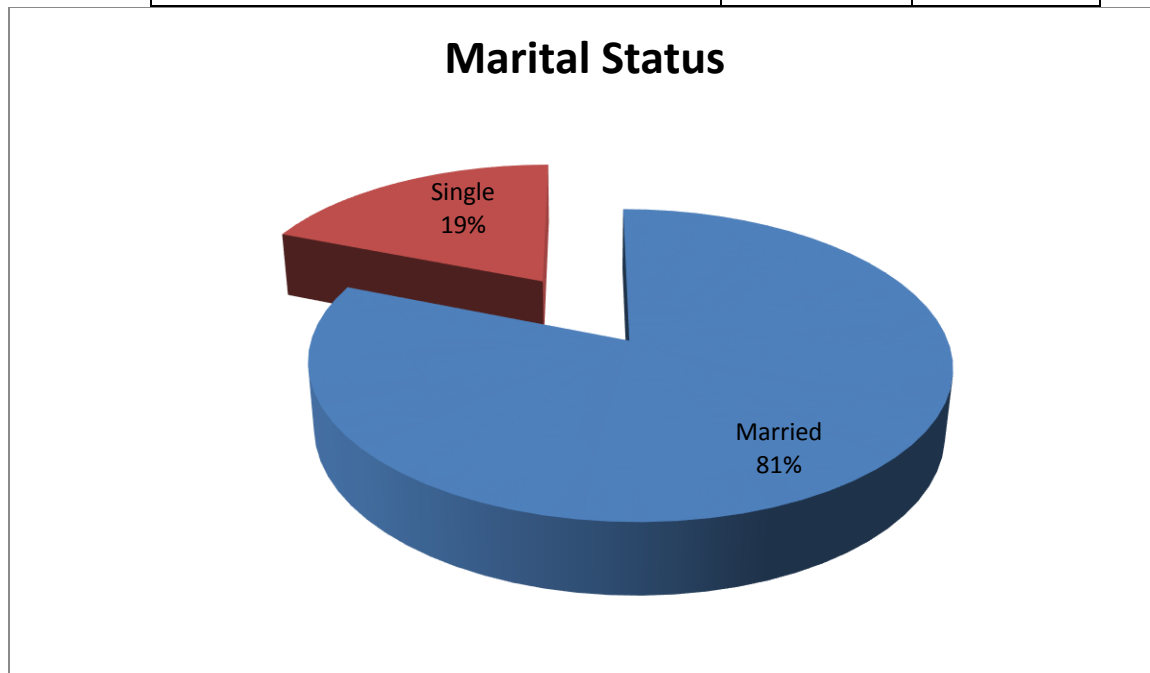
Graph 6.2 Education Levels of the Respondents

The graph represents the education distribution of the respondents. According to this 7% of the respondents were educated up to primary level, 9% of the respondents had middle schooling, and 22% were educated up to matric whereas 16% of them had done their intermediate, 18% have completed graduation and 5% were masters or above respectively.

- **Marital Status:** According to the survey 81% of the respondents were married and 19% were Unmarried or single.

Table 6.15 Marital Statuses of the Respondents

Sr. No.	Marital Status	Number	Percentage
1	Married	77	81
2	Single	18	36.5
Total		95	99.94



Graph 6.3 Marital statuses of the Respondents

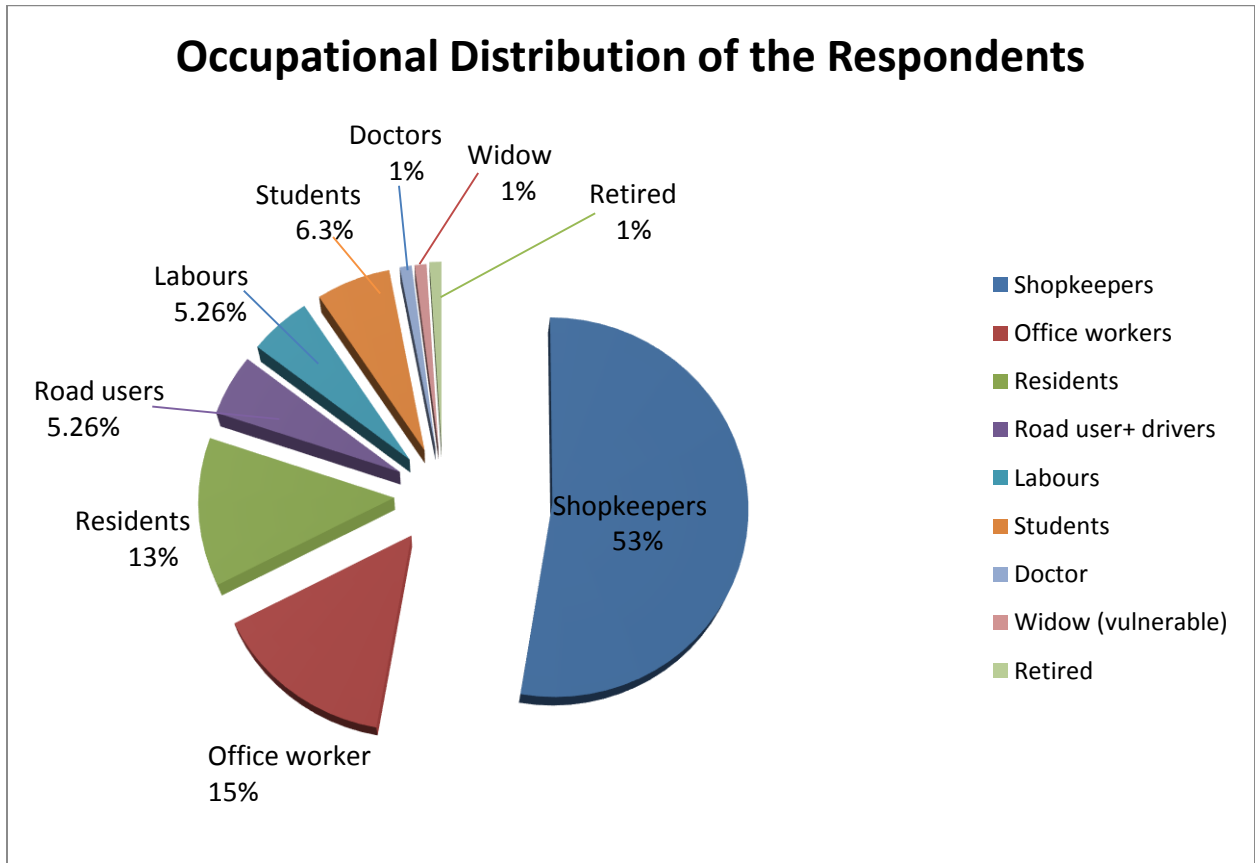
Composition of the Respondents

The respondents include Shopkeepers, businessman, office workers, students, road users, doctors, labor, and residents of the area. The graph below explains the %age composition of the responds in the area. Majority of the respondents were Shopkeepers/businessman i.e.53%. They were running different shops and businesses such as tyre shops, Auto spare parts shops etc. 15% of the people were associated with different private jobs and worked in factories. 13% of the people were those who lived in the area or live closer to the areas which are actually directly or indirectly affected due to the project. 5.2% of the people were the road users, drivers, pedestrians who use the road in different ways. 5.26% of the people were labors. They were inquired as to know how much they know about effect of the project on their work.6.3% of the respondents were students. Government College, National College of Arts, and other institutes are accessed through this road. So different students were also interviewed. 1% of the respondents were doctors in a government hospital. There was a group of doctors with whom the project was discussed. 1% of the respondents were vulnerable: vulnerable means that they did not have sole source of earning, such as any widow. And if they work in a close by area but due to the project their house and work is seriously affected. And they are hand to mouth for sustaining. Whereas 1% of the respondents were those who are not associated with work or either is retired from their jobs.

Table 6.16 Composition of the respondents

Serial No.	Composition of the Respondent	Number	Percentage
1	Shopkeepers	50	52.63%
2	Office Workers	14	15%
3	Road users	5	5.26%
4	Labors	5	5.26%
5	Residents	12	12.63%

6	Students	6	6.31
7	Doctors	1	1%
8	Widow	1	1%
9	Retired	1	1%



Graph 6.4 Occupational Distributions of the Respondents

7 Public Participation

This chapter explains the public participation process and findings from the field and data collected and highlight the gaps in the public participation and consultation.

Public participation is an integral part of EIA. Public participation means that public should be consulted, informed, or involved in the decision making process and public should know about the project in detail. Public participation is compulsory under the Pakistan Environmental Protection Act. According to PEPA Regulations 2000 under section 10 require that public notice should be published in English or Urdu in local newspaper in the affected area 30 days before the hearing. The public notice contains information on project type, location, name, address of the proponent and the place from where EIA report can be accessed.

To investigate about the public consultation and participation affected people, main stakeholders, and interested public were interviewed and asked about the process. As there is one mega project of historical preservation of monuments and facilitation of Metro Bus in the area, but for certain reasons the project was divided into the parts. One part of the project is construction of signal free Junction at Azadi Chowk and the other part is construction of alternate route to circular road. So it's one project but was divided into two parts. For determining the overall process interviews, questionnaires filled by respondents from Ravi Road to Masti gate, Sabzi Mandi, Larri Ada were carried out etc. Public hearing for the project of signal free Junction at Azadi Chowk was also attended on 24th of January in Alhamra Art Complex. The data on Public hearing of construction of alternate route to circular road was collected from NESPAK and EPA. The data includes the attendance sheets of the participants, pictures of the public hearing, and

details about presentation whereas one of the important document “Minutes of the Public consultation” was not being shared but was just communicated verbally.

Through the field visits, interviews, and questionnaires these points were identified:

- i. When it was asked whether earlier any public consultation was done with the people? Or anyone came to take their opinion? In reply to that everyone said neither their opinion was taken nor anyone consulted them. They believe that it's more an authoritative and bureaucratic process, where their voice was not being heard or considered.
- ii. In another question when it was asked whether they had seen or heard about the Public hearing notice in newspaper or by the word of mouth? No one had seen the notice in the newspaper. Whereas 2-3 people said that they heard about it from the LDA officials that there would be public meeting in Alhamra and they would be informed about it. But after that no one informed us about it. One of the Reasons for not knowing about the public hearing through newspaper is that people don't have a habit of reading newspaper or either they are not that educated. Secondly notice was published along with numerous tender notices. So people missed reading that.
- iii. When people were asked whether they attended public hearing which was held at Alhamra? It was identified through the survey that surprisingly no one was part of that meeting. Whereas many people reported that government officials asked us to come to LDA office- Johar Town on 15th of January. So all the shopkeepers, and affected people went to the office for land acquisition and other related issues. From the data sheets it was identified that 54 people attended the public hearing. Out of which 6 were the representatives from NESPAK whereas 5 were government representative from EPA, LDA, and EPA. Furthermore 15 participants were those who were actually out of Lahore

and came from far flung areas such as Vehari, Pakpattan, and Narang Mandi etc. whereas 23 people were from different parts of Lahore such as Johar Town, Muslim Town, Green town etc. People from the concerned area (Project Location) who have actually attended the Public hearing were just 5 out of which 2 were from Ravi Road, 2 were from Azadi Chowk and 1 was from Badami Bagh. Whereas their complete addresses were not mentioned in the data sheet so it's difficult to identify those participants in the Project area. How can one believe that those who were losing their properties, livelihoods, houses are not concerned about this process. It's not true that they are not concerned but they were intentionally kept out of the process to avoid conflict. This process clearly shows the lack of public participation and does not represent the transparency in decision making process. Secondly they were not aware of this process or meeting.

- iv. Inappropriate venue of public hearing is also a limitation. It must be closer to the project area. The public hearing could be arranged at "Minar-e-Pakistan" or closer to any public place or Government/TMA office. So that everyone came to know about it and general public also became part of it. But it was deliberately arranged at a place far from the project to avoid the conflict and to keep poor people out of the process.

In the 21st century citizens should enjoy "Right to information." But in practice it's not being observed. "Minutes of the Public hearing" is a public document. But it was not being shared but just communicated. It was informed that the time of the whole meeting was 1 hour and 30 minutes. The presentation was prepared in English but was presented in Urdu. The point to be noted is that all the documents, reports, and plans are in English. We should not forget the fact that majority of the people don't know English so the documents should be in Urdu, if it's not possible then at least the summary of the project should be in local language. Secondly the time

is an important factor. The time of the Public hearing was short and people were not explained the project, its impacts and mitigation. Those present were unable to comment.

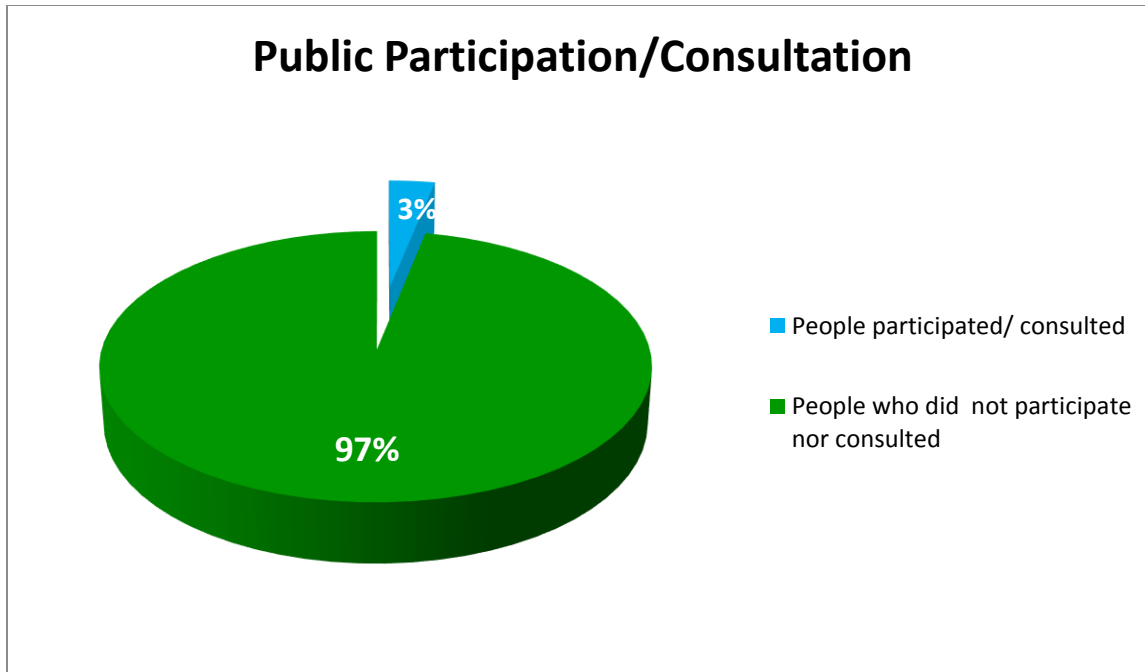
7.1 Public Participation

Public consultation/ participation were analyzed through the survey. They were asked about different steps of public participation and their role in it. The graphs below represent those steps.

When it was asked from the people whether they had been consulted or their opinion sought. The answer was no. But surprisingly 97% of the respondents said that no one asked or consulted them about the project. They believe that in this system their voice is not considered. And no one was interested to know what and how we think. Government did what it wanted. Whereas 3% of the respondents said that public participation and consultation was being done. These were the people related to the project such as project supervisors and site supervisors who should not have been there in the first place.

Table 7.1 Public participation and Consultation

Serial No.	Public participation/Consultation	Number	Percentage
1	People participated/ consulted	3	3.15
2	People who did not participate nor were they consulted	92	96.84
	Total	95	100



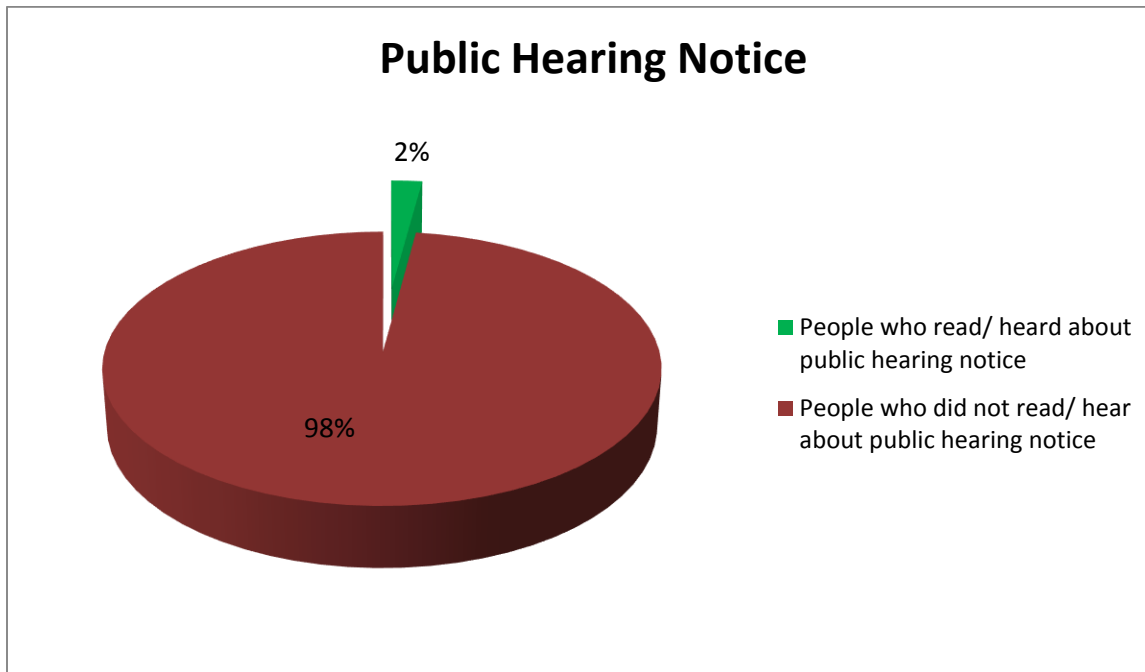
Graph 7.0.1 Public Participation or consultation

7.2 Public Hearing Notice

To identify the number of people who had seen public hearing notice the questionnaire were filled. It was such a significant finding that 98% of the people said that neither they had seen the notice in the newspaper nor had they heard about it. While 2% of the people said that they heard about it from the government officials. LDA officials told them that there would be a public meeting in Alhamra but they would inform them about it. But afterwards no one informed them.

Table 7.2 Public hearing notices seen/ heard by people

Serial No.	Public Hearing notice	Number	Percentage
1	People who read/ heard about public hearing notice	2	2.1
2	People who did not read/ hear about public hearing notice	93	97.8
	Total	95	100



Graph 7.0.2 Public Hearing Notice

7.3 Attendance in Public Hearing

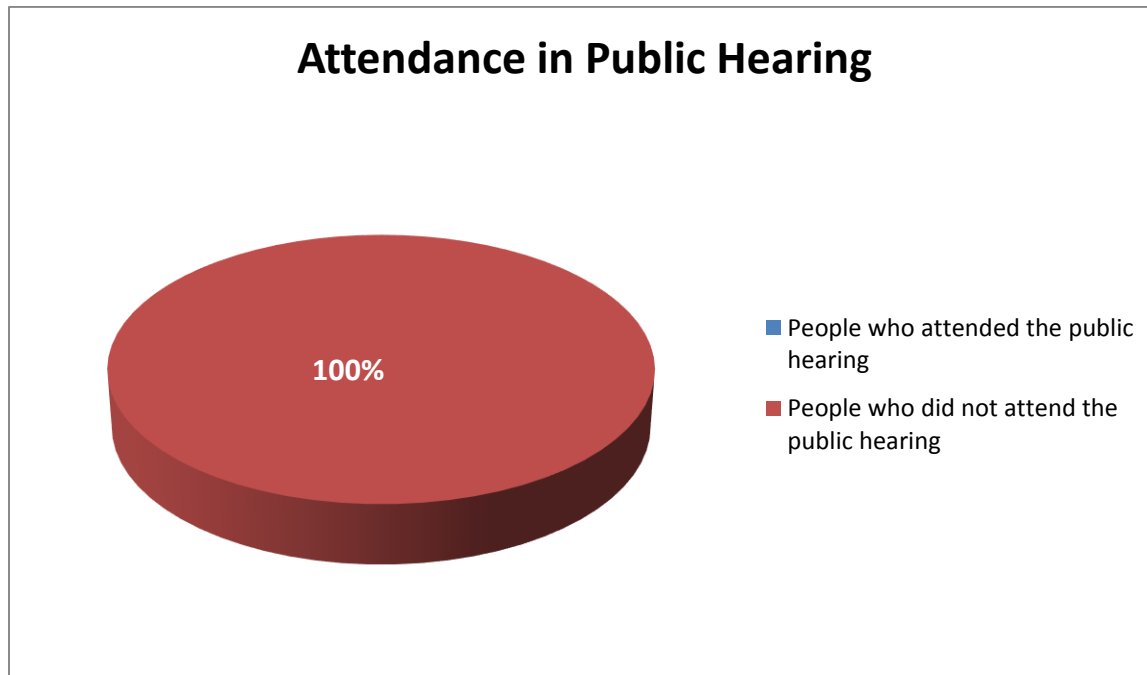
How many people actually participated in the public hearing arranged by the proponent?

According to the survey everyone reported that they had not heard about it and were not the part of that process. But they mentioned that had they been aware of it, they would have attended that for sure. 100% of the respondents had not attended the meeting. Another interesting finding is that majority of the people informed that they were asked to come to LDA-office Johar Town on 15th of January for land issues and other queries. Hence all the affected people went there. It is clear that people were misinformed to keep them away from public hearing in order to avoid conflict.

Table 7.3 People attend the Public Hearing

Serial No.	Attend the Public Hearing	Number	Percentage
1	People who attended the public hearing	0	0

2	People who did not attend the public hearing	95	100
	Total	95	100



Graph 7.0.3 Attendances in Public Hearing

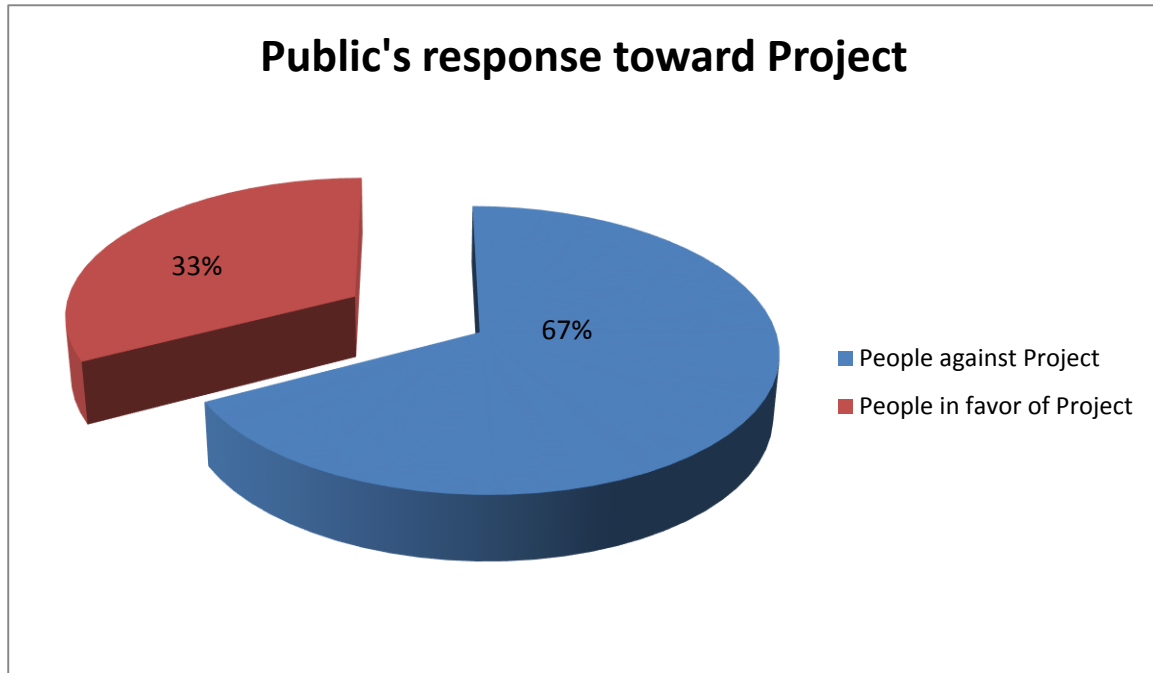
7.4 Public Response toward the Project

People were asked to respond whether they were in favor of project. Most of the people said that they were not in favor of the project because due to this their livelihoods would be disturbed. 67% of the people were against the project whereas 33% of the people were in favor of the project.

Table 7.4 People's Response toward the Project

Serial No.	Respondent	Number	Percentage
1	People against Project	64	67.36
2	People in favor of Project	31	32.63

	Total	95	100
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Graph 7.4 Public Response

7.5 HYPOTHESES TESTING FOR PUBLIC PARTICIPATION SURVEY

The following research hypotheses were tested. Data was collected from a survey of sample size $n=95$. The research hypotheses were:

1. Majority of the people were not consulted or participated at any stage of the project.
2. Majority of the people have not read or heard about public hearing notice.
3. Majority of the people have not attended public hearing.
4. Majority of the people were not in favor of the project.

These hypotheses were statistically tested. Results of statistically testing are given below.

Research hypothesis # 1

Majority of the people have not consulted/participated.

- Consulted (C)
- Not consulted (NC)

$$H_0 = \pi (\text{NC}) \leq 0.5$$

$$H_1 = \pi (\text{NC}) > 0.5$$

Using Z-test

$$Z = \frac{P_o - \pi_o}{\sqrt{\pi_o (1 - \pi_o)/n}}$$

$$= \frac{0.9864 - 0.5}{\sqrt{0.5 (1 - 0.5)/95}}$$

$$= 9.13$$

P value for this $Z = 9.13$ is almost zero hence we have strong evidence in form of H_1 and reject the H_0 .

Research Hypothesis # 2

Majority of the people have not heard or read about the public hearing notice (PHN) in the newspaper.

- Informed about public hearing notice (IPHN)
- Not informed about public hearing notice (UIPHN)

$$H_0 = \pi_{(\text{UIPHN})} \leq 0.5$$

$$H_1 = \pi_{(\text{UIPHN})} > 0.5$$

Using Z-test

$$Z = \frac{P_o - \pi_o}{\sqrt{\pi_o (1 - \pi_o)/n}}$$

$$Z = \frac{0.978 - 0.5}{\sqrt{0.5 (1 - 0.5)/95}}$$

$$Z = 9.56$$

P value for this $Z= 9.56$ is almost zero hence we have strong evidence in form of H_1 and reject the H_0 .

Research Hypothesis # 3

Majority of the people have not attended the public hearing.

- Attended (A)
- Not attended (NA)

$$H_0 = \pi (NA) \leq 0.5$$

$$H_1 = \pi (NA) > 0.5$$

Using Z-test

$$Z = \frac{P_0 - \pi_0}{\sqrt{\pi_0 (1 - \pi_0)/n}}$$

$$= \frac{1 - 0.5}{\sqrt{0.5 (1 - 0.5)/95}}$$

$$= 9.74$$

P value for this $Z= 9.74$ is almost zero hence we have strong evidence in form of H_1 and reject the H_0 .

Research hypothesis # 4

Majority of the residents were not in favor of project.

- In favor of project (F)
- Not in favor of project (NF)

$$H_0 = \pi (NF) \leq 0.5$$

$$H_1 = \pi (NF) > 0.5$$

Using Z-test

$$Z = \frac{P_0 - \pi_0}{\sqrt{\pi_0 (1 - \pi_0)/n}}$$

$$= \frac{0.6736 - 0.5}{\sqrt{0.5(1 - 0.5)/95}}$$

$$= 3.38$$

P value for this $Z= 3.38$ is almost zero hence we have strong evidence in form of H_1 and reject the H_0 .

8 Environmental Impacts and Measure and Mitigations

This section deals with the identification of impacts due to the project on biophysical, socioeconomic, landscape and visual aspects of the project area. The gaps in existing report would also be highlighted. This assessment also includes the mitigations and measures to alleviate the adverse impacts.

First of all the gaps in the existing report would be analyzed and shortcomings discussed. The method used for the identification of impacts in the exiting report is environmental Impact matrices but it's difficult to distinguish direct and indirect impacts of the project with this method and there is a chance of double counting of impacts. More than that it addresses few components of the physical, biological, and socioeconomic environment and ignores the many serious components. Secondly it does not explain the duration of the impacts. The purpose of baseline is to identify the impacts on all those components.

8.1 Physical Environment

These components were considered in impacts prediction: Topography, soil, air quality, noise and vibration, drainage and ground water quality were considered. Whereas the visual and landscape impact, change in climate or temperature were ignored. Well one of the main argument for the construction of the alternate route is that due to traffic congestion and vehicular emissions the archaeological, historical, and cultural heritage is being deteriorated. So to improve the transportation system and to protect the archeological heritage the project is being carried out. During the construction the impact (direct/ indirect) on these historical sites would be permanent. But consultant categorized it as moderate negative. Following are the gaps in the existing report:

- List of pre-construction activities and their impacts is not given.
- Change in Land use and its impacts are also not considered.
- Visual and landscape impacts are not considered.

8.2 Biological Environment

For identification of impacts on biophysical environment only vegetation and animal movement components were considered and impacts on particular trees, species were not studied in detail.

8.3 Socio-Economic Environment

Reduction of green spaces for public use, livelihoods and compensations, rehabilitation and displacement and other important social factors are not being discussed or even studied.

8.4 Environmental Impacts identified and Suggested measure and mitigations

For the identification of impacts literature review has been done and similar case studies are reviewed which show the predicted changes in the environment along with the checklist. For biophysical, socioeconomic, and visual landscape impacts literature and experts opinions were considered.

8.5 Physical Environment and components

Environment is a complex thing because so many things are interlinked and change in one component leads to change in the other. Predicting the future and environment is a tough job but with the help of literature and experts opinions impacts identification has been done. The components include:

- Topography
- Soil
- Air Quality

- Noise and vibration
- Water Resources (Ground Water Quality & Surface)
- Change in Land use pattern
- Visual and Landscape impacts
- Solid Waste
- Energy Use
- Public utilities
- Seismic Hazard
- Camp sites/ Site offices

8.6 Biological Environment and its components

The components of biological environment include:

- Flora
- Fauna

8.7 Socio-Economic and socio-ecological Environment and its components

The components of socio-economic and socio- ecological environment include:

- Land Acquisition and resettlement
- Compensation of the land
- Loss of Livelihoods
- Disruption in Public utilities
- Disturbance of education and health institution
- Reduction in green Space for Public
- Health and Social Problems

- Human Health and Safety
- Cultural heritage

Impact Assessment Checklist For Physical Environment**Pre-Construction/ Design Phase****Topography**

Would the topography of the site be affected due to the development of the project?

✓ Yes

No

Quality of Impact : Negative

Significance of Impact: Moderate

Duration: Long Term

Description: The topography of the project area is plain. For the purpose of embankments there would be cutting and excavation.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- As excavations are supposed to be done for the purpose of embankments and as per engineering drawings so it can't be avoided but excavation shall be kept confined to the specific location.
- Unnecessary excavations should be avoided as mitigation measure.

Soil

Will the project affect or change the soil quality? Soil erosion and contamination would

be up to what extent?

✓ Yes

No

Quality of Impact : Negative

Significance of Impact: Moderate

Duration: Short term Impact

Description: The quality of the soil would be seriously affected as Soil contamination would occur because of disposal of untreated waste water or direct disposal of chemical and on site preparation of materials. Oil, chemicals spills, and waste from camp sites may also deteriorate the quality of the soil.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- Provision of such vegetation native species of trees which help in reducing the erosion.
- Direct disposal of waste water and chemicals should not be allowed. Camp sites should avoid extra excavation and soil erosion.
- The Project site through which the alignment is proposed, should be investigated for the presence of naturally occurring contaminants, such as asbestos, arsenic, likelihood of erodibility of soil, contours, terrain stability, slope gradient, physical and chemical properties of soil, such as soil depth, particle size distribution, permeability, dispersibility, pH, salinity and likelihood of seismic activity.

- If any contaminated soils are found, they shall be removed and deposited in a sealed pit in an area agreed with the concerned authority.

Air Quality

Would the air quality be compromised? How would it really affects the air quality and up to what extent? Will the project affect or change the soil quality? Soil erosion and contamination would be up to what extent?

✓ Yes

No

Quality of Impact : Negative

Significance of Impact: Major Negative

Duration: Temporary

Description: The quality of the air will be affected because of the use of heavy machinery during construction. Impacts of air emissions may be carried over long distances depending upon the wind speed, direction, temperature of the surrounding air and atmospheric stability.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- The Project site through which the alignment is proposed should be monitored through out to kept record of Air quality and any change in it.
- For dust control there should be sprinkling of water across different tacks.
- Vehicles should be maintained so that no hazardous emission entered into the air.
- Ensuring that trucks carrying aggregate fill materials are kept covered with canvas

sheet to help contain construction materials being transported between sites.

Noise and Vibration:

Would the Noise and Vibration increase in the area? How will it disturb the community?

✓ Yes

No

Quality of Impact : Negative

Significance of Impact: Moderate Negative

Duration: Temporary

Description: Due to the movement of Heavy vehicles there would be excessive noise and vibration and it will disturb the community along the project alignment.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- There should be speed limit and bays and sign boards on the project site.
- To mitigate these impact noise barriers should be constructed in sensitive area such as populated areas, hospitals, and educational institutes.
- Provision of thick plantation for indigenous species of trees on available space along the road.

Water Resources (Surface and Ground Water)

Will there be any effect on water quality (Surface and ground water)? How much contamination of water is possible?

✓ Yes

No

Quality of Impact : Negative

Significance of Impact: Moderate Negative

Duration: Short term Impact

Description: The quality of the water may deteriorate in the area further. During the deep excavation aquifer may get hit and quality water will be depleted. Because of preparation of material on site the leachate may be produced and percolate through the soil and reach water table and contaminate it and may be consumed by the local people.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- Protection of the ground water reserves from any source of contamination.
- Water required for construction should be obtained in such a manner that water availability to the local communities remains unaffected.
- Excavation should be done in supervision of the site engineer so he can decide up to which limit excavation should be done.
- Prohibit washing of vehicles and machinery in the project area.

Change in Land use Pattern

Will the proposal change the current land use of the site, the appearance of the landscape or adjoining land uses?

✓ Yes

No

Quality of Impact : Negative

Significance of Impact: Significant Impact

Duration: Permanent Impact

Description: Though there was already a road but now it would acquire additional land which was earlier used for the commercial and residential purpose. Area was also acquired from the green Iqbal park. This was used by the public for sports purpose. But now the land use pattern would be permanently changed. There would be reduction in green space for public use.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- As the land is acquired from the public then there should be sufficient compensation to the people.
- The area of the existing circular road should be given for the purpose of green area.
- As public green space is reduced from the park then in the new heritage park access of people should be ensured.
- Plantation should be done for compensating the green area.

Visual and Landscape Impact

Is there a historic pattern of monument/ archeological boundaries in the area surrounding area and would it affect the visual of the site?

✓ Yes

No

Quality of Impact : Negative

Significance of Impact: Profound Impact

Duration: Permanent Impact

Description: It has been explained by the expert that earlier when someone entered in Lahore he could see Minar-e-Pakistan first but now due to the construction of the bridges and flyover that cannot be seen. This is a permanent negative impact because now it is modified visually.

Measures and Mitigation:

- There is no such measure and mitigation for that.

Solid Waste

Will there be solid waste generation problem? How would it affect the quality of the project site?

✓ Yes

No

Quality of Impact : Negative

Significance of Impact: Slight Impact

Duration: Temporary Impact

Description: waste would be generated due to camp sites/ site offices. Other than that

construction material would be prepared on site it also adds to generation of solid waste.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- It must be ensured that waste should not be dumped openly.
- Proper waste collection, storage, and disposal to the approval site should be ensured.
- Waste should be put in the waste containers.

Energy Use

What would be the change in energy use? How would it affect the project and community? Would Energy use increase?

✓ Yes

No

Quality of Impact : Negative

Significance of Impact: Moderate Impact

Duration: Short term Impact

Description: The energy use in the project area would increase as construction materials would be coming from far flung area and large number of vehicles would be used so consumption of energy would further increase. Then a lot of energy would be used during construction. Number of people would be associated with the project so they would also be commuting and consuming a large amount of energy. If summed up (all the energies) the figure would be much more than the existing energy use.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- As much as possible try to reduce the number of trips.
- People should be encouraged to live on site rather than commute on daily basis.
- All the local material from the nearest possible site should be utilized.

Public Utilities

What would be the effect on the public utilities and how it would affect the community?

Quality of Impact : Negative

Significance of Impact: Moderate Impact

Duration: Temporary Impact

Description: Due to the Project, public utilities will be affected creating disruption of public services and inconvenience to the locals. This impact is temporary and may be considered as moderately negative in nature.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- All public utilities (e.g. water pipes, power / telephone lines) likely to be affected by the proposed project will be relocated much ahead of time, before the commencement of construction work.
- Incorporate technical design features to minimize effect on public utilities.

Seismic Hazard

Quality of Impact : Negative

Significance of Impact: Major Impact

Description: the project area is located in the seismic zone 2A represents peak horizontal ground acceleration from 0.08 to 0.16g. in this zone designing of various type of structure should be on the basis of Peak Ground Acceleration (PGA). The factor requires special consideration of the designers keeping in view the recent earthquake of 08 October 2005. This is the major negative impact.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- The proposed structures of the elevated roundabout will be designed and constructed to withstand low to moderate earthquakes.
- For seismic hazard analysis updated structural and seismic evaluations will be consulted.

Camp Sites/ Site offices

Quality of Impact : Negative

Significance of Impact: Moderate Impact

Duration: Temporary Impact

Description: Due to the proposed camp sites, loss of assets on the selected land during and after completion of construction phase will occur. However the siting of these facilities may cause a number of issues such as loss of plantation and vegetation, permanent physical and visual impact on the area, siltation, and pollution. The impacts of these facilities would be temporary and moderate negative in nature.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- The construction camps and workshops shall not be located in sensitive area and shall not be within distance from the existing settlements.
- Efforts will be made to minimize vegetation loss while making site arrangements for construction camps and other facilities.
- Perpetration of waste management plan for addressing waste issue.
- A code of conduct and camp rules will be required within the construction camp management plan.

Impact Assessment Checklist for Biological Environment

Pre-Construction/ Design Phase

Flora (i.e. the plants in the area)

Would the flora of the site be affected due to the development of the project?

✓ Yes

No

Quality of Impact : Negative

Significance of Impact: Significant Impact

Duration: Long Term

Description: Trees are important part of vital ecosystems which perform diverse functions and have a major role in environment. Implementation of project activities would have negative impact such as cutting of trees within the proposed ROW. Trees/plants of different species would be affected. Permission from Forest Department will also have to be sought for cutting of trees from the roadside or along the water courses if these fall within the RoW. Planting should be done as soon as the construction of the road is completed. Maintenance is the key to the establishment of the plantation. Regular monitoring of the plantation should be carried out by the executing agency.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- The indigenous trees most suited to the tract like Shisham, Kikar, Bakain, Dharek, Siris (Albizzia

Procera), Farash, Sukh-Chain, Jaman Bohar, Peepal (Ficus reliogosa), Gullahr (Ficus glomerate) Sohanjana (Moringa oleifera), Karir and Wan (Salvadora Oleoides) are helpful in providing shade, ground cover, aquifer recharge and habitat (including shelter and food).

- These vegetated strips shall develop into a complete ecosystem. Flowering and fruiting shrubs can be planted along the road to beatify the landscape.
- Plantation should be done but it should be indigenous plants.

Fauna (i.e. the Animals/ birds/ mammals in the area)

Will the project affect the fauna of the area?

✓ Yes

No

Quality of Impact : Negative

Significance of Impact: Moderate

Duration: Short term Impact

Description: There would be serious effects on fauna due to the loss of vegetation/ flora most of the animals/ birds will lose their habitat. Due to excessive air, noise, and dust pollution the fauna will migrate.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- Provision of such vegetation native species of trees which help in making similar old habitat.
- Special measures will be adopted to minimize impacts on wild birds, such as avoiding noise generating activities during the critical periods of breeding.
- Contractor will make agreements to minimize the vibration, noise pollution.

Impact Assessment Checklist for Socio-Economic and Socio-Ecological Environment**Pre-Construction/ Design Phase****Land Acquisition and Resettlement**

✓ Yes

No

Quality of Impact : Negative**Significance of Impact:** Significant Impact**Duration:** Permanent

Description: Land should be acquired from the public. Due to this there would be disturbance in their daily routine. They have to move to some other place. Land use would also change from commercial and residential to road construction.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- Proper resettlement plan should be prepared and then people should be displaced.
- People should be informed through notifications or media about every step before it takes place
- People should be compensated in significant and good terms.

Compensation of the Land

Description: Private land has to be acquired from the public, for that purpose good compensation should be given to people. So that they can shift to other places and can settle down.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- Proper and good compensation should be given so that people can start their life in the good conditions on the new place.

Loss of Livelihoods

Description: it's a negative and significant impact. Due to change in land use (from commercial to road construction) many people will lose their business or livelihoods. It's a serious effect on their lives.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- Sufficient compensation
- Provision of jobs
- Should facilitate them till then they have work or business.

Disruption in Public Utilities

Description: Due to proposed project there would be disruption in public utilities which would be an inconvenience to the public. This is moderately negative and temporary impact.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- Provision in the design and budget for the relocation of the existing utility infrastructures wherever required, and

- All public utilities (e.g. water pipes, power / telephone lines) likely to be affected by the proposed project will be relocated much ahead of time, before the commencement of construction work.

Disturbance of education and health institution

Description: As there are so many physical Sensitive receptors in the area such as schools, hospitals and other institutes. Due to disturbance and construction work people will face problems. The impact is moderately negative and temporary.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- Alternate route plans should be explained to access these facilities so people don't face any problem.
- Timely completion of the Project.

Reduction in Green Spaces for Public

Description: Most of the land would be acquired from the Iqbal Park. The land was used earlier by the public for sports activities. But now 178 Kanals of the area would be utilized for the road construction. This is a significant permanent negative impact.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- The land of existing circular road will be given in the Minar-e-Pakistan area for the construction of park and a new lake.
- Easy access should be given to the locals of the area.

Human Health and Social Problems

Description: Due to construction of new road as the livelihoods, land and compensation issues and disruption in other life activity would seriously affect the social life and health of the people. The impact is

moderately negative and short term.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- Help public by giving them assistance and sufficient compensation
- Discussion of project design with public so they can find solution together, it will lessen their stress and pressure.

Human Health and Safety

Description: The whole process of project and construction activities also results in road accidents inflicting local communities and other health problems due to vehicular emission and machinery. People of the community and workers would be exposed to these emissions and machinery. This is a moderate negative and temporary impact.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- There should be proper control on construction activities.
- There should be proper control on oil spillage, leakage of vehicles.
- Provision of proper safety and diversion signage.
- Reducing the impacts of water born disease on long term health effect of workers should be accomplished through proper implementation of diverse intervention.
- Source of water should be selected carefully.

Cultural Heritage

Description: As the project site is near a lot of historical and cultural heritage such as Minar-e-Pakistan, Badshai Mosque, Lahore Fort and Iqbal park and many others. People cannot access these places during

construction. It's moderate negative and short term impact. The other impacts include:

- Aesthetic impacts on cultural monuments and archaeological sites; and
- Damage caused by road construction, related works such as excavation, vehicular emissions, and unregulated access to cultural heritage sites. Such damage
Could affect the historic, scientific, social and amenity values.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- Incorporate technical design features to minimize the project construction activities to avoid any interference with cultural heritage.
- In case of unavoidable interference prior notifications and consultation needs to be made to reach consensus on procedures and options.

Impact Assessment Checklist for Physical Environment**Construction Phase****Topography**

Would the topography of the site be affected due to the development of the project?

✓ Yes

No

Quality of Impact : Negative

Significance of Impact: Moderate

Duration: Long term

Description: The topography of the project area is plain. As a result of construction topography of the Project Area will be changed, One of the important activities during construction will be cutting and dismantling of existing infrastructure and that will have impact on the topography of the Project Area. For the purpose of embankments there would be cutting and excavation.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- As excavations are supposed to be done for the purpose of embankments and as per engineering drawings so it can't be avoided but excavation shall be kept confined to the specific location.
- And unnecessary excavations should be avoided as mitigation measure.

Soil

Will the project affect or change the soil quality? Soil erosion and contamination would be up to what extent?

✓ Yes

No

Quality of Impact : Negative

Significance of Impact: Moderate

Duration: Temporary Impact

Description: The proposed Project is planned to be constructed on already existing road but the larger area would be acquired from Iqbal Park. The quality of the soil would be seriously affected as Soil contamination would occur because of disposal of untreated waste water or direct disposal of chemicals and on site preparation of materials. Oil, chemicals spills, and waste from camp sites may also deteriorate the quality of the soil.

Measures and Mitigation: Impacts can be mitigated by adopting the following

- Provision of such vegetation native species of trees which help in reducing the erosion.
- Direct disposal of waste water and chemicals should not be allowed. Camp sites should avoid extra excavation and soil erosion.
- The Project site through which the alignment is proposed, should be investigated for the presence of naturally occurring contaminants, such as asbestos, arsenic, likelihood of erodibility of soil, contours, terrain stability, slope gradient, physical and chemical

properties of soil, such as soil depth, particle size distribution, permeability, dispersibility, pH, salinity and likelihood of seismic activity.

- If any contaminated soils are found, they shall be removed and deposited in a sealed pit in an area agreed with the concerned authority.

Air Quality

Would the air quality be compromised? How would it really affects the air quality and up to what extent? Will the project affect or change the soil quality? Soil erosion and contamination would be up to what extent?

✓ Yes

No

Quality of Impact : Negative

Significance of Impact: Major Negative

Duration: Temporary

Description: The quality of the air will be affected because of the use of heavy machinery during construction and from hydrocarbon emissions from heavy machinery and other vehicles. Impacts of air emissions may be carried over long distances depending upon the wind speed, direction, temperature of the surrounding air and atmospheric stability.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- The Project site through which the alignment is proposed should be monitored through out to keep record of Air quality and any change in it.

- For dust control there should be sprinkling of water across different tacks.
- Vehicles should be maintained so that no hazardous emission enters into the air.
- Ensuring that trucks carrying aggregate fill materials are kept covered with canvas sheet to help contain constructions material being transported between sites.

Noise and Vibration:**Would the Noise and Vibration increase in the area? How will it disturbs the community?**

✓ Yes

No

Quality of Impact : Negative

Significance of Impact: Moderate Negative

Duration: Temporary

Description: Noise is one of the most serious environmental problems in the urban areas especially on the road side. Noise pollution will be due to increase in mobility and construction activity. Due to the movement of Heavy vehicles there would be excessive noise and vibration and it will disturb the community along the project alignment.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- There should be speed limit and bays and sign boards on the project site.
- To mitigate these impact noise barriers should be constructed in sensitive area such as populated areas, hospitals, and educational institutes.
- Provision of thick plantation for indigenous species of trees on available space along the road.

Water Resources (Surface and Ground Water)

Will there be any effect on water quality (Surface and ground water)? How much contamination of water is possible?

✓ Yes

No

Quality of Impact : Negative

Significance of Impact: Moderate Negative

Duration: Short term Impact

Description: The quality of the water may deteriorate in the area further. And during the deep excavation aquifer may get hit and quality water will be depleted. Because of preparation of material on site the leachate may be produced and percolate through the soil and reach water table and contaminate it and may be consumed by the local people.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- Protection of the ground water reserves from any source of contamination.
- Water required for construction should be obtained in such a manner that water availability to the local communities remains unaffected.
- Excavation should be done in supervision of the site engineer so he can notice up to which limit excavation should be done.

Change in Land use Pattern

Will the proposal change the current land use of the site, the appearance of the landscape or

adjoining land uses?

✓ Yes

No

Quality of Impact : Negative

Significance of Impact: Significant Impact

Duration: Permanent Impact

Description: Though there was already a road but now it would acquire additional land which was earlier used for the commercial, residential purpose. And excessive area is also acquired from the green Iqbal park. This was used by the public for sports purpose. But now the land use pattern would be permanently changed. There would be reduction in green space for public use.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- As the land is acquired from the public then there should be sufficient compensation to the people.
- The area of the existing circular road should be given for the purpose of green area.
- As public green space is reduced from the park then in the new heritage park access of people should be ensured.

Plantation should be done for compensating the green area.

Visual and Landscape Impact

Is there a historic pattern of monument/ archeological boundaries in the area surrounding area and would it affect the visual of the site?

✓ Yes

No

Quality of Impact : Negative

Significance of Impact: Profound Impact

Duration: Permanent Impact

Description: During construction the heavy machinery and other waste would affect the visual of the site. Moreover It has been explained by the expert that earlier when someone entered in Lahore he can see Minar-e-Pakistan first but now due to the construction of the bridges and flyover that cannot be seen. This is a permanent negative impact because now it is modified visually.

Measures and Mitigation:

- There is no such measure and mitigation for that.

Solid Waste

Will there be solid waste generation problem? How would it affect the quality of the project site?

✓ Yes

No

Quality of Impact : Negative

Significance of Impact: Moderate Impact

Duration: Temporary Impact

Description: During construction waste generation rate would be high because of these reasons:

- Construction material would be prepared on site, it also adds to generation of solid waste.
- Waste would be generated due to camp sites/ site offices.

This will result in unhygienic conditions, health risk to work force and general public at the camp site.

Measures and Mitigation: Impacts can be mitigated by adopting the following measures:

- It must be ensured that waste should not be dumped openly.
- Proper waste collection, storage, and disposal to the approved site should be ensured.
- Waste should be put in the waste containers.
- Waste will be disposed at designated sites and no waste will be disposed openly or in heaps form.
- Sanitary wastes generating from start and labor camps must be disposed of in environment friendly manners, i.e. provision of septic tank etc. for toilet wastes.

9 Environmental Management and Monitoring Plan

This chapter aims to address the measures which are needed to be adopted during every phase of the project to avoid any accident. Mitigation and measures are followed by monitoring of the project.

9.1 Implementation of Environmental Mitigation and Monitoring Plan (EMMP)

The following staff will be involved in the implementation of EMMP;

- Environmental Engineer from Environmental Supervision Consultant
- Site Environmental Engineer of the Contractor
- Representative from LDA

The contractor shall be made bound through contract documents to implement the suggested mitigation measures in the EMMP. The EMMP shall be included as a clause of the contract documents.

9.2 Roles and Responsibilities of the Functionaries involved in EMPP Implementation

9.2.1 LDA: Project Director

Project Director in LDA will have responsibility for assuring implementation of EMMP. This includes the following:

- Ensuring that the required environmental training is provided to the staff concerned;
- The Project Director will be responsible for carrying out visits to the construction sites to review the environmental performance of the contractors;
- Monitoring the progress of environment related activities; and
- Ensure that the construction contractor is implementing the suggested additional measures.

9.2.2 Supervision Consultant: Environmental Engineer

Environmental Engineer will oversee the performance of contractor through periodic monitoring to make sure that the contractor is carrying out the work in accordance with EMMP. The Environmental Engineer/Specialist will also provide assistance to the Contractor's Staff to implement EMMP.

9.2.3 Construction Contractor: Site Environmental Engineer

Site Environmental Engineer of Construction Contractor (CC) will carry out the implementation of the mitigation measures at construction site. Construction Contractor will be bound through contract documents to appoint the Site Environmental Engineer with relevant educational background and experience.

9.3 Reporting Mechanism

Progress reporting related to environmental activities will be the responsibility of the Environmental Engineer of Supervision Consultant. Environmental Engineer will also be responsible for submitting a monthly EMMP compliance report for the project to the EPD Punjab.

9.4 Non-Compliance of the EMMP

The implementation of the proposed EMMP involves inputs from various functionaries as discussed earlier. Contractor shall be primarily responsible for ensuring implementation of the mitigation measures proposed in the EMMP, which shall be part of the contract documents. The provision of the environmental mitigation cost shall be made in the total cost of project, for which contractor shall be paid on the basis of monthly compliance reports. However, if the contractor fails to comply with the implementation of EMMP and submission of the monthly compliance reports, deductions shall be made from the payments to the contractor claimed under the heads of environmental components.

Table 9.1 Environmental Mitigation and Monitoring Plan

Aspect	Mitigation Measure	Monitoring and Reporting Frequency	Party (ies) Responsible
1. Use of heavy Equipment and Machinery	<ul style="list-style-type: none"> - Minimize use of heavy machinery; - Set protocols for vehicle maintenance; and - Prevent fuel tank leaks by <ul style="list-style-type: none"> (a) monitoring and cross-checking fuel level deliveries and use, (b) checking pipes and joints for leaks, (c) tightening generator fuel lines, tanks - Heavy equipment should not be parked under the tree to avoid soil compaction and damage to the roots of the 	Provision for plantation in design. Daily basis	The site Environmental Engineer shall ensure these measures and Supervision Consultant will monitor the implementation

	<p>trees.</p> <ul style="list-style-type: none">- Filter shall be installed at the point sources (machinery or equipment) of air emissions and shall be replaced regularly;<ul style="list-style-type: none">- Emissions from power generators and construction machinery are important point sources at the construction sites. Proper maintenance and repair is needed to minimize the hazardous emissions.- Construction workers should be provided with masks for protection against the inhalation of dust; and <p>NEQS applicable to gaseous emissions generated by construction vehicles, equipment, and machinery should be enforced during construction works.</p>		
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| | <ul style="list-style-type: none">- Efforts should be made to accommodate the traffic along the road as far as practically possible;- Provision of signboards directing the drivers about the diversion.- Contractor staff could be trained and put on the duty to manage the traffic during the construction activities taking place along the road.- Max allowable speed for heavy machinery on the site should not exceed than 20 km/ hr. | | |
|--|---|--|--|

<p>2. Waste Management</p>	<ul style="list-style-type: none"> - Wastewater effluent from contractor's workshop and equipment washing yards would be passed through gravel/ sand beds to remove. - Oil / grease contaminants before discharging it into natural streams; - Training of working force in the storage and handling of materials and chemicals that can potentially cause soil contamination; - Solid waste generated during construction and camp sites will be safely disposed in demarcated waste 	<p>Odor, Littering, debris</p> <p>On daily basis</p>	<p>The site Environmental Engineer will ensure these measures and supervision consultant will monitor the implementation.</p>
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	<p>disposal sites and the contractor will provide a proper waste management plan;</p> <ul style="list-style-type: none">- Burning of waste will be prohibited- Proper labelling of containers, including the identification and quantity of the contents, hazard contact information etc.;- Training employees involved in the transportation of hazardous material regarding emergency procedures;- Providing the necessary means for emergency response on call 24 hours/day;		
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| | <ul style="list-style-type: none">- The sewage system for camps will be properly designed (pit latrines or, as required, septic tanks) to receive all sanitary wastewaters; and- Lined wash areas will be constructed at site, for the receipt of wash waters from construction machinery.- Protection of groundwater reserves from any source of contamination such as the construction and oily waste that will degrade its potable quality;- The solid waste will be disposed off in | | |
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	<p>designated landfill sites to sustain the water quality for domestic requirements;</p> <ul style="list-style-type: none">- Water required for construction is obtained in such a way that the water availability and supply to nearby communities remain unaffected;- Regular water quality monitoring according to determined sampling schedule;- Prohibit washing of machinery and vehicles in surface waters, provide sealed washing basins and collect wastewater in sedimentation/retention pond;		
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	<ul style="list-style-type: none"> - Take precautions construct temporary or permanent devices to prevent water pollution due to increased siltation; and - Wastes must be collected, stored and taken to approved disposal site 		
3. Construction Camps	<ul style="list-style-type: none"> - Explore off-site accommodation for workers. Keep camp size to a minimum; - Avoid as much clearing of vegetation as possible, for example, by creating defined foot paths; - Provide temporary sanitation on site, such as pit latrines (assuming the water table is low enough and soil and 	<ul style="list-style-type: none"> - Surface & ground water pollution and conflicts with the locals - At beginning of project 	<ul style="list-style-type: none"> - The site Environmental Engineer will ensure these measures and Supervision Consultant will monitor the implementation.

	<p>geology of appropriate composition);</p> <ul style="list-style-type: none">- Use local or regional labor;- Screen potential staffs for HIV and tuberculosis;- Provide education and enforce guidelines on contact with local residents;- Set guidelines prohibiting poaching and collection of plants; and- Provide adequate quantities and good quality of food and cooking fuel- If the water is stored for drinking purpose, drinking water should meet the WHO standards and if it is used for construction purpose then it		
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	<p>should be clearly demarcated.</p> <p>- No domestic pets or livestock are allowed on the site.</p>		
<p>4. Material handling, use and storage</p>	<p>- Material shall be appropriately secured to ensure safe passage between the destinations during transportation.</p> <p>- Loads shall have appropriate cover to prevent spillage and contractor is responsible for any clean up resulting from failure;</p> <p>- Material from borrow site should be directly transported and deposited to the site where it has to be used. Stockpiles should be positioned and sloped to create least visual impact.</p>	<p>- Dust pollution and sedimentation loading suitable conditions.</p> <p>- Monthly in dry season and weekly in wet season</p>	<p>- The site Environmental Engineer will ensure these measures and supervision consultant will monitor</p>

	<p>No foreign material generated or deposited should remain on the site after completion of the activity and the areas affected by stockpiling should be reinstated.</p> <ul style="list-style-type: none">- Over spray of bitumen products outside the road surface on the road vegetation should be prevented;- Store gravel in a way that will keep it wet, for instance, covered with plastic sheeting- Used empty cement bags should be collected and stored to deliver these to recycling plant;- Contaminated water storage facilities should not be allowed to over flow and appropriate protection from		
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	<p>rain should be implemented.</p> <ul style="list-style-type: none">- Prevent dumping of hazardous materials specially near the archeological sites and Budda Ravi Nullah;- Burn waste oil that is not Readily reusable or recyclable; do not contain heavy metals; and are flammable. Investigate and use less toxic alternative products; <p>Prohibit use of waste oil as cooking fuel</p> <p>Training employees involved in the transportation of hazardous material regarding emergency procedures.</p>		
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<p>5. Material extraction: quarrying</p>	<ul style="list-style-type: none"> - Identify the most environmentally sound source of materials that is within budget; - Use material from local road cuts first, but only if it produces a suitable, durable aggregate for embankment fill or surface stabilization material; - On removal of material, the area should be restored and be treated with erosion control measures; - Follow quarrying, and borrowing plans that take into account cumulative effects; - Take photos of site before initiating excavation so restoration can match original site characteristics as much as practically possible. Restore 	<ul style="list-style-type: none"> -Change in landscape and creation of water ponds. -At project commencement - At 50% completion - At 100 % completion 	<ul style="list-style-type: none"> - The site Environmental Engineer will ensure these measures and Supervision Consultant will monitor

	<p>site quarries and gravel pits so that they are not visible to the road users;</p> <ul style="list-style-type: none">- Top soil fertile layer stockpiles shall be convex and not more than 2 meter high. Stockpile should be shaped so that no surface water ponding can take place. Stockpiles should be protected from erosion by wind or rain by providing the cut off drains; it should not be covered with materials like plastic that would lead to start of composting process and kill the seed bank. Stockpile should not be compacted and pushed by bulldozer for more than 50 meter.- Monitor adherence to plans to manage impacts of extraction and modify as necessary;		
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	<ul style="list-style-type: none"> - Restore area so it is suitable for sustainable use after extraction is completed; - Install drainage structures to direct water away from pit; - Implement safety protocols to minimize risks from falling rock or debris, collapsing quarry walls, or accidental falls - Discuss with local community the option of retaining quarry pits as water collection ponds for cattle, crops, or similar uses. 		
6. Site clearing or leveling	<ul style="list-style-type: none"> - Minimize disturbance of native flora during construction; - Minimize the amount of clearing. Clear small areas for active work; - Avoid use of herbicides. Any use should follow health and 	<ul style="list-style-type: none"> - Loss of vegetation, soil erosion & stability, surface water pollution and occupational health of workers and community 	<ul style="list-style-type: none"> - The site Environmental Engineer will ensure these measures and Supervision Consultant will monitor

	<p>safety procedures to protect people and the environment;</p> <ul style="list-style-type: none">- Herbicides should be used according to manufacturer specifications;- Clear without destroying large plants and turf where possible and preserve for replanting in temporary nurseries;- Move earth and vegetation only during dry periods. Store topsoil for respreading. If vegetation must be removed during wet periods, disturb ground only just before actual construction;- Use erosion control measures such as hay bales, berms, straw, or fabric barriers;- Re-vegetate with recovered plants and other appropriate	- weekly	
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	local flora immediately after equipment is removed from a section of the site;		
7. Excavation	<p>Place fence around excavation;</p> <ul style="list-style-type: none"> - Investigate shallow excavation and 'no excavation' alternatives; <p>Ensure excavation is accompanied by well-engineered drainage;</p> <ul style="list-style-type: none"> - Excavations shall be carried out carefully to avoid - Damaging infrastructure in the surroundings of the 	<p>Oil erosion & stability and surface water contamination.</p> <ul style="list-style-type: none"> - Weekly 	<ul style="list-style-type: none"> - The site Environmental Engineer will ensure these measures and Supervision Consultant will monitor.

	<p>project area.</p> <ul style="list-style-type: none"> - All excavation work will be sprinkled with water to control dust. 		
8. Operation of Concrete batching plant	<ul style="list-style-type: none"> - Concrete mixing on the ground shall not be allowed; and - All runoff from batching plant should be strictly controlled and cement-contaminated water should be collected, stored, and disposed off at the designated site. 	<ul style="list-style-type: none"> - Air ground and surface water pollution - On daily basis 	<ul style="list-style-type: none"> - The site Environmental Engineer will ensure these measures and Supervision Consultant will monitor

Table 9.2 Operation and Maintenance Phase

Aspect	Mitigation Measure	Monitoring and Reporting Frequency	Party (ies) Responsible
1. Traffic Flux	<p>ehicles with excessive noise should be prohibited to travel on the road;</p> <p>ublic should be educated about the noise and air pollution and how to keep the road clean.</p>	<p>Visual inspection</p> <p>Daily basis</p>	<p>LDA/ TEPA</p> <p>Traffic police</p>
2. Maintenance of Landscape	<p>- Regular watering fertilization of the planted trees</p> <p>Spraying of pesticides as/when required.</p>	<p>Visual inspection</p> <p>Monthly</p>	<p>LDA</p>

Table 9.3 Environmental Monitoring During Construction and Operation Phase

Components	Parameters	No. of Samples (Samples x Frequency)	Frequency	Responsibility	Duration
Construction Phase					
Air Quality	CO, NO _x , SO _x , PM ₁₀	1x2=2	Every three months	EE Of CC and SC	24 hours
Surface Water Quality	Total Coliforms, Fecal E. Coli, Total Colonial Count, Fecal Enterococci, pH, TDS, Total Hardness,	1x2=2	Every three months	EE of CC and SC	
Ground Water Quality	PH, Dissolved Oxygen, TSS, TDS, Alkalinity, BOD ₅ COD, Turbidity	2x2=4	- Every three months at camp	EE of CC and SC	

Noise Level		2x2=4	Every three months	EE of CC and SC	24 hours
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Operation Phase					
Air Quality	CO, NO _x , SO _x , PM ₁₀	2x2=4	Biannually	LDA	24 hours
Ground Water Quality	Total Coliforms, Fecal E. Coli, Total Colonial Count, Fecal Enterococci, pH, TDS, Total Hardness, Nitrate, Chloride, Sodium	2x2=4	Biannually	LDA	
Surface Water Quality	Dissolved Oxygen, TSS, Alkalinity, BOD ₅ , COD, Turbidity	2x2=4	Biannually	LDA	
Noise Level	-	2x2=4	Biannually	LDA	24 hours

10 CONCLUSIONS AND RECOMMENDATIONS

10.1 Summary of the Issues identified

The environmental impact assessment through holistic approach identifies the following problems:

Land acquisition, land use impacts, impact on ecology of the area, human health, community and the economic activity, cultural heritage, aesthetic and landscape, geology, soils, air and noise quality, water quality, flora and fauna.

10.2 Conclusions

The EIA conducted in historical and political context through a holistic approach gave us a chance to learn the mechanism in depth. It explained all those hidden processes through which stakeholders are deliberately kept out of the process. Uncertainty is the central part of EIA. The value of EIA may not singularly lie in its prescient limits (or need thereof), yet in its part as a system for pushing practical improvement and social learning. We are not against the development process but it should be clear that we have to take the right path for development otherwise the impacts may lead us to the damage of the ecosystems and environment.

It's always been mentioned that EIA provides the job opportunity to the locals of the area. But no one has questioned the sort of jobs and to whom exactly? Through our case study we came across this finding that it provides menial jobs mostly but it's a myth that jobs would be provided to the locals. The contractors hired labor force from somewhere else not from the area. Secondly government doesn't take people in confidence and involves them in the process of development in the light of the fact that it was bias even when the effort was apparently made to resolve the issues

Though the legal framework for EIA is considered strong yet the laws must benefit the society particularly for the development of individuals. State should perform its role for a transparent law and also practice the fair implementation of it because Land Acquisition Act 1894 does not favor the society or environment. It's only development oriented.

It should be ensured that decision making is done at every level. From the project plan to its operational phase all the stakeholders should be consulted on equal footing and proper discussions should be held with every representative of the society.

The public participation was very poor and weak. Government should improve the consultation process. For the improvement of public participation it should be arranged on the spot so that everyone can participate in it.

Conclusions in a nut shell

The major findings from this research can be explained in a nutshell through a table such as:

Aspects of EIA	Remarks
EIA process	<p>EIA process has some flaws in it which need to be improved.</p> <ul style="list-style-type: none"> • EIA reports are superficial and short term and basically are focused on direct and short term issues and neglect the long term and indirect issues. • Public participation is weak and people are deliberately kept out of the process to avoid conflict. • In public hearing there are no genuine stakeholders. People of concerned area are misinformed or either not informed about the public hearing. • No opportunity is provided to the stakeholders to raise

	<p>their concerns and they cannot influence the decision making at any stage.</p> <ul style="list-style-type: none"> • Job opportunity is also not provided to the locals of the area as the contractor hired the labor force from somewhere else. • The whole process is authoritative and bureaucratic. • Political factors are the main driving force behind the EIA process and every decision had already been made.
<p style="text-align: center;">EIA laws and legal requirement</p>	<ul style="list-style-type: none"> • The major loophole in the laws is the “LAND ACQUISITION ACT, 1894” of colonial times which negates the public interest and advocate the development without considering environment and the Public concern. • The Land Acquisition Act is limited to a cash compensation policy for the acquisition of land and built-up property, and damage to other assets such as crops, trees, infrastructure, etc. • The Land Acquisition Act does not take into account the rehabilitation and resettlement of displaced populations and the restoration of their livelihoods. • Land laws are anti-citizen, undemocratic and reveal the legacy of colonial times.
<p style="text-align: center;"><u>Environmental Concerns</u></p> <p>i. Air pollution</p> <p>ii. Noise Pollution</p> <p>iii. Green Area</p>	<ul style="list-style-type: none"> • Air pollution in the area is reduced as per claims of the government. • Noise pollution is reduced in the area and there is less traffic congestion. • Green area has been reduced, because 178 kannals of the area have been acquired from the Iqbal Park. The claim to rehabilitate the existing circular road as a green belt is not yet fulfilled.

Compensations	<p>Out of all the problems compensation is one of the major issues. People were not satisfied with the procedure adopted for land acquisition and compensation. They mentioned that the compensation offered is based on average price of transaction carried out in the concerned area over particular period of time.</p> <ul style="list-style-type: none">• There is no timeframe for payment and compensation• No efforts to rehabilitate the displaced.• No clarity on what is public interest.• “Government has unilateral powers to act as both judge and jury and decide to whom it can award or deny land.”
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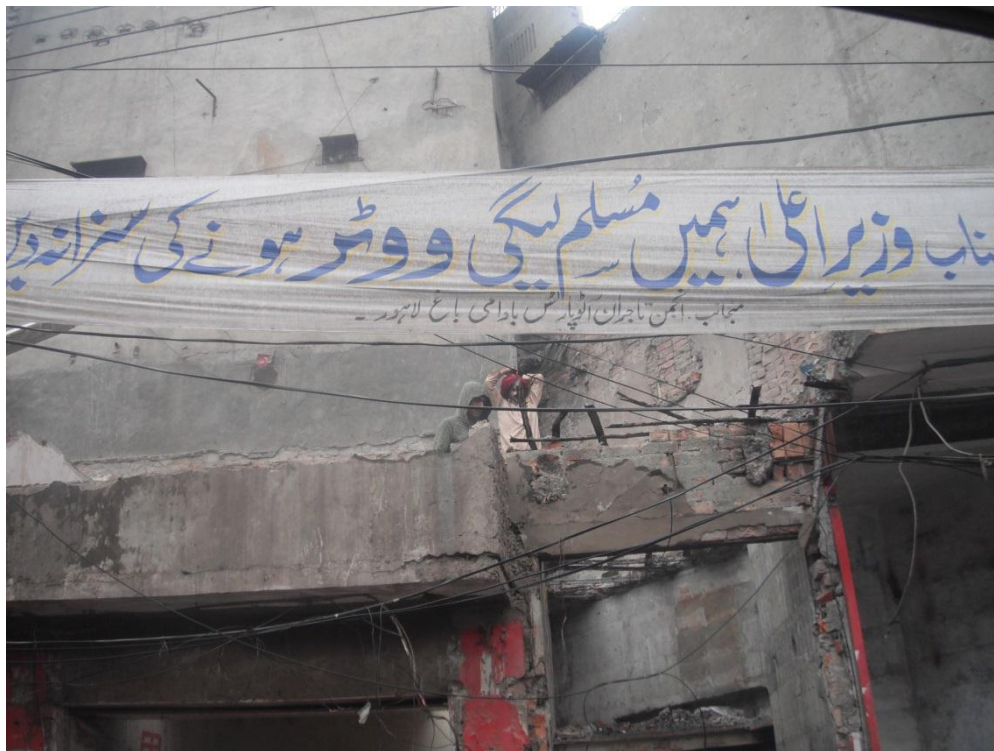
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12 APPENDIX



Impact of Construction Work on Historical Landmarks



Protest by locals against the Project



During Public Consultation



During Construction Phase of the Project



Speculation as an Impact of Development (Above) Site Office (Below)



Azadi Chowk Before and After the Project

Compensation Details

ASSESSMENT OF STRUCTURE				
Sr. #	Property no.	Name of Owners/Occupants	Unit Name	Structure Amount (Rs)
1	Property no: 1	Iftikhar Ahmad S/o Jalal Din	Z.A Autos	539,429
2	Property no: 2	Sakhi Nesaar S/o Nesaar Ahmad	K.M Traders	338,338
3	Property no: 3	Naeem Razaaq S/o Abdul Razzaq	Naeem Autos	398,169
4	Property no: 4	Sohaib Butt S/o Muhammad Azam	Auto Part Shop	380,211
5	Property no: 5	Fawad Ahmad S/o Muhamamd Amin	Indus Autos	297,889
6	Property no: 6	Muhammad Afzal S/o Muhammad Arif	Afzaal Autos	280,378
7	Property no: 11-A	Qaiser Mahmud S/o Muhammad Ishaq	Lucky Tyres	280,477
8	Property no: 11-B	Muhammad Imtiaz S/o Manzoor Ahmad	1st Floor Lucky Tyres	165,362
9	Property no: 11-C	Muhammad Imtiaz S/o Manzoor Ahmad	2nd Floor Lucky Tyres	173,767
10	Property no: 12	Qaiser Ishaq S/o Muhammad Ishaq	Prince Battery	437,792
11	Property no: 13-A	Junaid Tariq S/o Tariq Mahmud	Super Tyres	187,077
12	Property no: 13-B	Qaiser Ishaq S/o Muhammad Ishaq	1st Floor Super Tyres	211,328
13	Property no: 13-C	Bimono Food Industry	2nd Floor	222,067
14	Property no: 14	Muhamad Imtiaz S/o Manzoor Ahmad	Sozo Motors	478,304
15	Property no: 15-A	Abdul Manan	NTN Shop	245,826
16	Property no: 15-B	Abdul Ghaffar	Heavy Trailor Center	263,358
17	Property no: 15-C	Abdul Rab	Auto Shop	2,829,383
18	Property no: 18/I	Farhan Ali	Tea Stall	53,319
19	Property no: 18/II	Farhan Ali	Gas Cylinder Shop	36,792
20	Property no: 18/III	Muhammad Khaliq S/o Tajdin	Shop	38,544
21	Property no: 18/IV	Muhammad Ayub S/o Muhammad Yaqub	Shop	38,544
22	Property no: 18/V	Muhammad Naeem S/o Mansoor Khan	Shop	59,567
23	Property no: 18-A	Shahid S/o Muhammad Umair	First Floor	135,502
24	Property no: 22	Mian Shafi S/o Karim Bakash	China Peter House	627,666
25	Property no: 23	Mukhtar Ahmad, Mushtaq Ahmad, Khalid Mahmud and Zahid Mukhtar	Hafiz Autos	2,712,032
26	Property no: 24	Muhammad Aslam, Muhammad Ramzan, Muhammad Arif S/o Akram Ali	Mughal Autos	2,767,002
27	Property no: 26	Khaliq Khan S/o Abdul Qadeer Khan	Qadeer Paints	180,994
28	Property no: 27	Mian Naveed S/o Mian Yousaf	Mian Tractors	155,916
29	Property no: 44	Athar Ahsan S/o Sheikh Ihsan ul Haq	Moman Tyres	1,575,467

30	Property no: 42	Hafiz Tahir	Javaid Brothers	1,463,425
31	Property no: 40	Riaz Mahmud	Riaz Tyres	747,920
32	Property no: 39	Azeem Basti	Lahore Tyres	586,138
33	Property no: 37	Unknown	Poly Tyres	471,546
34	Property no: 38	Noor Jahan Banu	Residence	85,503
35	Property no: 28 & 28/ii	Mushtaq Ahmad S/o Mukhtar Ahmad	Mukhtar Autos	8,780,794
36	Property no: 32	Sheikh Waseem	Zahid Gas Point	101,163
37	Property no: 33	Sheikh Waseem	Rana Battery	132,043
38	Property no: 31	Sheikh Waseem	Rana Riaz Mazda	69,217
39	Property no: 30-A	Sheikh Waseem	Chaman Autos	381,499
40	Property no: 31-B	Sheikh Waseem	New Zahid Sons	319,890
41	Property no: 57	MCL	Total Pump	2,879,430
42	Property no: 56	MCL	Shell Pump	1,262,663
43	Property no: 55	MCL	PSO Pump	1,417,295
44	Property no: 50	Qadri Brothers	Qadbro Factory	400,199
45	Property no: 25	Zahid Munir S/o Muhamamd Munir	Zahid Battery	75,845
46	Property no: 43	Mian Afzal Ahmad S/o Sajjad Afzal	Sajjad Traders	906,759
47	Property no: 41-A	Hashim Rasheed S/o Muhammad Rasheed	Subhan Tyres	503,571
48	Property no: 41-B	Nazim Rasheed S/o Muhammad Rasheed	Subhan Tyres 1st Floor	290,633
49	Property no: 36	Farman Ali S/o Muhammad Bashir	Residential	420,113
50	Property no: 60	Rang Ali	Residential	365,897
51	Property no: 61	Rang Ali	Residential	931,809

Source: TEPA